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RESEARCHING THE IMPACT OF COVID -19 ON DIGITAL ECONOMY - DIGITAL SOCIETY IN VIETNAM

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Nguyen Tat Thanh University

1. THE URGENCY OF THE TOPIC

The outbreak of Covid-19 epidemic has brought great and unprecedented challenges, significantly impacting the development of Vietnam's economy over the years. It causes the break of the sequence of traditional economic activities, but it is also a "lever" for the parallel development of the digital economy, making an important contribution to the formation of "digital society" in Vietnam.

According to the general definition of the digital economic collaboration group of Oxford, the digital economy is "an economy operating mainly based on digital technology, especially electronic transactions conducted via the Internet". Digital economy is present in all areas of the economy such as industry, agriculture and services; Production, distribution, circulation of goods, transportation, logistics, banking and finance ...

Digital economic development is considered by many countries as an indispensable trend of the Industrial Revolution 4.0. In recent years, Vietnam's digital economy has thrive in both infrastructure and business market. The Internet has become an essential part of trade and service industries such as banking, transportation, health ... Vietnam is considered as one of the 20 countries with the most internet use in the world with 68.17 million. Users (accounting for 70% of the population).

For these reasons, the author decided to choose "Researching the impact of Covid - 19 to digital economy - digital society in Vietnam" as his topic. This topic focuses on clarifying the influence of Covid-19 on the specific group of Vietnamese people, especially the most important aspects associated with digital economy - digital society. With the title of the topic that clearly defines the purpose, tasks, scope of research, the author will use the data processing results collected from investigations, field surveys and specialized research results and. Interdisciplinary relevant to try to solve research problems.

2. PURPOSE AND TASK OF RESEARCH

2.1. Purpose

Clarify the influence of Covid-19 on digital economy - digital society in Vietnam, thereby making some recommendations to improve the advantages and limit the shortcomings of the research problem.

2.2. Mission

Describe the situation of applying digital economy, transformation to digital society of Vietnamese people.

Researching the impact of Covid-19 on digital economy - digital society in Vietnam.

Draw a number of proposals and recommendations to help promote positive effects and limit the negative effects of digital economy - digital society in Vietnam.

3. SUBJECTS, OBJECTS, SCOPE OF RESEARCH

3.1. Research subject

The influence of Covid-19 on Digital Economy - Digital Society in Vietnam.

3.2. Research objects

Vietnamese people.

4. RESEARCH SCOPE

4.1. Scope of content:

Research focusing on describing the situation of application of digital economy - digital society in Vietnam.

4.2. Research question

How does the application of digital economy affect the traditional economy in Vietnam?

How does the conversion into digital society affect the lives of Vietnamese people?

How does Covid-19 epidemic affect the application of digital economy - digital society in Vietnam?

4.3. Research hypothesis

In general, digital economy - digital society affects the traditional economy as well as the general development of Vietnam, especially changing many basic aspects in the life of Vietnamese people. Vietnamese people use the Internet most in the fields of life, especially increasing during the Covid-19 period.

After controlling the outbreak of Covid-19 epidemic, people realized the convenience of digitizing the basic aspects of life and continuing to maintain that change. Although the negative pancreas of the use of the Internet in particular and digitization in general in people's lives still exist and need to be concerned.

5. RESEARCH CONTENT

Digital economic development is considered by many countries as an indispensable trend of the Industrial Revolution 4.0. In recent years, Vietnam's digital economy has thrive in both infrastructure and business market. The Internet has become an essential part of trade and service industries such as banking, transportation, health ... Vietnam is considered as one of the 20 countries with the most internet use in the world with 68.17 million users (accounting for 70% of the population).

According to the report "Southeast Asia's digital economy 2020", Vietnam's digital economic growth rate always grew at two numbers, leading the region (along with Indonesia) with an average growth rate of 27 % in the period 2015-2020. In 2020, in

the context of general decline of global and regional economy, Vietnam's digital economic growth is still 16% - the highest in ASEAN.

The scale of the digital economy in Vietnam from US \$3 billion in 2015 increased to US \$12 billion in 2019 and US \$14 billion in 2020. It is expected that by 2025 to break through 52 billion USD. In particular, e-commerce, one of the most important components of Vietnam's digital economy, has contributed significantly to promoting economic growth in Vietnam. According to the e-commerce report in 2020, B2C e-commerce revenue growth in the period of 2015-2019 is always in two numbers with an average growth rate of the whole period of 25.4%, the scale of revenue in 2019 in 2019 increased by 2.5 times compared to 2015.

In recent years, there have been many digital economic models that have been very developed in Vietnam, with many applications that can be installed on smartphones, helping users can call car, delivery, booking, booking tickets Aircraft, food booking, renting rooms, hiring tutors, hiring maids, hiring services for repairing equipment in the family ... even users can connect a home health care doctor at home.

Vietnam has developed many online methods in operating, working, training of management agencies, businesses, schools Currently, the most popular among businesses is digital in storage Store and process data from production to bringing products to the market. Vietnam's 5G network is also experimenting, expected to start in 2021. In Vietnam, the medium Internet service rates, fixed broadband Internet service charges at the lowest level in the region Asia Pacific.

Along with e-commerce, non-cash economic transactions are growing in Vietnam, creating opportunities for businesses to promptly grasp and apply the tools of digital economy as well as the implementation process. The e-government was implemented faster and more drastically.

In particular, besides the negative impacts, Covid-19 epidemic has partly promoted the digital economic development process faster in both infrastructure and telecommunications, information technology and e-commerce. Online trading and non-cash purchase transactions have increased sharply in the outbreaks, thereby forming a new habit for consumers, and promoting digital economic development. According to data from the payment case (State Bank), quarter of I-2021, trading via the Internet channel reached 156.2 million dishes with a value of 8.1 million billion dong, up 28.4% in value compared to In the same period by 2020; Transactions via mobile phone channels reached 395.05 million dishes with a value of more than 4.6 million billion dong, up 103% in value; QR Code channel reaches 5.3 million dishes with a value of 4,479 billion dong, up 146%...

With a population of nearly 100 million people, Vietnam is considered as one of the countries with digital economic growth rate at ASEAN region. The Government of Vietnam also clearly shows the determination, orientation and efforts to act strongly in promoting digital economic development. The Ministry of Information and Communications said that Vietnam has great opportunities for digital economic development. For the first time in history, Vietnam is accompanying the world in the

fourth industrial revolution, the revolution of digital transformation and we have a great opportunity to break through and rise. Along with that, Vietnam is a large market, potential for new business models, with a large population, in the period of gold population structure, with a large number of labor force, with the number of internet users. And big and rapid smartphones will create attractive markets for the digital economy. Vietnam is also located in the center of Southeast Asia, Asia, the region is considered to be the center of digital technology and global digital economic development. In particular, Covid-19 is a global disaster but also a hundred-year-old nudity for digital transformation, digital economic development ...

However, the digital economic development in Vietnam is also facing many difficulties. It is an imbalance between fields and regions; Legal issues, network security and the guarantee of user privacy. In addition, awareness, habits and quality of human resources in Vietnam are not "really ready" for the digital economy. The annual Vietnam Economic Report was published by the Institute for Economic and Policy Research (VEPR), University of Economics, Hanoi National University, which shows up to 85% of Vietnamese industrial enterprises at the end of May 2019. Nam is still outside the digital economy, only 13% at the level of beginning.

6. CONCLUSION

Thus, with the transition from the traditional economy to digitizing the basic fields in life, it has brought many advantages for everyone in the context of "social isolation" in the years of Covid-19 epidemic years. explode. Currently, most people have adapted to this "digitization". In the future, this digitization is expected to continue to grow dramatically and make Vietnam a country with great competitiveness of businesses and the economy.

RECOGNIZING COVID-19 BY USING LATENT FEATURES IN COUGHS

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SUMMARY:

Cough sound is one of the top symptoms related to respiratory diseases, the characteristics of cough sound indicate disease status or signs of infection. Consequently, cough-based research is an effective solution to give the diagnosis of respiratory diseases. Lately, COVID-19 - a contagiously respiratory infectious disease has spread to most countries and territories around the world bringing many negative influences on life, health, and economy. This leads to the need for research on measures to support disease prevention and control. Applying Deep Learning techniques (DL) and Artificial Intelligence (AI) based on cough sound data could result in many positive insights to connect the industry 4.0 techniques in order to solve the decade's disease. Motivated by these things, this paper presents a support system for screening COVID-19 patients based on cough sound data consisting of two components Cough Detection and COVID-19 Cough Recognition, with the main proposal being not only the use of metadata features and acoustic cough features such as Mel-spectrogram and variant Mel frequency cepstral coefficients (MFCC) to develop DL solutions in parallel but also the Cough Segmentation, Cough Concatenation methods as data processing techniques, MobileNet - 1d Convolutional neural network - Long short-term memory (MobileNet - 1d CNN-LSTM) as Hybrid Deep Learning model for the COVID-19 Cough Recognition methodology and the combination of 1d-CNN and 2d-CNN as a methodology for Cough Detection module. Besides, Machine Learning (ML) approaches are implemented to bring out more insights for the research. The AUC-ROC scores of 0.9687 and 0.8666 are the best achievement of the Cough Detection solution, COVID-19 Cough Recognition with the proposed Hybrid approach respectively on the dataset of ESC-50 [1], Coswara [2], and COUGHVID [3]. In addition, analysis and comments on the achieved results are provided in this research for better explanation.

KEYWORDS:

Cough detection, COVID-19 cough recognition, Cough segmentation, MFCC, Mel-spectrogram.

1. PROPOSAL AND RESEARCH CONTRIBUTIONS:

1.1. Proposals:

COVID-19 is an infection caused by coronavirus and also called SARS-CoV-2. World Health Organization (WHO) made a statement that COVID-19 is a pandemic in March 2020 after the first case was recorded in Wuhan, in December 2019. Until now, COVID-19 has been spread out to almost every nation and territory around the

world with an enormous quantity of cases and deaths. The breakout of the SARS-CoV-2 pandemic has been witnessing complex and unpredictable occurrences impacting the global society and economy desperately. Ironically, wealthy and prosperous countries undergo the same situation that the COVID pandemic rises rapidly, and this contagious disease evolves into many sorts of dangerous variants including Beta, Gamma, Delta, and Omicron. Basically, COVID-19 prevention and limitation solutions are simultaneously distancing residents and curing infected patients. With the aim of early detection of COVID-19 patients, a plentiful number of large countries, as well as small areas all over the world, employ directly antibody tests, antigens, and RT-PCR before isolating COVID-19-infected individuals. However, this measure increases the COVID-19 infection rate due to the exposure of other people in the test areas. Further to this, those experiments cost a huge amount of money and time to implement in large residential settings. Consequently, gathering all of the aforementioned circumstances, we need a method ensuring time-saving aspects, cost reduction, social distancing, and implementation at ease.

COVID-19 is able to directly influence patients' respiratory systems. Therefore, one of the easiest ways to recognize COVID patients can be based on their coughs which have various shapes due to their background diseases as well as physical health. Thus, cough is a vital key for applying classification techniques and solutions and particularly audio signal processing to find out effective COVID-19 screening choice developed by an excellent AI platform. Acoustic classification is also called audio records analysis. Specifically, audio classification has many promising applications in AI and data science such as automatic voice translation, virtual assistant, music genre classification, and cough recognition and diagnosis in medical areas. Prominently enough, cough is considered one of the most essential and powerful aspects of diagnosing respiratory-related illnesses. Enforced and inspired by the above momentum, AI and Machine Learning continue to use cough sound as a precious resource to build tools for picking out diseases in the context of global COVID-19 spread.

We present a research process of cough sound and recommend a cough audio classification system for COVID-19 recognition. Based on Deep Learning and Artificial Intelligence platform, our study attempts to answer the question that whether an audio recording contains cough sounds of a COVID-19 patient or not. There are two tasks in this study including cough sound detection and COVID-19 coughs classification. In this research, we primarily employ Machine Learning and Deep Learning models for both tasks and show the experimental results of each model's performance. With the intents and purposes of implementing and comparing among many ML and DL models, we return a process to construct a COVID-19 cough diagnosing tool which is capable of being attached to smart devices and assisting disease screening at a distance. In summary, our study enhances the reliability of a new approaching way applying state-of-the-art models by using two classification components where the first component is to point out whether the record is a cough sound or not and the second one is to pinpoint the COVID-19 samples. In addition, with signal features extracted from cough recordings, we

exploit the power of other data fields in metadata to optimize model learning effectiveness. Especially, MobileNet, a high-durable-performance model, is another element that we use in the comparison among baselines because it is easy to embed in mobile devices such as smartphones. This makes the research approachable in the community to overcome the pandemic instead of stopping at a study on paper.

1.2. Research Contributions:

Through the process of surveying previous studies, we conclude their advantages and disadvantages, consequently, we accept useful solutions and insights from previous studies as well as work on the disadvantages to propose the most applicable solution for the problem of recognizing COVID-19 through coughs. It is the use of metadata information obtained from the datasets provided in Coswara and COUGHVID along with the Hybrid model.

We find that building a system with two components Cough Detection and COVID-19 Cough Recognition helps to optimize the diagnosis quality of the classification models which leads to improving the reliability of the solutions' results. In this research, we conduct two separate studies for two different problems: Cough Detection and COVID-19 Cough Recognition before combining them to provide the best solution.

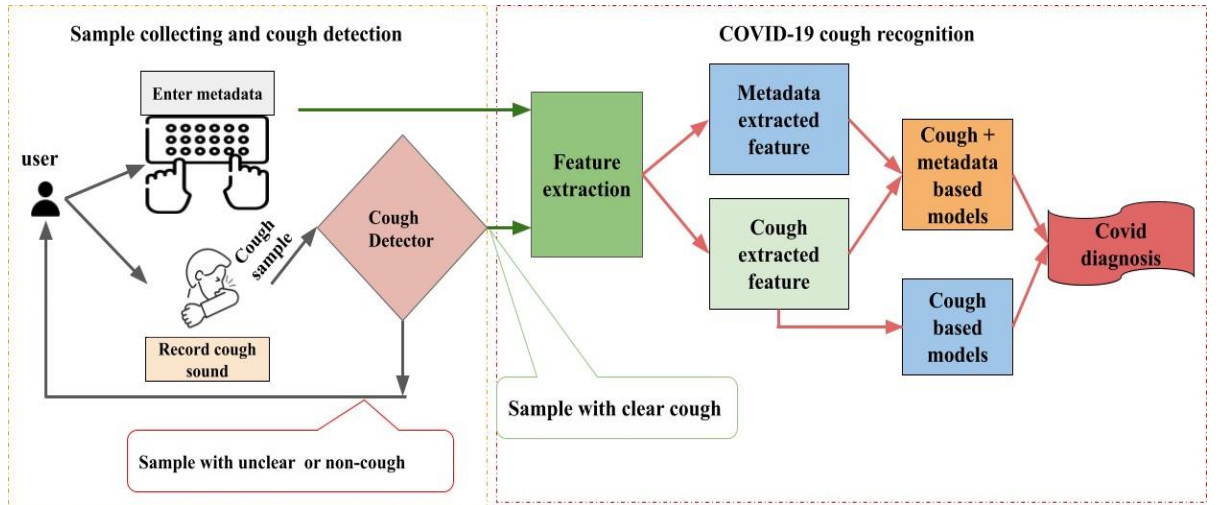


Figure 1.1: The architecture of the proposed system of Cough Detection and COVID-19 Cough Recognition.

Regarding solutions for building a COVID-19 identification model, it is necessary to build a reliable and powerful performance model with the capability of integrating on mobile devices in order to widely serve the solution to the community to help screen the COVID-19 affected people from distance. Therefore, we recommend using MobileNet [4] to build a COVID-19 Cough Recognition model. As far as we know, the use of features from metadata has been tested in previous studies that focus on experiments on metadata + 1-d acoustic features and DL models have not

been explored much.

Subsequently, in this study, we propose to use the following techniques and solutions:

- (1) Data Preprocessing and Feature Extraction techniques such as Cough Segmentation and Cough Concatenation.
- (2) Using a Hybrid model with metadata input + 2-d acoustic features.
- (3) And 1-d acoustic features with 1-d featured processing techniques such as Standard scaler and SMOTE for ML models

2. RESEARCH METHODOLOGY:

2.1. Proposed data preprocessing

Cough segmentation After observing data in both Coswara and COUGHVID datasets, we realize that cough audios contain many low-energy or noisy intervals as a gap between two times of cough as depicted in Fig. 2.1. Therefore, separating cough audios into each chunk of cough helps improve the training dataset's quality and simultaneously eliminate noisy gaps. We exploit pydub API [5] to implement audio segmentation into chunks of coughs. We also experiment with a variety of different parameters on Coswara and COUGHVID, then observe generated chunks to choose the most optimized group of parameters.

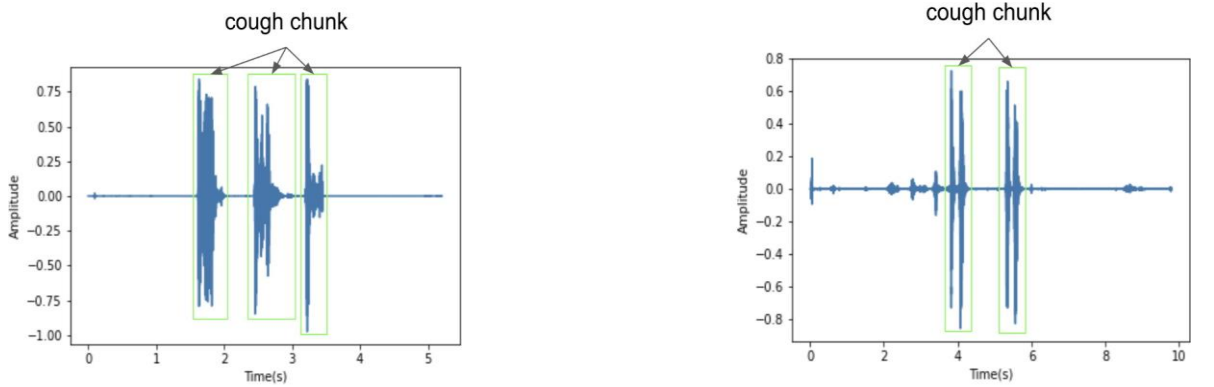


Figure 2.1: Cough audio sound from Coswara and COUGHVID.

By using pydub API, we have the set of parameters including `min_silence_len = 100`, `silence_thresh = -30`. Empty sound will be added to the cough chunk in order to make sure that chunk duration belongs to the range of 1 – 1.3 seconds. Throughout the experimental process and observation, we recommend a feature extraction system illustrated in Fig. 2.2.

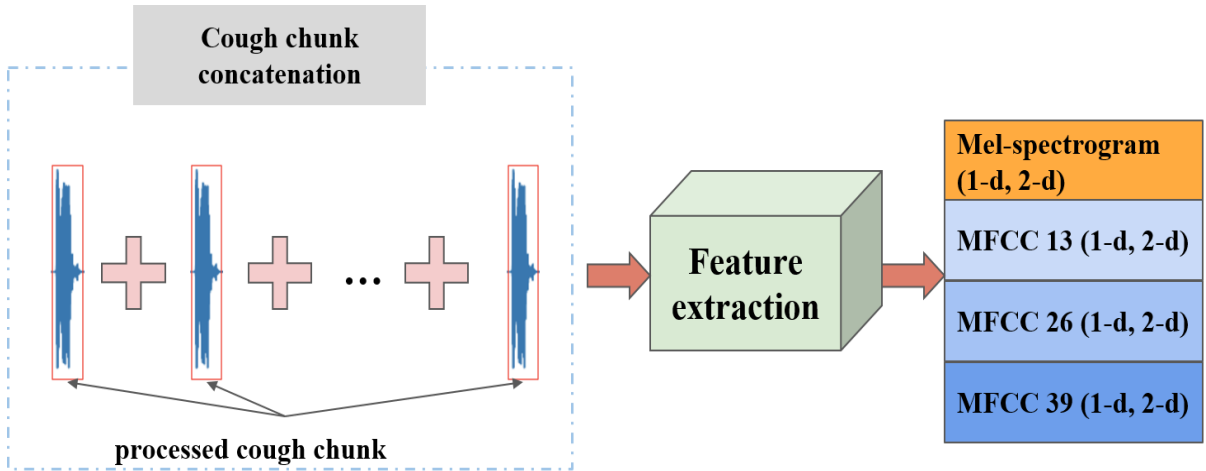


Figure 2.2: Cough chunk concatenation and feature extraction procedure.

Applying the segmentation technique helps enhance the number of available data and filter a fraction of noisy coughs. Here are the sizes of the two aforementioned datasets before and after segmentation: the number of Coswara recordings increases from 4,465 cough audios to 22,878 cough chunks, and the figure for COUGHVID rises from 20,072 cough audios to 84,981 cough chunks.

Moreover, we design experiments on different feature processing techniques such as Standard scaler and SMOTE in order to make a comparison between using original features extracted from the datasets and employing processed features for the COVID-19 coughs recognition issue.

2.2. Proposed model architecture

Regarding the Cough Detection component, after training ML and DL models as well as evaluating their results, we recommend our highest-score model which is the combination of convolution neural network (CNN) 1-d and 2-d. In particular, Mel Frequency Cepstral Coefficient (MFCC) and Mel-spectrogram, which are cough sound features, are handled by 1-d CNN and 2-d CNN respectively. We desire to boost the performance of Cough Detection models, therefore, we make an attempt to join two CNN models. With the idea of the ensemble network model from Virufy (a COVID-19 binary classification model based on cough sounds), we made the corrections to a suitable use for our data. Specifically, we only use 2 network layers for MFCC and Mel-spectrogram input instead of 3 layers. The model is described in Fig. 2.3.

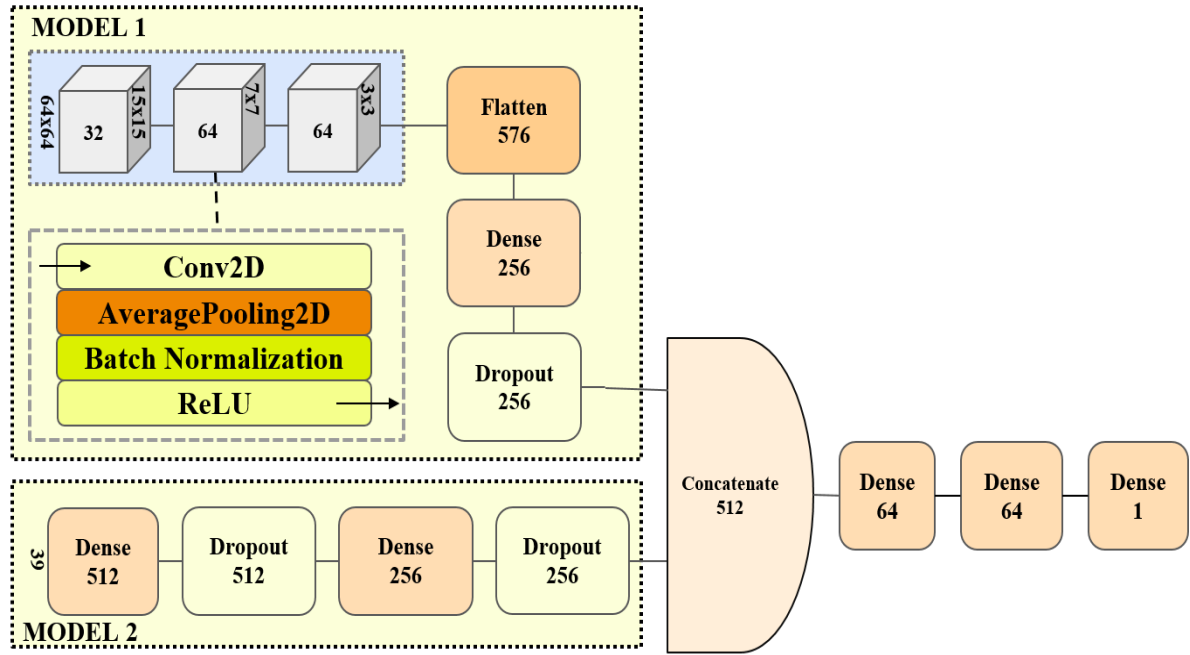


Figure 2.3: 1d-CNN and 2d-CNN for Cough Detection.

We highly recommend using MobileNet in realistic deployment based on its advantageous characteristics. We construct a special version of MobileNet and 1-d CNN-LSTM with the purpose of utilizing both cough features and metadata fields. Alongside MobileNet, we also employ alternative ML models such as LightGBM, RF, and SVM. All of the listed models will be implemented on the original coughs dataset and cough chunks dataset so as to score and evaluate among them. Eventually, results will be compared to comprehend feature extraction techniques, feature processing techniques as well as models for the COVID-19 Cough Recognition methods.

Proposed Hybrid approach (MobileNet + 1-d CNN-LSTM) The architecture of the Hybrid approach is shown in Fig. 2.4 where 2-d acoustic features (from cough) are used for training the MobileNet model and 1-d features (from metadata information) are fed to train the 1-d CNN-LSTM model. The two models are independently developed in

parallel, then synthesized from the two dense layers before going through a softmax layer in order to give the prediction probabilities for the labels.

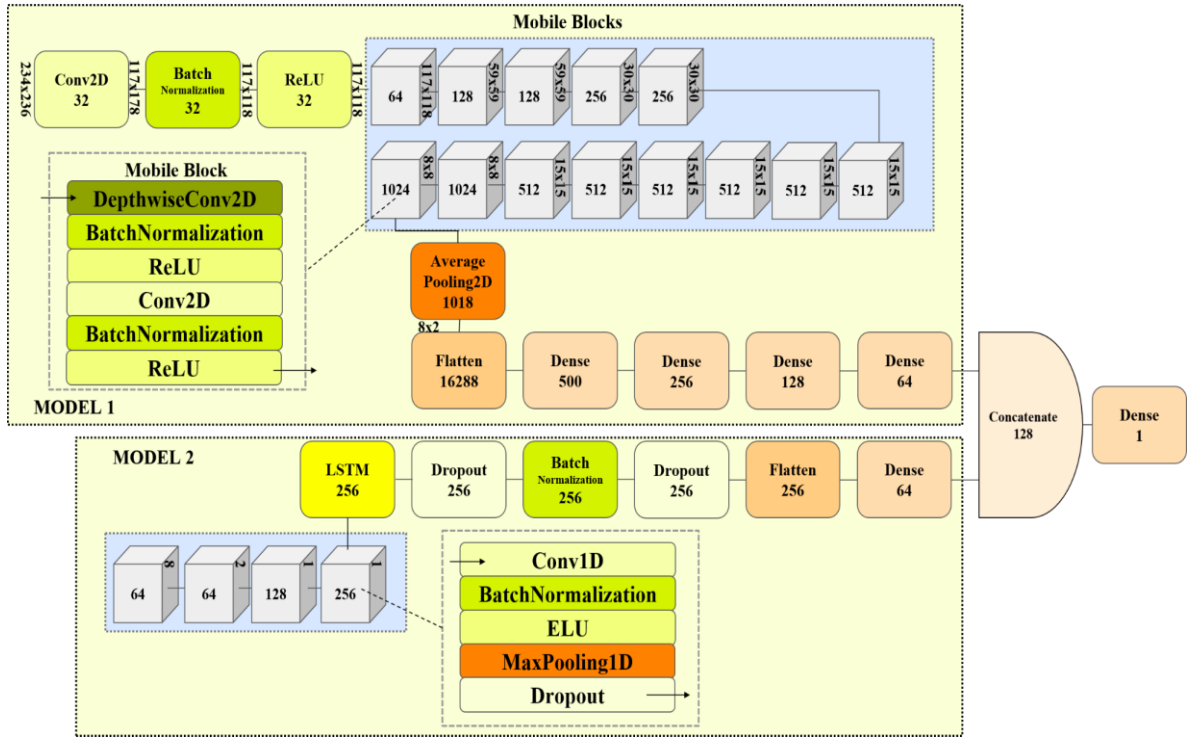


Figure 2.4: Proposed Hybrid approach architecture.

3. RESEARCH RESULT

Machine Learning Experiment Results: The results show that in the COUGHVID dataset the models will have the best performance when combined with the smote method. The best performance in RandomForest with 0.6768 with smote method, using Raw Cough and features is MFCC 39. The best performance of each modeltype is 0.6640 of Light-GBM, respectively, SVM has the best efficiency of 0.5912 and Catboost is 0.6742. All models have the best performance when used with the data machining method smote

The performance of our Machine Learning models on the Coswara dataset. The best performance is 0.7881 of the Catboost model with smote method, using Raw Cough and features is MFCC 26. The best performance of other models is 0.7869 with RandomForest, 0.7435 with Light-GBM, and SVM reaching 0.7225. The smote method gives the best performance compared to the other methods when used for Machine Learning models.

Deep Learning Experiment Results: It is worth noticed that models trained on Coswara Cough chunk data give better performance in Coswara raw cough recordings. By contrast, on the COUGHVID dataset, models learn better on the raw cough recordings in comparison with Cough chunk data.

Overall, models trained with the batch size = [8, 16] quite outperform those trained with the batch size of [32,64,128]. In addition, SMOTE technique does not improve the performance of MobileNet and Hybrid models. Whereas, most of the highest AUC-ROC scores come from the models developed on acoustic features processed by the Standard scaler technique.

In regard to acoustics features-based models, the MobileNet model trained on the Coswara dataset, in which the highest AUC-ROC score is 0.8407 for the model trained on MFCC 26 features extracted from raw cough recordings with Standard scaler. Specifically, the highest AUC-ROC scores of Mel-spectrogram, MFCC 13, MFCC 26 and MFCC 39 features are 0.8246, 0.8219, 0.8407 and 0.8092 respectively. For the aspect of training data source, raw cough data helps the MobileNet model reach a peak at 0.8407, while it is 0.8219 for the model trained on cough chunk data. Besides, the batch size parameter also plays a crucial role when developing a well-performed model. The highest score for batch size of 8, 16, 32, 64 and 128 are

0.8407, 0.8069, 0.7980, 0.7875 and 0.8042 respectively. Lastly, the feature processing techniques (raw features, standard scaler, and SMOTE) peak at the AUC-ROC score of 0.8390, 0.8407, and 0.7899 respectively.

About the performance of MobileNet model trained on the COUGHVID dataset, it can be seen that the highest AUC-ROC score is 0.8482 for the model trained on MFCC 13 features extracted from raw cough data without any special feature processing techniques. In particular, the highest AUC-ROC scores of Mel-spectrogram, MFCC 13, MFCC 26 and MFCC 39 features are 0.8399, 0.8482, 0.8378 and 0.8439 respectively. For the aspect of training data source, raw cough data improves the MobileNet model to hit the highest point at 0.8482, while it is 0.8219 for the model trained on cough chunk data. Moreover, the highest score for batch size of 8, 16, 32, 64 and 128 are 0.8467, 0.8482, 0.8448, 0.8350 and 0.8190 respectively. Meanwhile, the feature processing techniques (raw features, standard scaler, and SMOTE) hit a peak at the AUC-ROC score of 0.8482, 0.8439, and 0.8214 respectively.

The performance of the proposed Hybrid model which is trained on a combination of acoustic features and metadata features is truly better than that of acoustic features-based model. On the Coswara dataset, the highest AUC-ROC score of the Hybrid model is 0.8666 which is 0.0259 larger than that of MobileNet model trained on acoustic features only. And, it is 0.01 AUC-ROC score larger than that of models trained on COUGHVID dataset.

Particularly, the performance statistics of the proposed Hybrid model developed on the Coswara dataset. It highlights the highest AUC-ROC score of 0.8666 from the model trained on Mel-spectrogram features extracted from cough chunk recordings with Standard scaler. Specifically, that of Mel-spectrogram, MFCC 13, MFCC 26 and

MFCC 39 features are 0.8666, 0.8361, 0.8319 and 0.8635 respectively. While

models trained on raw cough and cough chunk data peak at 0.8635 and 0.8666 for each. Alikeacoustic features-based models, batch size parameter has a great impact on the models' predictive result. The highest score for batch size of 8, 16, 32, 64 and 128 are 0.8635, 0.8666, 0.8429, 0.8470 and 0.8028 respectively. The feature processing techniques (raw features, standard scaler) still outperform SMOTE with the highest AUC-ROC scores for each one being 0.8470, 0.8666, and 0.8238.

The proposed Hybrid model performs exceptionally well on the COUGHVID raw cough recordings, all AUC-ROC values greater than 0.8 are from models trained on features extracted from raw cough recordings. In addition, all highest AUC-ROC scores of each group of experimental observations are above 0.8. In specific, the best model is trained on MFCC 13 features with raw features reaching a score of 0.8582. Besides, the highest AUC-ROC scores of Mel-spectrogram, MFCC 13, MFCC 26 and MFCC 39 features are 0.8549, 0.8582, 0.8482 and 0.8568 respectively. While raw cough recordings source provides a model having the highest AUC-ROC score of 0.8582, that from cough chunk source is only 0.7765. The feature processing techniques (raw features, standard scaler, and SMOTE) hit the highest AUC-ROC score of 0.8582, 0.8530, and 0.8467 respectively. Moreover, like other experimental results from this research, batch size with small values of 8 and 16 give better-trained models.

4. CONCLUSION:

In this research, we structure and develop a COVID-19 recognition system using cough audios as input and also implement our recommended processing and feature extraction.

Our study provides empirical results for the issues of Cough Detection and COVID-19 cough recognition experimented on the two datasets of Coswara and COUGHVID. In the preprocessing stage, we utilize many existing techniques which are cough segmentation, cough concatenation, standard scaler for feature normalization, and signal feature extraction such as Mel-spectrogram (1-d, 2-d) and MFCC 13, 26, 39 (1-d, 2-d), SMOTE technique for imbalanced data. During training time, we employ not only basic ML models (SVM, RF, and LightGBM) but also DL models (CNN, MobileNet) and Hybrid models (MobileNet + 1-d CNN-LSTM). Especially, this research also evaluates the effect of a hyperparameter - batch size on DL models' accuracy.

By observing achieved results, we realize that SMOTE has not returned good influence as a way of handling imbalanced data and does not contribute beneficial values to solve the final issue which we have been dealing with. We are aiming at using GAN as an alternative to automatically generate positive COVID-19 cough samples from available positive ones and then eliminate the considerable impact of imbalanced data.

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OBJECT DETECTION AND MEASUREMENT: CANNY EDGE DETECTION ALGORITHM

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ABSTRACT:

In today's modern world, detecting objects in real-time and measuring their dimensions has become a challenge in many areas of industry. In our study we present an enhanced version of object detection and measurement where we utilize OpenCV, NumPy, SciPy, imutils, argparse. Our study includes the implementation of canny edge detection, dilation, and erosion algorithms. Our study comprise of five steps: (1) setting up all needed packages and libraries, (2) recognizing an object to measure using canny edge detection algorithms, (3) using dilation and erosion algorithms to perfect the edges, (4) fix and sort contours, and (5) finding the dimensions of the object detected in the input image. In proposed study, we designed a system that used OpenCV software library, NumPy. Our proposed technique gave us 99% success in calculating and displaying the dimensions of the object detected from input image.

KEYWORDS: *Object Measurement, Object Detection, Dimensions, Computer Vision, OpenCV, NumPy, Canny Edge Detection, Contour*

I. INTRODUCTION

Real-time object detection and measurement systems have become crucially important in industrial processes nowadays. Object detection and measurement is often used in product quality stages in the industry, where we need to either check the quality or get to know the measurement of some tool/object. The proposed system can be efficiently applied in real life applications in different industries. The study can be used to identify objects in real world and measure their dimensions for beneficial and time saving use in Industries.

The competence of the proposed framework has been confirmed through utilizing genuine image input that have been taken from a Redmi Note 7 Pro Mobile Camera. The execution of this method has a high computation rate and it is subordinate on the determination of frames. The accomplishment of distinguishing objects and separate these objects from the foundation is ideally perfect.

To calculate the estimate of each object, firstly we require to determine the reference object. After that, the measurements of the reference objects will be utilized to calculate the estimate of other objects. In order to determine the size of an object in input image, we need to first perform calibration using a reference object. We should know the dimensions of the reference object (in terms of width or height) in a measurable unit (such as millimeters, inches, etc.). We ought to be able to effortlessly discover this reference object in the input image, either based on the arrangement of the object (such as the reference object continuously being put within the top-left corner of the input image) or through appearances (like being a particular

color or shape, one of a kind and diverse from all other objects within the picture). In either case, our reference ought to be interestingly identifiable in a few ways. Like in our study, we took a two rupee coin, which is an Indian National Rupee Currency. Figure 1.1 below shows that we used a two Indian national rupee coin as our reference object and ensured that it is always placed as the left-most object in the image, making it easy for us to extract it by sorting contours based on their location. A two Indian national rupee has a width of 1.07 inches.



Figure 1.1. We used a two Indian national rupee coin as our reference object. By ensuring the coin is the left-most object, we are able to sort our object contours from left-to-right, grab the coin (which is able continuously be the primary contour within the sorted list), and utilize it to characterize our pixels_per_metric, which we characterize as:

$$pixels_{per\ metric} = object_s width / known_{obj} width$$

For example, our two rupee coin's known width is 1.07 inches and let us suppose that our object_width in pixels is 150 pixels wide (based on its associated bounding box).

Therefore,

$$pixels_{per\ metric} = 150px / 1.07in = 140.18px$$

Thus, it implies that there are approximately 140.18 pixels per every 1.07 inches in our input image. We can use this ratio to calculate the size of object in our input image.

II. PREVIOUS WORK

Some Edge Detection techniques for Image Segmentation have been researched

earlier as well. In the (Muthukrishnan.RDec2011)¹ various edge detection techniques were carried out with an image using MATLAB. It was observed that the results Marr-Hildreth, LoG and Canny edge detectors produce almost same edge map. Canny result is superior one when compared to all for a selected image since different edge detection work better under different conditions. Even though, so many edge detection techniques are available in the literature, since it is a challenging task to the research communities to detect the exact image without noise from the original image. The Canny edge detector is arguably the most well known and the most used edge detector in all of computer vision and image processing.

III. METHODOLOGY

3.1 Platform Or Technology Used:

PyCharm

- PyCharm is an integrated development environment (IDE) used in computer programming, specifically for the Python programming language.
- It provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems (VCSes), and supports web development with Django as well as data science with Anaconda.
- PyCharm is cross-platform, with Windows, macOS and Linux versions.

OpenCV

- OpenCV (Open Source Computer Vision Library) is a library of programming functions mainly aimed at real-time computer vision.
- OpenCV runs on the following desktop operating systems: Windows, Linux, macOS, FreeBSD, NetBSD, OpenBSD.
- OpenCV is written in C++ and its primary interface is in C++, but it still retains a less comprehensive though extensive older C interface. All of the new developments and algorithms appear in the C++ interface. There are bindings in Python, Java and MATLAB/OCTAVE.

NumPy

- NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.
- NumPy targets the CPython reference implementation of Python, which is a non-optimizing bytecode interpreter. Mathematical algorithms written for this version of Python often run much slower than compiled equivalents due to the absence of compiler optimization.
- NumPy addresses the slowness problem partly by providing multidimensional arrays and functions and operators that operate efficiently on arrays; using these requires rewriting some code, mostly inner loops, using NumPy.

SciPy

- SciPy provides algorithms for optimization, integration, interpolation, eigenvalue problems, algebraic equations, differential equations, statistics and many other classes of problems.

imutils

- A series of convenience functions to make basic image processing functions such as translation, rotation, resizing, skeletonization, displaying Matplotlib images, sorting contours, detecting edges, and much more easier with OpenCV and both Python 2.7 and Python 3.

argparse

- The argparse module makes it easy to write user-friendly command-line interfaces.
- The program defines what arguments it requires, and argparse will figure out how to parse those out of sys.argv.
- The argparse module also automatically generates help and usage messages and issues errors when users give the program invalid arguments.

3.2 Object Detection and Object Measurement

The study consists of two parts which are object detection and object measurement. For the first part, we use the camera to get the proper input image. And for the second part, OpenCV features will be applied to the input image to detect the object in input image, later determining the dimension of the object. The object which will be detected will quickly be processed to calculate and display the dimensions of the objects.

In our study, firstly, we get our input image. We convert the image to grayscale to have efficiency and accuracy. Objects will be detected using canny edge detector algorithm. We use canny edge detector algorithm to detect single or multiple objects in an image or video. Utilizing canny edge detector algorithms, converted image will be ready to process further.

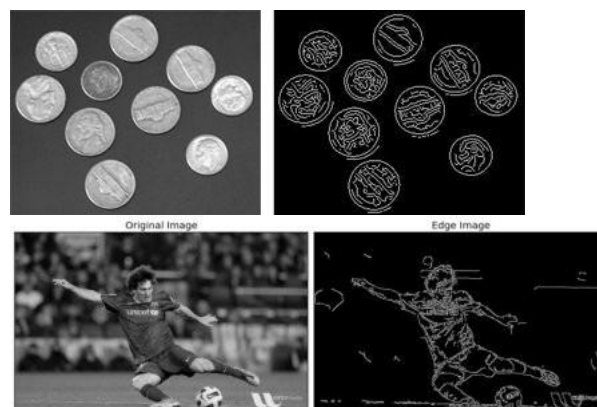


Figure 3.1. Example of how original image and canny edge detection applied image looks like

After we are done scanning the whole input image using canny edge detector algorithm, we execute dilation and erosion algorithm to close holes amount edges in the edge frame.



```

30
31  # perform edge detection, then perform a dilation + erosion to
32  # close gaps in between object edges
33  edged = cv2.Canny(gray, 50, 100)
34  edged = cv2.dilate(edged, None, iterations=1)
35  edged = cv2.erode(edged, None, iterations=1)

```

Figure 3.2. Snippet of code performing edge detection, dilation and erosion

First thing that happens when we apply canny edge detection algorithm is that it starts to delete the noise in the image frames by applying a Gaussian filter. The image after being converted to grayscale and being applied with Gaussian filter can be seen in Figure 3.1 example image. Within the compute gradient stage, we identify the edge gradient and direction for each pixel. For the characterizing the gradient at every pixel of smoothed outline, Sobel operator is utilized. A total check of frame will be done a while later receiving gradient size and direction, to dispose of any undesirable pixels which might not set up the edge. In this stage, just local maxima must be considered as edges through applying Non-maximum suppression. Non-maximum suppression exchanges the smoothed edges within the frame of the gradient magnitudes to sharpen the edges. Non-maximum suppression is carried out to keep every local maximum within the gradient picture, and expelling the whole thing else.

The ultimate stage of canny edge detector algorithm is hysteresis thresholding. This stage chooses which edges are without a doubt edges and which aren't edges. The two threshold values are observationally chosen and their definition will be upon the substance of a given frame. Usually accomplished via choosing enormous and little edge values. On the off chance that Edge pixels stronger than the big threshold, it is marked such as sturdy. Strong edges will be measured as the final edges. Moreover, edge pixel will be smothered In case an edge pixel's weaker than the small threshold, and it is checked as frail edge in case an edge pixel among the enormous and little thresholds. To get the way better result and more precise object detection, the canny edge detection strategy has been improved with a few Morphological operations. These procedures are commonly a combination of nonlinear procedures performed generally on the arrangement of pixels without changing their numeral values, erosion and dilation are the keys for morphological operations. In this study, a morphological process is performed such as a blend of dilation and erosion. The opening is the initial procedure in which erosion is taken after through dilation. Closing is the second operation in which dilation is followed through erosion. As a blend of these processes we are capable to obtain prevalent assurance for discovery edges in-depth frame. To briefly summarize object measurement, after edge detection and close any gaps between edges, we detect contours by utilizing an

OpenCV function that is `cv2.findContours` to discover the shapes of the objects within the edge outline. We organize contours from left to right. The reference object within the frame is for all time the left one. By depending to the reference object, we calibrate the camera and set the value of parameter. Following, we check each contours, begin looping over each individual contours. After that, the rectangle around objects will be drawn in green. So, the points of the bounding box rectangle will draw in a little purple rounds. After that, we will get midpoints since the bounding box is requested. At last, we calculate pixels per metric variable through dependence on reference object. The height-distance in pixels will put on `hD` (height) variable and width distance will put on `wD` (width) variable. At that point, we calculated the Euclidean distance among sets of center points.

IV. RESULTS

We proposed the system to measure objects in a real time pictures. We arranged many test setups to test the rightness of the proposed strategy. The implemented proposed framework has made by the assistance of Python programming language. For the experiment the camera has been effectively capturing the pictures. The proposed system applies four operations such as record frames, find edges, find objects, and measure size for each objects. When we run the application, the output screen displays on the PC screen as appear in Figure 4.1 below and Figure 4.2 shows the object detection and measurements. Each size of an object are calculated and displayed.

In the first test, we calculated the size of objects such as coin, scissor, medicine tablet, college id. Table 5.1, shows the accuracy of proposed object measurement system for these objects. Abbreviations in the table are as follows; RMH: Real Measured Height, EMH: Expected Measured Height, RMW: Real Measured Width, EMW: Expected Measured Width.

The error in measurement is very low. The error rate is specifically much smaller when camera is above the objects or 90 degrees.

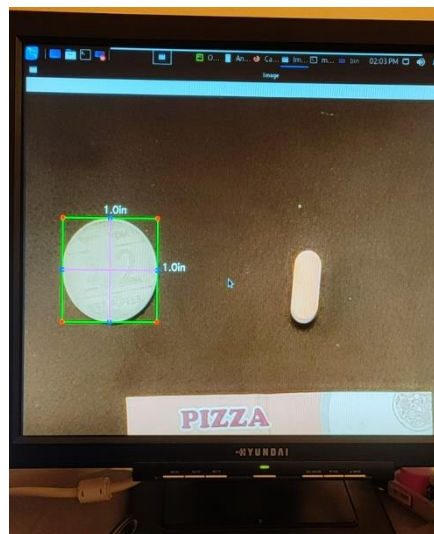


Figure 4.1 Output Display on my screen

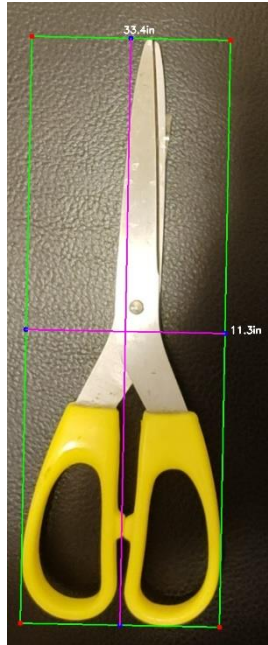


Figure 4.2 Display of calculated size of object

V. ADVANTAGES AND DISADVANTAGES

Advantages:

- 1) Reduces human error and provides efficiency
- 2) It is easily usable, it's user-friendly
- 3) The less the error is you will get more work done in less time
- 4) Cheap solution

Name of Objects	RMH (in)	EMH (in)	RMW (in)	EMW (in)	Accuracy(%)
<u>Scissor</u>	11.5	11.3	33.4	33.5	98%
<u>Coin</u>	1.07	1.0	1.07	1.0	93%
Medicine	0.4	0.3	0.8	0.7	99%
<u>Tablet College ID</u>					
<u>Card</u>	2.95	2.8	4.75	4.6	99%

Table 5.1. Accuracy Of Object Measurement

- 5) The less the error is you will get more work done in less time
- 6) Cheap solution

Disadvantages:

- 1) There is a need for a backup system to store or back up any record.

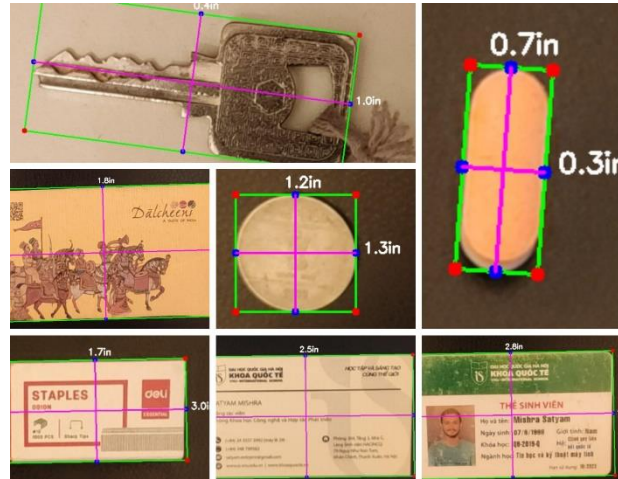


Figure 5.2. Some of the objects tested for their measurement in our study

Some result images from our study:

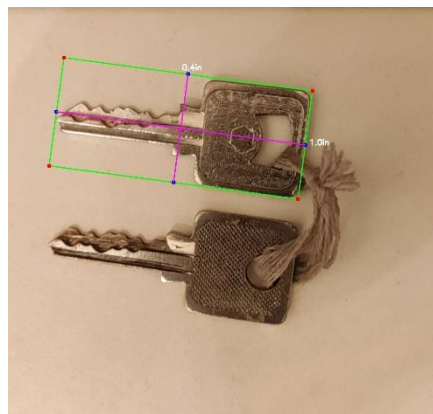


Figure 5.3. Key Dimensions Output



Figure 5.4. Student ID Dimensions Output



Figure 5.5. Staple pin box Dimensions Output

VI. CONCLUSION

In this study, a capable object measurement method is proposed for industrial frameworks. Within the offered system, Computer Vision utilized to distinguish and measure objects. The framework can identify and measure objects. After the object has been identified by utilizing canny edge detector algorithm, the measure is gotten for each object by utilizing OpenCV functions. We upgraded the canny edge detector algorithm through utilizing Morphological operations. This procedure benefits to dispense with additional noises. Moreover, whereas eliminating the additional noises it moreover smoothens the shape and keeps the layout and estimate of each object. In this way, the outlines of the distinctive objects within the frame were kept.

The proposed method works exceptionally quick and efficiently, it gives 98~99% success in determining the measurement of the objects. Hope other scientists can add more feature to it and industrialists can commercialize it for better and modern industrial use.



Figure 6.1 Business Card Dimensions Output



Figure 6.2 Coin Dimensions Output

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**STUDY THE GLOBAL IMPACT OF COVID-19 ON SOCIETY AND
ECONOMY, TRENDS IN DIGITAL TRANSFORMATION
DEVELOPMENT, DIGITAL TECHNOLOGY IN VIETNAM AND AROUND
THE WORLD FROM THE PERSPECTIVE OF STUDENTS.**

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SUMMARY:

The outbreak of the Covid-19 pandemic has had a tremendous impact on people and property around the world. Most operations are reduced or disrupted, and many businesses and organizations are forced to close or shut down. To escape bankruptcy, crisis, and minimize the damage caused by the Covid-19 pandemic, organizations have chosen to change operational solutions, seeing digital transformation as an urgent and vital task, helping organizations adapt to the new context. I think digital transformation is an inevitable thing in this civilized society and Covid - 19 is a catalyst to help it happen faster. We need to be well equipped with skills to face the challenges that have occurred in the digital age.

KEYWORDS:

The global impact of Covid-19; Digital transformation; Students.

I. THE GLOBAL IMPACT OF COVID-19 ON SOCIETY AND ECONOMY.

The world has experienced many pandemics, causing heavy losses to the economic, social and environmental development process. The Covid-19 pandemic, known as the infectious disease pandemic, with the sars-cov-2 virus, takes place on a global scale. The Covid-19 pandemic has severely devastated the global economy and labor market as a whole, the biggest economic shock in 35 years. The devastation of the pandemic not only with vulnerable economies but also caused many major economies to come to a standstill: economic decline, rampant unemployment, poverty and unemployment rising...

The COVID-19 pandemic has had far-reaching consequences beyond the spread of the disease and efforts for quarantine. As the SARS-CoV-2 virus spread globally, concerns have shifted from supply-side manufacturing issues to declining business in the service sector. The pandemics caused the largest global economic downturn in history, with more than a third of the world's population at the time frozen.

The outbreak of the Covid-19 pandemic has brought unprecedented challenges over the past decades for the health sector and for all economic and social development activities globally. On the basis of statistical reports, the article summarized the effects of the pandemic on the labor and employment markets in general and some vulnerable labor groups in particular. The results showed that the severe impact from the reduction of working hours due to the impact of the pandemic and comprehensive epidemic prevention measures caused a very large workforce in general to fall into unemployment, loss of income, in which vulnerable labor

groups such as informal sector workers, Migrant workers, poor workers, women's workers... Falling into a more desperate state. However, the new statistical reports are mainly estimates, still not fully, in detail, deeper assessment of the internal severity and related consequences. In addition, the vulnerable labor group must also refer to the group of young people who lost their jobs, the group of elderly workers, the group of disabled workers, the child labor group, etc. these workers also suffered serious, even extreme impacts due to job losses, losing a job, losing a sharp income, or losing your income because of the crisis.

The issue of employment and unemployment of labor when the pandemic has been and is still going on has become a major concern globally, of each country, becoming a great burden in the bailouts, aimed at ensuring social security for people and supporting businesses, at the same time, reducing the production and business process, product supply chain and the ability of economies to recover in the coming time. Given this situation, the ILO has called for urgent, drastic measures on a large scale and synchronously across the pillars: the protection of workers in the workplace; stimulate the economy and jobs; support for employment and income. "The COVID-19 crisis exacerbates existing vulnerability and inequality. Therefore, policy responses must ensure support reaches the workers and businesses that need the most support."

The world is facing its most severe global recession since the Great Depression of the mid-1930s and unlike any previous crisis. The epidemic has affected the global economy; reducing both total demand and total social supply, slowing the pace of growth, disrupting and disrupting global supply chains for longer than expected; as well as increasing difficulties for governments in the face of inflationary pressures, bad debts, public debt and social security guarantees in most countries, from developed countries to even the world's least developed countries.

Between 2020 and 2022, the global economy faces a cumulative loss of about \$13 trillion in income. If the global economy grows as it did in the early 2000s (about 3.5% per year), it will not be until 2030 to be able to regain pre-pandemic levels. According to the IMF, in 2020, global GDP will grow negatively by 4.2-4.4%; Global trade decreased by more than 10%; FDI has decreased by about 40%; It burned 41 percent of its finances, or \$157 billion, the market capitalization of 116 listed airlines worldwide. The world's public debt is soaring, currently more than 103% of global GDP; Global GDP growth forecast in 2021 is 5.9% and in 2022 is 4.9%. The Covid-19 pandemic has deepened the potential fragility of global supply chains and caused global FDI flows to decline by 30-40% between 2020 and 2021, which is very closely related to disruptions in global supply chains as a result of the pandemic, especially in the services sectors related to aviation services, hotels, restaurants, entertainment, as well as manufacturing and energy sectors.

The Covid-19 pandemic also accelerates the process of restructuring the world economy towards valuing the market and strengthening supply chains in each country; reshape and shift some international production chains back to the country itself or leave areas affected by disease and prolonged social distancing; promote

digital transformation in both management and production and business, distribution circulation and other traditional social activities. E-commerce activities, work, meetings, study, consulting and even remote entertainment... It's becoming more and more popular.

At the same time, the world today is posing the requirement for harmonious coordination, the simultaneous use of both state functions and market functions in a new type of State model, with the importance of synchronization and attention to the duality of policy solutions, more global cooperation, in order to diversify and effectively coordinate resources, strengthen forecasting, information, maintain trust, harmonize interests, avoid extremes in awareness and action to overcome crises ...

Risk mitigation measures and response policies in a country may be available. But in the absence of reasonable global coordination, the adoption of those policies would likely be less optimal. Cooperation can also help limit the use of policies that could have a negative spillover effect on trading partners, such as export restrictions or subsidies.

The pandemic also made the world narrower, increased dependence, closer connections and more pervasive impact among the countries therein. Each country, community and individual has a deeper experience and more empathy when understanding that no one, no country is safe, when the community and other countries are not safe. The epidemic creates pressure and motivation to promote efforts to build, solidify, coordinate more often national and international institutions and resources, to increase the capacity to withstand, forecast and prevent epidemics on a global scale more timely and effectively in the coming time.

II. TRENDS IN THE DEVELOPMENT OF DIGITAL TRANSFORMATION AND DIGITAL TECHNOLOGY IN VIETNAM FROM THE PERSPECTIVE OF STUDENTS.

The Covid-19 pandemic is likened to the storm that Vietnamese businesses like forests are developing. The storm wind blew through many large trees, small trees fell, even the great ones wobbled. In this context, digital transformation is considered a "lifeline", a "light at the end of the tunnel" – an irreversible trend for businesses to adapt and overcome the difficulties of the Covid-19 pandemic.

In the most common understanding, digital transformation in organizations and businesses is the process of changing from traditional models to digital enterprises by applying new technologies such as big data, Internet of Things (IoT), cloud computing (Cloud) ... change the mode of administration, leadership, workflow, company culture. Digital transformation brings many benefits such as cutting operating costs, reaching more customers in the longer term, leading decision-making faster and more accurately thanks to a timely transparent reporting system. Thereby, the operational efficiency and competitiveness of organizations and enterprises are improved...

In the middle of the era of 4.0 changed rapidly, not "big fish swallow small fish but fish quickly swallow fish slowly", digital transformation does not accept the big, half-hearted, stagnant. "Digital transformation or death," said Mr. Nguyen Huu Thai Hoa,

Chairman of iBOSSSES Vietnam, as well as Vice Chairman of VNPT Group's Strategic Council. According to Hoa, businesses involved in digital transformation "need to do it immediately and without hesitation."

According to the Vietnam Bankers Association, Covid-19 has boosted the industry's digital transformation awareness faster by 3-5 years, making a leap forward for digital payments. The latest statistics of the State Bank showed that the number and value of non-cash payment transactions both grew strongly during the pandemic, especially the number and value of transactions via mobile channels increased sharply.

The obvious benefits of digital transformation are: there is no need to set aside a space to store records, papers, documents ... , save the cost of renting premises, save time printing and arrange documents, search is also simpler; the digitization of data combined with good security tools can enhance the safety of storage; Easy to control, plan...

Digital transformation has helped many businesses reap the fruits of the early season in the middle of the pandemic, but to be truly sustainable, it needs to be associated with changing thinking and methods of production and business, not just buying technology platforms for application. In addition, digital transformation should not come only from the pressures of the Covid-19 epidemic. The Covid-19 epidemic serves as a nudge to promote faster, stronger digital transformation. According to a survey by the Institute of Business Development, before the Covid-19 epidemic, more than 50% of businesses applied digital technologies. Since the covid-19 outbreak, more than 25% of businesses have adopted digital technology. But in fact, this seems to be only the prelude of the digital transformation journey, there are still many barriers ahead and inside businesses still have "torn" with the old and the barriers.

In order to create an environment to support businesses to accelerate the digital transformation process, at the Ho Chi Minh City Economic Forum, Mr. Alfonso Garcia Mora, Vice President of the International Financial Organization (IFC), in charge of Asia Pacific, said that on a global scale, the pandemic has driven the pace of digital adoption, transform development as businesses and citizens embrace technology-supporting solutions in education, health, transportation, climate and more. Therefore, this is the right time for the city to focus on digital transformation, making the digital economy a top priority for economic recovery and investing in future competitiveness. According to Alfonso Garcia Mora, digitalization is one of the key developments shaping the world and could light up the path to a sustainable green future. However, to achieve this goal it is necessary to take four main steps including the availability of policies, infrastructure, services and skills; at the same time ensure that no one (especially women) is excluded from digital systems.

In particular, two current problems are taking place that make this process difficult. Specifically, small businesses are difficult to carry out digital transformation, so there should be a legal framework for departments or units to finance small businesses to successfully conduct digital transformation. The majority of foreign enterprises or financial development units are still hesitant to come up with new tools related to the

digital economy because they have not seen the legal framework for such activity.

In the same view, Ms. Carolyn (Carrie) Turk, Country Director of the World Bank (WB) in Vietnam, Ho Chi Minh City has the basic foundations for the process of building a digital economy, because of the large number of digital enterprises, accounting for one-fifth of the country's enterprises in terms of the ability to fully use the digital process in production and business activities. In addition, the city is also leading the way for the development of new technologies such as artificial intelligence, big data as well as digital popularity in financial services, public services

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On the other hand, to succeed in the transformation of the digital economy, Ms. Carolyn (Carrie) Turk said that Ho Chi Minh City needs to develop a skill set for citizens to master digital technology through the design of training courses. Digital skills are key to unlocking the opportunities that technology can offer. Investing in strong connectivity infrastructure, as well as public and private investment in more advanced services such as data centers, 5G-Internet of Things, can support businesses to reach the next level of digital transformation and gain a competitive advantage. This will also help the city attract more foreign direct investment in the high-tech sector.

III. TRENDS IN THE DEVELOPMENT OF DIGITAL TRANSFORMATION AND DIGITAL TECHNOLOGY IN THE WORLD.

Although the internet has been around the world for a long time, new digital transformations appeared and became popular when the 4th Industrial Revolution broke out. Digital transformation involves not only the application of new technologies merely but also the provision of services, goods and first-hand experiences while finding, processing and accessing the resources that are truly available (human, physical, intellectual, economic, etc.), creating many connections between people, Place and things. Digital transformation helps organizations transform their entire operations and processes and create their value on the basis of digital technology in response to the changing market landscape.

Digital transformation is applied in educational institutions to facilitate the learning process involving the ability to overcome various challenges, such as time and competence in traditional learning. Digital transformation in higher education applies the university's digital platform to convert the formal form of training to online training. Digital infrastructure is invested by the school for teaching and learning such as online learning software, internet connection system, access to digital documents, interaction between lecturers and students through the platform, evaluating the student's learning outcomes. Bond et al. (2018) . affirming that innovation in digital teaching is not only technical innovation but also academic, program, organizational and structural innovation that contributes to improving digital knowledge, improving the teaching of higher education, transforming the existing physical learning environment and creating new virtual learning environments. They found the integration of digital media in teaching and learning was a complex process of negotiation between the university's various stakeholders. Gaivoronskii et al. (2017)

acknowledges that the development trend of digital transformation in education has brought outstanding achievements, while the traditional way of learning has some limitations. Digital transformation helps digitize lecture knowledge, create online libraries, create keyword search engines, change traditional learning structures, move towards educating users and markets, avoiding redundant or unnecessary training for the future. Xiao (2019) acknowledges that digital transformation in education improves the quality of teaching, digitizes data for application, and establishes e-libraries that give users access to lifelong research and learning goals.

Thanks to technology, learners are now at the heart of the learning process, and education is gradually shifting from the transmission of knowledge to the development of learner capacity. The application of digital transformation in education creates conditions for students to access open sources of materials, promoting the initiative and creativity of students. Students are equipped with the skills of working independently and working in teams to ensure academic effectiveness.

The university's digital transformation process will quickly succeed in enhancing the interaction between faculty and students on technology platforms invested by the university or social networks and when students receive support from faculty and the university in accessing digital resources. Singh et al. (2020) affirms that interoperability, cost-effectiveness and perceived usefulness shape students' positive attitudes towards digital transformation and the intention to apply it in the short term. Alhubaishy and Aljuhani (2021) found that overcoming cognitive, behavioral, and emotional barriers between students and instructors facilitated a successful early digital transformation. Furthermore, students' level of awareness of knowledge, skills acquired and satisfaction also increases the school's digital transformation process.

In contrast to the above studies, Zizka and Probst (2022) found that although students appreciate the usefulness of the learning experience, the consequences of "compulsive" online learning cause their motivation to learn to decline, leading to many adverse effects on students' learning results. The above studies hypothesize the following: Performance expectancy, effort expectancy, and social impact have significant positive effects on students' online readiness in online learning.

The prolongation of the Covid-19 epidemic has had a strong impact on Internet traffic, as most activities are increasingly taking place online. Against this backdrop, global Internet bandwidth grew by 35% in 2020, the largest one-year increase since 2013. It is estimated that about 80% of Internet traffic involves video, social networking, and gaming. Monthly global data traffic is expected to increase from 230 exabytes in 2020 to 780 exabytes in 2026. 2021, witnessing the explosion of the digital economy, as shown by the huge amount of data circulated on the Internet system. One forecast assumes that global Internet Protocol (IP) traffic by 2022 - domestically and internationally - will exceed all Internet traffic in 2016.

The size of the global Internet of Things (IoT) market is \$308.97 billion by 2020. It is expected that the market will increase from \$381.30 billion in 2021 and to \$1.85

trillion in 2028, with annual growth of 25.4% in the period 2021-2028. Worldwide spending on IoT has been negatively impacted by the pandemic, although it is expected to return to double-digit growth in the medium to long term, reaching an annual growth rate of 11.3%. China, the U.S. and Western Europe will account for about three-quarters of total IoT spending. While the three regions will initially have similar total spending, China's spending will grow at a faster rate than the other two — an annual growth rate of 13.4 percent, compared to 9.0 percent and 11.4 percent — making it a leader in IoT investment. The fastest annual IoT spending growth will be in the Middle East and North Africa (19.0%), Central and Eastern Europe (17.6%) and Latin America (15.8%).

Southeast Asia is one of the world's fastest growing Internet markets, due to its young population, smartphone usage and rapid urbanization, as well as a growing middle class. Southeast Asia's Internet economy is projected to reach \$1 trillion by 2030, after 60 million new Internet users have been added since the start of the Covid-19 epidemic, bringing the total to 440 million who are using the Internet, with tens of millions participating in online shopping and food delivery.

III. CONCLUSION

Governments around the world have been and will continue to have many approaches and responses to the Covid-19 pandemic; At the same time, policy choices are becoming increasingly difficult, with multidimensional challenges, such as low employment, rising inflation, strong public debt, food insecurity, a slowdown in labor capital accumulation and climate change. The pandemic showed that there were no breakdowns and crises for any business and state models, including the world's leading giants and economic powers; Today's hyper-connected global economy, characterized by extensive trade links, has made the world more vulnerable to shocks and attacks from nature. Trade can increase countries' vulnerability levels and vulnerability to hazards, as well as facilitate the transmission of such hazards through economic, financial, transport and digital links. At the same time, trade, as the main driver of productivity and economic growth, helps countries create the resources needed to prevent risks, prepare for and recover from shock.

RESEARCH THE IMPACT OF COVID-19 ON THE DIGITAL ECONOMY - DIGITAL SOCIETY IN VIETNAM

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ABSTRACT:

In this study, we attempt to develop a deep understanding of the impact of Covid-19 on the Digital economy- the Digital Society in Vietnam. It is intended to serve two main purposes. First, it critically examines the impact of Covid - 19 on the Digital Economy including investment and loans in Vietnam, secondly, the current study also examines the same impact on Digital Society.

INTRODUCTION:

The coronavirus disease 2019 (COVID-19) pandemic, caused by the SARS-CoV-2 virus, originated in Wuhan City in December 2019 and spread rapidly across the world. It soon became the most pressing and dominant issue in both developed and developing countries, even overshadowing such issues as climate change or the US-China trade war. Unlike other contagious diseases, COVID-19 has not been confined to the least developed countries. Directly and indirectly, no country has remained untouched, and Vietnam is no exception. In 2020 and the first four months of 2021, thanks to its early tracing, testing, and strict quarantine strategy, Vietnam excelled in controlling the spread of COVID-19, with an infection rate of 0.003% over the whole population (=2,928/98.5 million) and a death rate of 1.2% overall infected cases (=35/2,928) ([Worldometer Coronavirus, 2021](#)). On the economic front, Vietnam enjoyed a GDP growth of 2.9% in 2020, the highest in Southeast Asia, when many other countries were entering a recession.

Being under-resourced and neighbors with China, where cases of COVID-19 initially emerged, Vietnam was in a precarious position of potentially having an explosion of COVID-19 cases (9). With an estimated population of 97.33 million people, which until 30 July, 2020, had 459 confirmed COVID-19 cases with no fatalities but as of November 4th had 35 deaths, it can be viewed as a model LMIC for other countries struggling with COVID-19.

Not surprisingly, Vietnam's early COVID-19 performance was praised by the , the International Monetary Fund (IMF) , and. According to the, an independent think tank in Australia, Vietnam was ranked second worldwide in the control of COVID-19 infection at the end of January 2021. Keeping in mind Vietnam's proximity to China, its population size, its level of economic development, and its reliance on international tourism, Vietnam's COVID-19 record in 2020 can be justly considered the best in the world. In this optimistic climate, the Vietnamese government anticipated an economic growth rate of 6.5% in 2021.

1. DIGITAL ECONOMY - DIGITAL SOCIETY IN VIETNAM

1.1 Digital Economy

Recently, the digital economy of Vietnam has had a high growth rate and is widely applied to other economic fields, especially in the period of COVID-19. Various proactive approaches used in Vietnam to establish dominant alliances support the economy, but macroeconomic factors also stated a significant influence among them.

The digital infrastructure in Vietnam has seen strong growth in terms of quantity and quality. Lately, Vietnam has almost full broadband network coverage. 3G and 4G networks covered over 95 per cent of the population in 2019, an increase of 18 per cent compared to 2016 and 5G networks are set to follow in 2020. Mobile broadband connection penetration also experienced strong growth from 2016 with 39 per cent through 2019 and with use by 76 per cent of the total population. The overall mobile connectivity index has also increased by more than 9 scores between 2016 and 2020 (Table 1).

Table 1.1. Vietnam's digital infrastructure development from 2012 to 2020

Digital Infrastructure indices	2012	2016	2017	2018	2019	2020
3G coverage ¹ (per cent of the population)		77	90	91	95	
Mobile Broadband connections penetration rate ¹ (per cent of the population)		39	47	61	76	
Mobile connectivity index ¹ (overall country index score out of a maximum possible score of 100)		55.8	59.2	63.8	64.6	64.98
Internet users (million)	30.59	47.3	50.05	64	64	68.17
Internet penetration rate (per cent of the total population)	34	50	53	67	66	70
The average speed of fixed Internet connection (MBPS)			6.27	24.77	27.18	43.26
Mobile subscriptions (million)	127.3	143	124.7	146.5	143.3	145.8

Mobile subscriptions rate (per cent of the total population)	139	152	131	153	148	150
Smartphone penetration rate (per cent of the adult population)	16	55	72	72	72	93
Social media penetration rate (per cent of the total population)	9	37	48	57	0.64	67

Source: Digital 2012, 2016, 2017, 2018, 2019, 2020: Vietnam (published in January of the year) [6-11] 1MCI Data 2020 [12].

The country has seen rapid development in the internet and mobile communications technologies. The internet penetration rate in 2020 has more than doubled compared to 2012, reaching 70 per cent of the total population with 68.17 million users. The mobile subscription rate has always remained at a high level, accounting for about 150 per cent of the total population. By 2020, the number of mobile subscribers reached 145.8 million people. Smartphone penetration has seen strong growth between 2012 and 2020. It is currently at 93 per cent of the adult population in 2020 - one of the highest rates in Southeast Asia. The social media penetration rate was at 67 per cent in Jan 2020 with 65.00 million social media users (see Table 1.1).

The developed digital infrastructure has contributed to increasing the number of digital consumers in Vietnam, especially during the COVID-19 epidemic. COVID-19 led to an acceleration of digital consumption as users tried new digital services for the first time. In Vietnam, 41 per cent of all digital service consumers were new (higher than the SEA average), with 94 per cent of these new consumers intending to continue their behaviour post-pandemic. More than 1 in every three digital service consumers started using the service due to COVID-19. Majority of new consumers are from metro areas (74 per cent) [13].

The Internet sector provided access to essential goods, healthcare, education, entertainment, and helped businesses “keep the lights on”. The Vietnamese people were spending 3.1 hours online (for personal use) pre-COVID-19, which spiked to 4.2 hours at the height of national social distancing, and now rests at 3.5 hours per day. With 8 out of 10 users viewing technology as very helpful during the pandemic, it has become an indispensable part of people’s daily lives. Technology has fundamentally impacted all aspects of life this year [13].

As such, the digital infrastructure in Vietnam is being developed rapidly. However, the most challenging point in digital infrastructure in Vietnam is that these infrastructures are mainly concentrated in urban areas.

1.2 Digital Society

In addition to causing severe consequences on the economy, COVID-19 also produced negative effects on the quality of life of residents, mainly because of the sensitive timing of the outbreak elevated health and safety concerns as many Vietnamese had travel plans for reunions and family festivities. The government issued several social isolation orders in major cities, limiting inbound and outbound travel. Similar to other nations in the world, Vietnam has swiftly implemented measures to contain the spread of COVID-19, and these have been transforming many aspects of society. The country is showing resilience to fear, stress, and anxiety related to the COVID-19 pandemic. The Ministry of Health and the World Health Organization's office in Vietnam recommended people celebrate Tet safely with the message that 'health is the most precious gift we can give each other this Tet holiday'.

The high efficacy of the communication of public health information can be traced to strict enforcement against misinformation and apt use of existing technologies. Included in Vietnam's total government response was the mobilization of police forces to engender trust among communities, spread relevant information about the virus, and strictly enforce guidelines (14). Of importance is the community approval of suspending certain personal rights to combat the spread of the virus as Vietnam's strict enforcement (i.e., distributing fines to those spreading misinformation) (9, 14) may be incompatible in other countries such as the United States of America where people protested mandatory mask-wearing (14). Trust fostered between communities and police, or community policing, involved a relationship in which the latter would distribute essentials such as face masks and accommodate to locals required to quarantine, allowing residents to feel comfortable providing trustworthy contact-tracing information.

Tet is prime time for increased spending thanks to a long tradition of gift-giving, drinking and dining with friends and family, and sprucing up the home for the holidays. The health measures and social distancing orders therefore dampened the Vietnamese economy, which had shown promising signs of recovery after recovering from the first two waves of COVID-19.

Amid this looming crisis, more and more Vietnamese turned to e-commerce platforms and digital financial services for Tet preparation. Tiki, one of the four largest online shopping platforms in Vietnam, reported that its transaction volume in January surged 50 per cent compared to the same period last year. Due to the new outbreak leading up to Tet, it is likely that all e-commerce platforms experienced a massive surge in activity. The National Payment Corporation of Vietnam (NAPAS) reported a significant surge in the numbers of transactions in e-commerce and interbank funds transfers since 28 January, continuing to rise after the holidays.

Vietnam is among the most vulnerable countries to COVID-19 on both economic and health aspects. The Vietnamese economy heavily relies on China as China is currently the second largest export market of this country and production in Vietnam always depends on imported raw materials, primarily from China (VietnamCredit, 2019). On health perspective, because of sharing a long border with China and limited healthcare resources, Vietnam had a higher likelihood of having COVID-19 imported

cases as well as high risk of large-scale community transmission (VietnamCredit, 2019; Ebbighausen, 2020; Fleming, 2020). Although having a small number of confirmed cases and zero deaths related to COVID-19, the Vietnamese government decided to impose the nationwide partial lockdown at the early stage, starting from April 1st, 2020. This strategy has shown effectiveness in stopping the spread of COVID-19 (Vu and Tran, 2020), however, it is freezing the economy and producing adverse impacts on inhabitants' life. This study targets to provide empirical evidence about the influence of this national social distancing on quality of life and household income of Vietnamese citizens amid COVID-19, with the ultimate goal to inform the policymakers to take appropriate and timely actions for controlling the disease while ensuring both health and socioeconomic wellbeing of the general population.

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DIGITAL TRANSFORMATION OF SOCIO-ECONOMIC SYSTEM: PROSPECTS FOR DIGITALIZATION IN SOCIETY

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I/ INTRODUCTION

Global digitalization has changed not only the economic, but also the social vision of the world. The digital era is determined by continuous flows of data containing information, knowledge, ideas and innovations. Having completed industrialization, developed countries are successfully digitalizing their economies. They are rapidly developing innovative technologies where artificial intelligence, automation and digital platforms prevail. Digitalization is traditionally regarded as a positive characteristic of society development. However, digitalization has penetrated so deeply into all spheres of public life that there is a question whether human rights to privacy and anonymity may be infringed (Antikainen et al., 2018).

At the current development stage, it is already possible to assess the advantages and disadvantages of digitalization, as well as to assert that it will be impossible to effectively manage the state and its economy without the active implementation of the latest developments in computer science, radio electronics, communications and telecommunications. Digitalization contributes to the reduction of poverty and the digital divide between people of all social groups and various social elevators.

The concepts of “digital technologies” and “digital economy” were introduced into the scientific dictionary due to the technological changes of the 21st century regarding the “merging” of telecommunication, information and communication technologies and innovations.

Currently, digital technologies are transforming the relations between economic actors in energy, construction, banking, transportation, retail trade, education, healthcare, the media and security.

The complexity of public institutions of development and relations, which are often based on modern digital technologies, causes an exponential increase in data flows and highlights the issue of the digital economy formation (Rachinger et al., 2018). It is the current processes that make it possible to put on the agenda the creation of a new economy type, in which the implementation of innovations in the economy and social life is accelerated by the production, processing, storage, transmission and the use of a growing data volume.

II/ BODY PART

In this research, I used a deduction method to determine global trends in the digitalization of education, an institutional analysis to identify the objects of regulation of public life digitalization, information synthesis methods to indicate the

penetration of digitalization in national economies, as well as analysis tools to outline the most common definitions of digitalization found in regulatory sources.

The indicators of deep digitalization of public life, the “digital leap” and the transition to a higher technological level of macro-system development (for example, states) can be:

The ability to develop and implement digital technologies, as well as information and communication technologies, the availability of professional personnel;

Access to appropriate equipment, technologies, technology distribution among citizens and businesses. An additional indicator here is a gradual recovery of domestic demand for technology, market “success stories” in various spheres of life and the economy, the presence of local offices of technology manufacturers, and the distribution of high-tech equipment;

A sufficient level of system integration of technological products and services: from design to integrated implementations of various technologies, software and hardware;

Creative culture and the ability to generate ideas, as evidenced by the country's position in the Global Innovation Index ranking (Eurofound, 2018).

It is necessary to stimulate domestic consumption markets, the introduction and production of digital technologies, as well as to develop the vision of economy transformation from the traditional type into the more efficient digital one. It is also important to identify priority steps to introduce appropriate incentives and create conditions for digitalization in the real economy sector, where citizens acquire digital competencies.

I believe that the most promising areas of digitalization are the following:

Bridging the digital divide through the development of digital infrastructures.

The main goal of the development of digital infrastructures is to ensure that all citizens (including socially disadvantaged population groups) regardless of their location or place of living can use digital opportunities without any technical, organizational and financial restrictions or difficulties (Carbó-Valverde, 2017). In order to bridge the digital divide and create the foundations of a digital economy, states should focus on the development of digital infrastructures, such as broadband fixed telecommunications infrastructure and mobile telecommunications infrastructure, digital television infrastructure, radio and technology infrastructure for the IoT projects, computing, virtualization and data storage (cloud and fog), cybersecurity infrastructure, specialized infrastructures. Soft digital infrastructures are still important for the digital economy development, in particular, identification infrastructure, open data infrastructure, blockchain technology infrastructure, electronic payment and transaction infrastructure, infrastructure of e-commerce and online interaction of business entities, government services infrastructure (e-government), life support infrastructure (medicine, education, public safety, transport, etc.).

Particular attention to ensure broadband Internet access should be given to rural areas. This will provide new opportunities to the regions (education of children, modern medical services, ecommerce) and transfer the advantages of the city to the village. The Internet creates new opportunities for rural communities in economic and social development. The implementation of integrated digitalization tools will bridge the digital divide in the areas remote from the centers of economic life and provide an additional impetus to the development and well-being of rural residents. The digitalization of villages will also support the development of agriculture and employment. It will reduce the migration of rural residents to cities.

The development of digital competencies

The driving force of the digital economy is human capital – knowledge, talents, skills, abilities, experience and intelligence of people. In connection with the rapid introduction of digital technologies, the formation of digital skills of citizens is particularly important. Online and other technologies help citizens to more effectively get knowledge and skills in many fields (for example, learning languages, subjects, mastering professions). The number of jobs requiring ICT and digital literacy is rapidly increasing and the ability to use these technologies is becoming the main staffing requirement (Latos et al., 2018).

The creation of favorable conditions and the search for appropriate models of public-private partnership with operators of non-formal digital education and support for their regional development can contribute to the growth of private investment in this area. This will significantly expand the ability of citizens in cities and especially in rural areas to get the appropriate digital skills, occupations, etc.

One of the important tasks is updating the state classifier of occupations, that is, the development and approval of the list of digital occupations based on the actual requirements of the labor market and digital trends followed by the development of a program for their implementation in specialized educational institutions.

Implementation of the “digital workplace” concept In the digital economy, jobs are no longer tied to physical places. They become digital, virtual and mobile. This means that there is no need for a permanent employee at the workplace. The concept of “digital workplace” is becoming extremely popular in the business environment and is positively perceived by the vast majority of workers who like flexible working hours, the ability to work at home, on vacation or from any geographic location with the Internet access. A digital workplace also contributes to flexible performance of official duties by state employees, stimulates their cooperation and interaction, supports decentralized and mobility ecosystems, offers a choice of technologies for work (Bourreau et al., 2008). The benefits of digital workplaces are reduced hardware and office space costs.

Digitalization of the real sector of the economy

This is the main element of the digital economy and a determining growth factor of the economy as a whole, as well as the digital industry itself, in particular, as a technology manufacturer. In many sectors, digital technologies are the foundation of

marketing and production strategies. Their transformative power changes traditional business models, production chains and processes leading to the emergence of new products and services, platforms and innovations. It is important to create conditions and appropriate information marketing and fiscal incentives in order to significantly transform enterprises, small and medium-sized businesses, as well as the industry. Digital technologies should be accessible both from the point of view of organizational and technological access to the corresponding digital infrastructures, and from the financial and economic point of view, that is, through the creation of tools that will encourage business digitalization. The result of such activities will be the modernization of the economy, its recovery and competitiveness.

Education

The digitalization of education is implemented through:

The creation of educational resources and digital platforms supporting interactive and multimedia content to be widely accessed by educational institutions and students, including through the use of tools to automate the basic processes of educational institutions;

The development and implementation of innovative computer, multimedia and computer-oriented teaching aids and equipment for creating a digital learning environment (multimedia classes, STEM research centers, laboratories, inclusive classes, blended learning classes);

Providing broadband Internet access for pupils and students in all educational institutions;

The development of a full-fledged distance form of education with the use of cognitive and multimedia technologies.

Healthcare

The digitalization of medicine is a vital for the development of the sector and the effective provision of medical services. Digital medicine ensures the interaction between patients, medical workers and institutions using information and communication and digital technologies (Gbadegeshin, 2019). The transition of medical workflow to electronic format is one of the priorities of digital medicine. The development of a full-fledged digital medical platform is an important step towards the digitalization of medical and related services, as well as the interaction of operators in this field.

A digital medical platform is a dynamic set of systematically organized electronic data on the health status of an individual patient, which provides information exchange between departments, as well as confidentiality and security of information storage. The introduction of telesystems to provide remote medical services to citizens and support doctors in rural areas is still an important element of the digital medicine development.

Medicine is being transformed: periodic diagnostics is taking place online, the Internet of things allows using sensors to continuously monitor human health, the operators of medical and related services become participants in digital platforms. All this affects the quality, efficiency and functionality of the medical care system.

Tourism

A modern tourist needs access to digital infrastructures: from telecommunication networks to noncash payments. The need of tourists, especially young people, to travel and keep in touch with their business partners, relatives or friends is an important condition for choosing tourist routes. It has become one of the main drivers of digital transformations of world tourism. The development of fast and accessible Internet networks in transportation systems, along tourist routes, in nature reserves, at cultural sites, in leisure and recreation centers provides the full realization of the tourist attractiveness of the areas. Digital technologies help cities to fully use their tourism potential and create new opportunities for its growth (Heavin & Power, 2018).

Other important tourism digitalization initiatives are the creation of tourist websites with content localized to the needs of tourists; collection and analysis of statistics in real time using the Internet of Things technologies and large and open data; creation of virtual tours, 3D-modeling, installation of webcams at tourist facilities, introduction of QR codes, RFID tags, non-cash payment system; implementation of loyalty programs and tourist electronic cards; creation of travel mobile applications (with route maps, audio guides, geolocation), electronic tickets at tourist sites and leisure facilities; digitalization of museums (electronic multilingual catalogs, virtual and augmented reality, audio guides and electronic guides).

E-democracy

Digital technologies provide new opportunities to attract citizens to participate in social and political processes. Traditional democratic processes (offline) can be transferred into digital. The forms of the e-democracy development are e-parliament, e-voting, e-justice, e-mediation (pretrial settlement of disputes), e-referendum, e-consultations, e-petitions, electronic political campaigns and polls. But the most important area is electronic voting. This is the simplest form of e-democracy, but its implementation brings a number of political and organizational challenges. In addition, it is this form that is gradually being introduced in various countries, thereby forming international practice.

Providing voters with electronic means of voting is a matter of optimizing electoral technologies. Voting via the Internet facilitates access to the procedure for a significantly large number of citizens, increases the overall efficiency of obtaining voting results and makes it possible to vote remotely (New Digital Economy, 2011). The creation of an electronic voting program will attract a larger number of citizens, especially young people, improve the representation and quality of elections, as well as reduce possible falsification of results.

Ecology and environmental protection

Digital technologies have a significant potential to improve the environmental situation, reduce industrial emissions and facilitate the transition of real businesses to the principles of sustainable development.

The priority initiatives are:

The creation of a national system of independent environmental monitoring and assessment of the natural ecosystems and the atmosphere;

The creation of electronic registers of natural resources in order to provide information to state institutions and citizens during the discussion and decision-making on natural resources management, early prevention, quick response and recovery in case of emergency;

The development of a state analytical system integrated into the European online Shared Ecology Infrastructure System (OECD Digital Economy Papers, 2019) in order to analyze short-term and long-term trends in biodiversity, environmental pollution, weather conditions and the development of unique ecosystems, as well as to plan joint measures to prevent negative changes;

Promoting the creation of digital mobile applications for environmental “patrolling” of natural resources with the possibility of notifying law enforcement authorities about illegal activities (pollution, poaching, logging, illegal landfills).

In-city life support

The smart city concept is a model of the city using digital technologies to solve the current problems of the city, its sustainable development and comfortable life of citizens.

In order to implement the smart city concept and its scaling, a methodological base is required. The base includes:

The development of a national road map for the digital transformation of cities as a basis for the formation of relevant urban road maps and support for urban digitalization projects;

The creation of a national platform, which is a catalog of smart city solutions based on the experience of the European smart city platform (Kockmann et al., 2018). Thus, different cities will have equal possibilities of the design, development and implementation of relevant projects;

The introduction of international standards for the smart city management (ISO-37120, ISO37101);

The targeted state support for the development of innovative ecosystems in cities and the involvement of citizens in the development of smart city solutions.

III/ CONCLUSION

Digitalization requires new forms of partnership and cooperation of various spheres at all levels of the economy and society:

Digitalization should provide every citizen with equal access to the services of information and knowledge provided on the basis of information, communication and digital technologies. The creation of digital infrastructures is the main factor of expanding citizens' access to the global information environment and knowledge. In 2011, the UN recognized free access to the Internet to be a fundamental human right – a digital right.

Digitalization should be aimed at the creation of benefits in various spheres of life, which include improved quality of health and education services, creation of new jobs, development of entrepreneurship, agriculture and transport, protection of the environment and natural resources management.

Digitalization should be carried out through the economic growth by increasing the efficiency, productivity and competitiveness of the use of digital technologies, which implies the digital transformation of economic sectors, areas of activity, as well as the acquisition of new competitive qualities and properties.

Digitalization should contribute to the development of the information society and the media. Creating content in accordance with national or regional needs contributes to social, cultural and economic development, as well as strengthens the information society and democracy principles.

Digitalization should be focused on international, European and regional cooperation. Conscious and full-fledged implementation of information, communication and digital technologies leads to the integration into global systems and infrastructures.

Digitalization should be accompanied by increased public safety. Information security, cybersecurity, protection of personal data, privacy and rights of users, strengthening and protecting trust in cyberspace are the prerequisites for simultaneous digital development and corresponding prevention, elimination and high-quality management of associated risks.

Digitalization as an object of focus and integrated public administration. The main objectives of the state towards digitalization are to correct the shortcomings of market mechanisms, overcome institutional and legislative barriers, attract relevant investments, stimulate the development of digital infrastructures, create needs for the use of digital technologies by the population and develop the corresponding digital competencies necessary for digital entrepreneurship.

The implementation of these projects is the basis for strengthening state competitiveness. However, simultaneous digitalization which is not controlled at the regulatory level, the lack of domestic software, hardware and development projects can affect national security. The most dangerous cross-border and political threats to the state's information security have been studied for a long time within the framework of the information war problem. Therefore, digitalization projects should be considered in the context of ensuring information security at various levels of public life.

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EFFECTS OF VIETNAM ICT DEVELOPMENT ON LOCALITIES' ECONOMIC GROWTH

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I/ INTRODUCTION

Development of science and technology has become an urgent issue for global economy as well as national economies. In recent years, with a shock such as the COVID-19 pandemic, information and communication technologies (ICT) has been strongly promoted, but it has also faced specific difficulties.

Vietnam is also in the trend of developing ICT aspects. In recent years, there have been many focused programs about development and application of information communication technology. These includes: National Digital Transformation Program; Program to develop ICT to 2025 with a vision to 2030; Strategy to develop digital technology businesses in Vietnam; ... These programs and strategies aim at improving technological indicators of the whole country, as well as ministries, industries, localities and enterprises, which promise to enhance Vietnam's technological position in the international arena. Therefore, it is necessary to research how ICT aspects have been developing in Vietnam, as well as how they affect social and economic aspects, so that suitable policies can be recommended for technological development.

In acknowledgement of the importance of Vietnam's ICT on economic growth, the author proposed the topic: ***“Effects of Vietnam ICT development on localities' GDP growth”***. This paper aims at analyzing how three channels of ICT (Technical Infrastructure, Human Resource Structure and ICT application) affect GDP growth of provinces/cities in Vietnam, then proposing recommendations for authorities in applying ICT aspects in economic growth.

KEYWORDS: *ICT development, Economic Growth, Technical Infrastructure, Human Resource Structure, ICT application.*

II/ BODY PART

2.1. Research methodology

2.1.1. Model framework and hypotheses

Based the Vietnam ICT Index system for localities, the author proposes the including 03 ICT factors: Technical Infrastructure, Human Resource Infrastructure, and ICT application. The dependent variable, Economic Growth, is measured by yearly GDP growth in 63 provinces and cities in Vietnam from 2018 to 2020.

Table 2.1 Vietnam ICT Index System, for provinces/cities

No.	Indicator
TECHNICAL INFRASTRUCTURE	
<i>I</i>	<i>Social Infrastructure</i>
1	Landline users/100 inhabitants
2	Mobile subscribers /100 inhabitants
3	Internet users/100 inhabitants
4	Fixed broadband subscription/100 inhabitants
5	Traffic-generated mobile broadband subscription/ 100 inhabitants
6	Percentage of households with computers
7	Percentage of households with broadband Internet connection
8	Percentage of enterprises with broadband Internet connection
<i>II</i>	<i>Infrastructure of State agencies</i>
1	Ratio of Computers/Officers in State Agencies of the province, city
2	Ratio of Bandwidth/Officers in State Agencies of the province, city
3	Percentage of provinces with data centers
4	Percentage of provinces with online video conferences
5	Information security solutions
6	Data security solutions
7	Investment for technical infrastructure/officer (VND)
8	Investment for information security infrastructure/ officer (VND)
HUMAN RESOURCE INFRASTRUCTURE	
<i>I</i>	<i>Social Infrastructure</i>
1	Percentage of adults who can read and write
2	Percentage of students at school age attending school
3	Percentage of primary schools teaching informatics
4	Percentage of secondary schools teaching informatics
5	Percentage of high schools teaching informatics
6	Percentage of colleges and universities with IT majors
<i>II</i>	<i>Infrastructure of State agencies</i>
1	Percentage of officers in charge of IT
2	Percentage of officers in charge of IT with University degree or higher
3	Percentage of officers in charge of information security
4	Percentage of officers trained in open source software
5	Percentage of officers trained in information security
6	Expenses for IT training/officer (VND)
IT APPLICATION	
1	Percentage of officers granted official email addresses
2	Percentage of officers using email at work
3	Deployment of basic applications at the Office of the Provincial Committee

4	Deployment of basic applications at departments and industries
5	Deployment of basic applications at districts
6	Using electronic documents at the Office of the Provincial Committee
7	Using electronic documents at departments and industries
8	Using electronic documents at districts
9	Application of open source software
10	Percentage of provinces/cities having Websites/ Web portals
11	Website building technology of provinces/cities
12	Expenses for IT application/officer (VND)

Source: Ministry of Information and Communications, 2020

Based on previous results of effects of ICT on economic growth, the author proposed the following hypotheses:

H1: Technical Infrastructure has direct, positive effects on economic growth (Kowal & Paliwoda-Pękosz, 2017); (Hwang & Shin, 2017); (Kurniawati, 2020).

H2: Human Resource Infrastructure has direct, positive effects on economic growth (Kowal & Paliwoda-Pękosz, 2017); (Lee, 2003) .

H3: ICT application has direct, positive on economic growth (Vu, 2011); (Thai Thi Thanh & Kim, 2016).

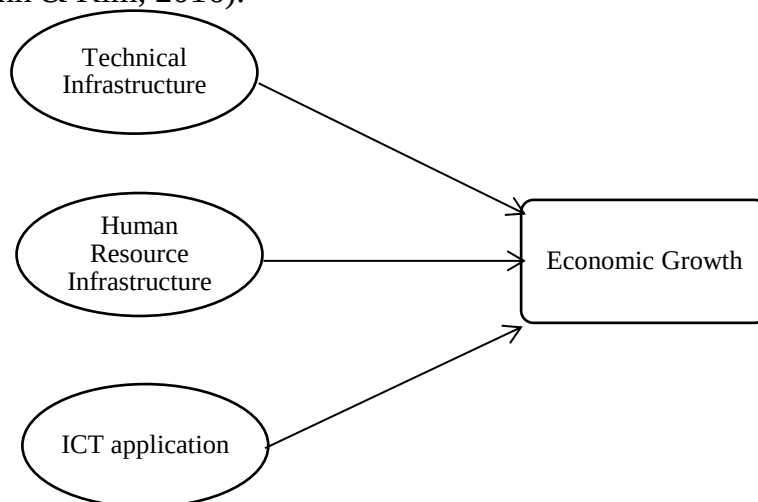


Figure 2.1. Model framework of ICT factors on economic growth in Vietnam's localities

Source: Compiled by the author

2.1.2. Data collection

The data of ICT Index and other components: Technical Infrastructure; Human Resource Infrastructure; and ICT application were collected from Vietnam ICT Index Development and Application Reports from 2018 to 2020. Until now, the 2020 version is the most updated report, which included ICT Index of 63 provinces/cities in Vietnam as well as ministries, industries and banks.

To collect GDP growth in 63 provinces/cities, the author accessed official web portals of Vietnam Government, General Statistics Office, and websites of 63 localities. These data were officially published from 2018 to 2020.

2.1.3. Analysis methods

To evaluate how ICT development affects GDP growth in 63 provinces/cities in Vietnam, the author used the regression model using GDP Growth as the dependent variable, and three independent variables include: Technical Infrastructure, Human Resource Infrastructure, and ICT application. The regression analysis uses the ordinary least square (OLS) estimator.

The regression function is written as follows:

$$gdp\_growth = \beta_0 + \beta_1 tech + \beta_2 human + \beta_3 ict\_apply$$

Table 1.2. Model's variables

Variable	Label	Source
Technical Infrastructure	Tech	Vietnam ICT Index Development and Application Reports , Ministry of Information and Communication, 2018-2020.
Human Resource Infrastructure	Human	
ICT application	Ict_apply	
Economic Growth	GDP_Growth	Web portals of Vietnam Government and 63 provinces/ cities.

Source: Compiled by the author

After using regression analysis, the author tested whether the chosen model has following errors:

- Omitted variables: Using the Ramsey Reset Test, if the p-value is greater than 0.05 or 0.1, then the model has omitted variables (Wooldridge, 2015).
- Multicollinearity: Using Variance Inflation Factor (VIF), if there is a VIF that is greater than 10, then the model has the multicollinearity error (Wooldridge, 2015).
- Heteroscedasticity: Using the Breusch-Pagan test, if the p-value is greater than 0.05 or 0.1, then the model has Heteroscedasticity phenomenon (Wooldridge, 2015).

2.2. Results

2.2.1. Sample Description

The sample includes 189 observations, corresponding to data of Technical Infrastructure, Human Infrastructure, and ICT application as well as GDP growth of 63 provinces/cities in Vietnam from 2018 to 2020.

Table 2.3. Sample Descriptive Results

Variable	Observations	Mean	Standard Deviation	Min	Max

tech	189	0.368	0.166	0	1
human	189	0.569	0.193	0.056	0.997
it_apply	189	0.317	0.163	0.046	1
gdp_growth	189	0.068	0.040	-0.105	0.208

Source: Calculated by the author, through STATA software

About Technical Infrastructure, it can be seen that, from 2018 to 2020, Da Nang, Ba Ria Vung Tau, and Quang Ninh remained positions in the top five provinces/cities with highest indexes of Technical Infrastructure. Meanwhile, Hanoi has been out of the top five since 2019 and in 2020, Hue replaced Da Nang as the highest Technical Infrastructure index.

About Human Resource Infrastructure index, there was significant fluctuations in top five in the 2018-2020 period, with the 1st position belong to Da Nang, Hue and Can Tho respectively. In addition, Ninh Thuan and Hung Yen lost positions in top five since 2019 and this period saw improvements of Quang Ninh and Bac Ninh in Human Infrastructure index.

About ICT application index, Da Nang and Hue remained the two highest positions in 2018 and 2019, before Hue fell down to 4th position in 2020. In 2020, due to the pandemic of COVID-19, many provinces/cities had great improvements in ICT application index, with Hanoi, Quang Ninh and Can Tho being in top five highest.

Table 2.2. Top five localities with highest ICT indicators, 2018-2020

Technical Infrastructure Index					
2018		2019		2020	
Da Nang	0.9338	Da Nang	0.7925	Hue	1.0000
Ba Ria Vung Tau	0.7596	Ba Ria Vung Tau	0.7115	Da Nang	0.7864
Ho Chi Minh City	0.5831	An Giang	0.6076	Ba Ria Vung Tau	0.7147
Ha Noi	0.5766	Quang Ninh	0.5876	Ho Chi Minh City	0.6885
Quang Ninh	0.5276	Lao Cai	0.5510	Quang Ninh	0.6517
Human Resource Infrastructure index					
2018		2019		2020	

Da Nang	0.9582	Hue	0.9578	Can Tho	0.9974
Ha Tinh	0.8545	Da Nang	0.9538	Da Nang	0.9851
Can Tho	0.8490	Quang Ninh	0.9449	Hue	0.9827
Ninh Thuan	0.8425	Ha Tinh	0.9206	Quang Ninh	0.9407
Hung Yen	0.7959	Can Tho	0.8661	Bac Ninh	0.8440
ICT application					
2018		2019		2020	
Da Nang	0.9300	Hue	0.9062	Da Nang	1.0000
Hue	0.7323	Da Nang	0.8500	Can Tho	0.4823
Tien Giang	0.7283	Quang Ninh	0.6725	Quang Ninh	0.4804
Nghe An	0.6879	Tien Giang	0.6636	Hue	0.4615
Ho Chi Minh City	0.6726	Lao Cai	0.5064	Ha Noi	0.3976

Source: Ministry of Information and Communications, 2018-2020

2.2.2. Regression results

Overall, all three channels: Technical Infrastructure, Human Resource Infrastructure, and ICT application have significant effects (at 1% or 5% level) on Economic Growth. Therefore, the chosen model is also statistically significant.

The regression function can be written as follows:

$$gdp\_growth = 0.072 - 0.141 tech + 0.044 human + 0.073 ict\_apply$$

Human Resource Infrastructure and ICT application have positive effects on GDP growth of provinces/cities, with regression coefficients at 0.044 and 0.073 respectively. Human Resource Infrastructure has the statistical significant level at 5% ($p - value = 0.020$), and IT application has the statistical significant level at 1% ($p - value = 0.000$).

Meanwhile, Technical Infrastructure is the only channel to negatively affect GDP growth of Vietnam's provinces/cities, with the coefficient at about -0.141. The p-value of Technical Infrastructure is smaller than 1%, which proves that this effect is statistically significant at 1% level.

Table 2.3. Regression OLS estimator results

<i>gdpgrowth</i>	Coefficient	Standard Error
<i>tech</i>	-0.141 [-6.55] (0.000*)	0.021
<i>human</i>	0.044 [2.34] (0.020**)	0.019
<i>ict_apply</i>	0.073 [3.93] (0.000*)	0.018
<i>_cons</i>	0.072 [8.63] (0.000*)	0.008

Source: Calculated by the author, through STATA software
(Note: * is statistically significant at 1% level; ** is statistically significant at 5% level)

In addition, the author also used the correlation matrix between independent variables. The result shows that, Technical Infrastructure, Human Resource Infrastructure and ICT application have positive correlations to each other. Furthermore, all correlation coefficients between these variables are smaller than 0.8, which proves that there is no multi collinearity in the model.

Table 2.4. Correlation matrix between independent variables

	tech	human	ict_apply
tech	1		
human	0.6628	1	
ict_apply	0.4388	0.4740	1

Source: Calculated by the author, through STATA software

2.2.3. Model errors testing results

Results of errors tested are shown in the Table 7. Overall, indicators support the null hypotheses that the chosen model does not have errors: Omitted Variables;

Multicollinearity; and Heteroscedasticity. Therefore, regression results are significant and believable.

Table 2.5. Model errors testing results

Error tested	Method	Null Hypothesis (H₀)	Indicator	Conclusion
<i>Omitted variables</i>	Ramsey Reset test	Model has no omitted variables	<i>p – value</i> = 0.6852	Accept H ₀
<i>Multicollinearity</i>	Variance Inflation Factor	Model has no multicollinearity	<i>Mean VIF</i> = 1.70	Accept H ₀
<i>Heteroscedasticity</i>	Breusch-Pagan test	Model has constant variance	<i>p – value</i> = 0.0829	Accept H ₀

Source: Calculated by the author, through STATA software

2.3. Discussion

As mentioned in the regression result, among three channels of ICT index, only Technical Infrastructure has negative effects on Economic growth of Vietnam's provinces/cities. This could be explained by current deployment of technical infrastructure in localities. According to the Authority of Information Technology Application, Ministry of Information and Communications (2020), the construction and development of information systems, databases in localities is still closed, deployed separately, lacking connectivity, leading to the situation difficult to share, difficult to integrate data. In addition, there are still barriers such as: lack of legal frameworks for connection and data sharing (46.9%); lack of data (40.9%); lack of connection and sharing platforms (74.3%) and standards (57.5%); unstandardized data (71.2%).

By contrast, Human Resource Infrastructure and ICT application have positive impacts on Economic growth in provinces/cities. These results are consistent with the situation in Vietnam's provinces/cities. According to the Vietnam ICT Index Report 2020, there are 30/63 localities having 100% of officers trained in open source software (OSS), such as Da Nang, Hue, Ha Noi, Ho Chi Minh City, ... In addition, there are 11 provinces/cities having at least 80% of officers trained in information security, such as Hue, Tay Ninh, Ha Noi, Hung Yen, ... These statistics prove that, localities in Vietnam have improved quality of human resources, especially in ICT education and training.

About ICT application in localities, the Vietnam ICT Index Report 2020 showed that 40/63 provinces and cities have the ratio of using e-mail in state agencies at 100%. In addition, the deployment rate of electronic one-stop systems in 2020 was higher than previous years, which proves that IT application in Vietnam general and in localities has been improved significantly.

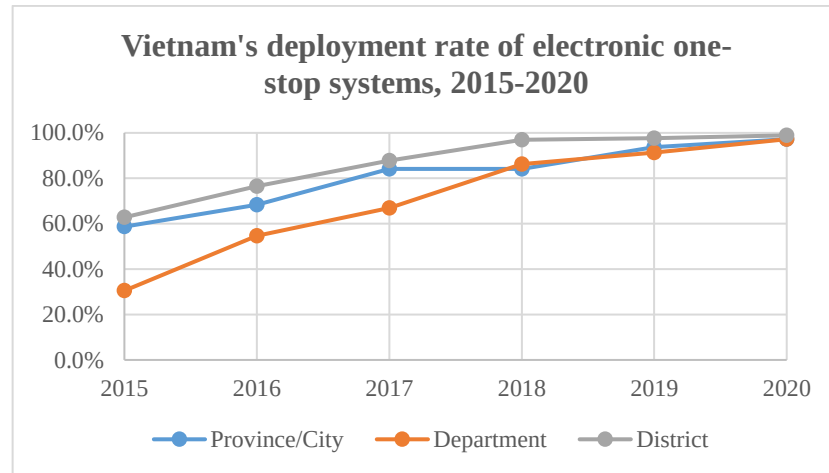


Figure 1.2. Vietnam deployment rate of electronic one-stop systems, 2015-2020
Source: Ministry of Information and Communication, 2020

2.4. Recommendations for ICT development in Vietnam

As mentioned above, technical infrastructure for ICT in Vietnam has faced specific difficulties and challenges, especially in connectivity and sharing between localities. Therefore, it is necessary for government and local authorities to build legal framework as well as detailed regulations and instructions in data connectivity and sharing, so that localities and authorities can follow and perform. In addition, localities should be provided conditions to access, learn and apply international standards in building, archiving and sharing databases, so that technical infrastructure quality can be improved. Taking advantage of different sources of investment in ICT infrastructure, such as foreign direct investment (FDI), official development assistance (ODA), and other privatized investment sources is a possible solution.

Moreover, to improve quality of ICT human resource, it is necessary to suitably change education programs. For instance, in 2018, Vietnam Ministry of Education and Training provided a new program for primary, secondary and high school students, which includes new components in Technology: Tech Awareness, Tech Communication, Tech Usage,... These changes aim at improving quality of ICT human infrastructure in the long run, and it also expectedly promotes ICT application in Vietnam. In addition, it is important to regularly update and improve quality of ICT infrastructure, devices and services that are suitable to international and national situations.

III/ CONCLUSION

Economic growth in Vietnam's provinces/cities is significantly affected by both three channels of Information and Communications Technologies, including Technical Infrastructure, Human Resource Infrastructure, and ICT application. Regression results showed that, while Human Resource Infrastructure and ICT application significantly improved Economic Growth in the 2018-2020 period, Technical Infrastructure had negative impacts on Economic Growth of localities.

Overall, ICT development in Vietnam has been beneficial in different aspects. Education and training in ICT knowledge and skills have been significantly improved in recent years, which has directly improved quality of human resource at localities, departments and even enterprises. Because of high-skilled human resource infrastructure, the usage and application of ICT devices and services have been effective and efficient. As a result, ICT application index has improved economic growth in localities.

Besides advantages in ICT development, Vietnam also has challenges, especially in investing in technical infrastructure. Furthermore, there are some barriers for ICT development such as: lack of legal frameworks for connection and data sharing; lack of data; lack of connection and sharing platforms and standards; unstandardized data, ... This requires government, authorities and localities to have suitable solutions and policies to remove barriers so that Vietnam has optimal conditions for ICT, then contribute to economic growth and social development.

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DEVELOPMENT TRENDS OF DIGITAL TRANSFORMATION, AND DIGITAL TECHNOLOGY IN VIETNAM AND AROUND THE WORLD FROM THE PERSPECTIVE OF STUDENTS

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INTRODUCTION

In the era of industrial revolution 4.0, digital transformation and digital technology have been developing constantly and are an important step forward, because it is not only suitable for the trend of the times but also applied in all industries. fields for development for each country in the world, including Vietnam.

BODY PART

1. THE TRENDS OF DIGITAL TRANSFORMATION AND DIGITAL TECHNOLOGY AND THE CONVENIENCE FEATURES OF DIGITAL TRANSFORMATION AND TECHNOLOGY

1.1. What is digital technology, digital transformation?

Digital transformation is the integration of digital technologies into all areas of an enterprise, leveraging technologies to fundamentally change how businesses operate business models, deliver new values for their customers, and speed up business operations. Digital transformation is also a change in the culture of businesses, requiring businesses to constantly change, try new things and freely accept failures. Digital technology, also known as digital transformation, is when we have digitized data, we must use technologies such as AI, Big Data, etc to analyze data, transform it and create value. Understandably, digital transformation is a higher level of digitization, as a complete phase of digitization.

1.2. Digital transformation, technology in the world

Digital transformation is increasingly changing the perception of leaders, who can determine the direction and ability to successfully transform an organization. After realizing the importance of digital transformation in increasing operational efficiency and ensuring national security, the government apparatus of many countries immediately entered a new "race" in the application of digital transformation number conversion.

In the past, old-fashioned technologies were only accessible to large companies with a lot of strong economic potential. Therefore they are always leading the market, at least by a few steps. But now, small companies or new startups can access technology no less than large companies.

Reports of large market research companies such as Gartner, and IDC...all show that digital transformation brings many benefits to all aspects of business activities: from management to research, business...The most recognizable benefits of digital transformation for businesses are cutting operating costs, reaching more customers in the longer term, and leading to faster and more accurate decision-making thanks to

The speed of digital transformation varies by region and country, depending on the level of technology development and the speed of business model transformation. Europe is considered to be the region with the fastest digital conversion speed, followed by the US and countries in Asia.

At the initial stage of digital transformation, the choice of most businesses when building business development directions is to choose digital technology platforms first (“Digital-First”). IDG's Digital Business Survey in 2019 also shows that about 91% of businesses plan to adopt or have already applied the "Digital-First" strategy. There is not much difference between large enterprises and small enterprises in the “Digital-First” strategy when this figure for SMEs is 89% and large enterprises are 93%.

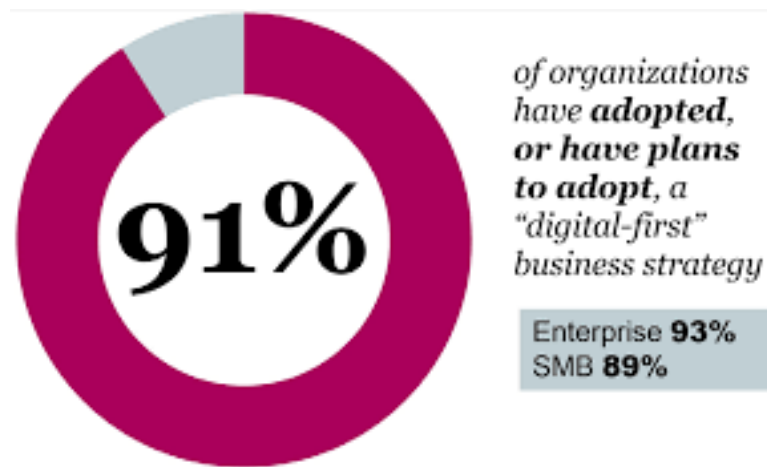


Figure 1.2.

Source: 2019 Digital Business Survey.

1.3. Digital transformation, technology in Vietnam

Since opening up to the Internet in 1997, Vietnam has quickly become one of the world's leaders in information and communication technology (ICT) infrastructure development thanks to strong national policies. government. Technological improvements in industry and all socio-economic sectors have led to significant changes in the education sector.

Therefore, digital transformation is increasingly being used to improve the quality of teaching, management, and resources in education in general and in higher education in particular. For students, digital transformation and digital technology have become a basic requirement to achieve digital literacy, an undeniably important competence of students and workers in the 21st century. As they may constantly change their career, job, function, or field direction, mastering digital tools for work and communication will help them succeed.

In particular, deploying and piloting advanced teaching and learning models on a digital basis in the direction of teaching following the conditions and needs of general and continuing education. Developing digital repositories, open learning materials to share for the whole education sector, including electronic lectures, television lectures,

multimedia digital learning materials, electronic textbooks, system development Online question bank for all subjects of general and continuing education. Besides, strong application of artificial intelligence technology in service provision. Deploying a school administration platform that integrates digital workspaces to 100% of educational institutions to create an online working and interactive environment for education administrators, teachers, staff, and learners, thereby ensuring the connection and reporting of data from educational institutions with the national database system of the education sector.

In Vietnam, the process of digital transformation has begun to take place, especially in industries such as finance, transportation, tourism...On the part of the tourism management agency, the National Administration of Tourism is preparing to deploy deploying the project of digital transformation in the tourism industry, aiming to form an interconnected axis connecting management information from the central to local levels and service establishments; A national database system on tourism; An electronic trading floor that connects service providers and tourists. In the field of transportation, digital technology is also applied and digital data is extensively used in all management activities to develop modern and advanced transport infrastructure, protect the environment and ensure safety, and traffic safety for the people. Besides, digital transformation in the financial - banking industry is the focus of the economy's digital transformation, which has broad relevance to many other industries. Banking is a pioneer field in digital transformation, leading the development of the digital economy, followed by the fields of securities, insurance, and ecological systems of other businesses.

Governments and authorities at all levels are making efforts to build e-Government towards Digital Government. More than 30 cities are also planning to build Smart cities with new technology platforms...Or FPT said that it is also implementing digital transformation for FPT itself with nearly 36,000 people and is committed to achieving results within 12 months.

The situation of digital transformation for SMEs in Vietnam:

About 100,000 stores in Vietnam use software for sales management activities at retail stores and multi-channel sales; the same is for Sapo and thousands of other businesses using Quick, etc.

Hundreds of thousands of businesses are directly doing business on e-commerce platforms such as Sendo, Tiki, Lazada, Shopee, etc.

Although there are no statistics, a large proportion of Vietnamese businesses (hundreds of thousands of businesses) have used digital marketing as an important marketing method (accounting for more than 20% of the total). total advertising spending in Vietnam) in marketing and sales activities; major digital marketing platforms can be said like Facebook, Google, Youtube, Tiktok, Instagram, 24h, Admicro, etc.

For digital transformation in corporate governance, although the transformation is still slow, it is shown by the small number of enterprises applying ERP, HRM, E-

Office solutions, timekeeping, payroll software, etc, there is a relatively large proportion of enterprises that have converted the number of administrative and internal operations at a basic level, as shown by preliminary statistics:

More than 60% of businesses are using accounting software, of which nearly 200,000 businesses use accounting software Misa;

Over 200,000 businesses are using e-invoice software from many different suppliers;

Almost all businesses have equipped and used digital signatures;

Online tax declaration software and online social insurance declarations are applied in the vast majority of businesses in Vietnam.

However, Vietnamese enterprises in general, especially small and medium enterprises, are still not properly aware of the role of digital transformation in the fourth industrial revolution. Specifically, according to VCCI, currently, Vietnam's small and medium enterprises account for about 97% of the total number of enterprises, the level of science, technology, and innovation is still low, with 80% to 90% of the machinery used in the industries. Vietnamese enterprises are imported, nearly 80% of which are old technologies from the 1980s and 1990s.

In Vietnam, SMEs are facing barriers in the digital transformation process such as lack of digital skills and human resources (17%), lack of a strong enough IT platform to enable the digital transformation (16.7%), lack of digital thinking or digital culture challenges in business (15.7%),...However, the report also shows that Vietnamese small and medium enterprises are investing in cloud technology (18%), cybersecurity (12.7%), and upgrading software and hardware to move number change (10.7%).

According to a survey by VCCI and JETRO with more than 400 businesses in Vietnam, the current situation in the digital transformation of enterprises is modest with the main barriers including:

Investment costs in digital transformation are still high;

Current information technology infrastructure is underdeveloped;

Difficulty in accessing network security and risk solutions;

Limited digital transformation resources;

Organizational management, business processes, and supply chains have not been standardized;

Difficulty in accessing information about digital technology.

Advances in the field of AI have been brilliant. AI has not only replaced humans in many intellectual tasks, such as certain types of cancer diagnosis⁴⁷ and speech recognition (reducing AI's word error rate from 26% to 4% only between 2012 and 2012).⁴⁸ 2016),⁴⁸ but also became an indispensable pillar of society's most important building blocks. Currently, most people not only trust AI blindly in their daily lives through car anti-lock braking systems (ABS) and autopilot in airplanes but also with their cultural, economic, social, and political opinions. If we study any other species

that has outsourced most of its energy allocation decisions, three-quarters of its resource allocation decisions, and one-third of its average reproduction decisions to some kind of information system, intelligently and proactively, that is unlikely to happen, that we will treat them as two separate and independent systems. We will view it as an organically intertwined and inseparable social-technological system. From the historical point of view of social change, the fusion of biology and AI is beyond any point of return, at least from the social science point of view of society as a whole. Now, the downsides of this merger are starting to become apparent, including loss of privacy, political polarization, psychological manipulation, substance use, social anxiety, and distraction, wrong information.

According to research conducted by Microsoft in the Asia-Pacific region, before and after the outbreak of the COVID-19 pandemic, 74% of business leaders believe that innovation is imperative and plays an important role in their ability to thrive and enterprise resilience.

Up to 98% of businesses pioneering innovation believe that innovation is the key to quickly responding to market challenges and opportunities, and digital transformation is promoted in the State apparatus. Specifically, the Ministry of Industry and Trade has implemented many online trade promotion conferences. Helping Vietnamese businesses' brands to approach partners and export markets effectively right.

Thus, digital transformation and digital technology are important premises for socio-economic development for each country in the process of international integration, thereby enhancing the country's potential as well as improving the quality of life of each person.

CONCLUSION

Digital transformation and digital technology have become an inevitable trend and a top concern of many countries around the world, digital transformation and digital technology not only play an important role for businesses. but also in other fields of society such as medicine, science, mass communication, etc. In Vietnam, the Government is also particularly interested in digital transformation and has introduced policies and schemes to help the country keeps pace with the trend of the times.

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THE IMPACT OF COMPREHENSIVE AND PROGRESSIVE AGREEMENT FOR TRANS-PACIFIC PARTNERSHIP (CPTPP) ON VIETNAM'S DAIRY FARMING INDUSTRY – FROM THE DIGITAL ECONOMIC PERSPECTIVE

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ABSTRACT:

The article analyzes the impact of the CPTPP on the dairy farming industry in Vietnam from the perspective of the digital economy, thereby proposing some solutions to deal with this issue.

KEYWORD:

Digital economy, CPTPP Agreement, dairy farming industry.

1. GENERAL THEORETICAL ISSUES ABOUT CPTPP AND DAIRY FARMING INDUSTRY IN VIETNAM

1.1. A brief overview of the formation and development of the CPTPP agreement

The Comprehensive and Progressive Agreement for Trans-Pacific Partnership, or CPTPP for short, is the successor of the Trans-Pacific Partnership Agreement. Partnership Agreement – TPP); including all 12 participants. TPP was officially ratified on December 4, 2016 in Auckland (New Zealand) after 5 years of negotiations towards the purpose of integrating the economies of the Asia-Pacific region. helpful.

The predecessor of the CPTPP is the P4 Agreement; The reason is called “P4” because the Agreement now includes only 4 countries, namely Brunei, Chile, New Zealand and Singapore, signed on June 3, 2005, then the agreement came into force on May 28. May 2006.

It was not until September 22, 2008, that the United States expressed its intention to participate in the Agreement, but it was not simply the P4 with only 4 members as before, but a comprehensive cooperation agreement with a related scale. with many economies in the Asia-Pacific region, called the Trans-Pacific Partnership - TPP. Not long after that, Australia and Peru also began to announce their accession to the agreement.

On November 13, 2010, at the Asia-Pacific Economic Cooperation (APEC) Summit held in Yokohama, this was the moment marking the moment when Vietnam officially entered the Comprehensive Trans-Pacific Partnership Agreement. – TPP after three negotiations. Gradually other members such as Malaysia, Mexico, Canada and Japan also began to participate in TPP respectively; bringing the total number of members in the agreement to 12 countries. However, in 2018, the US - the country that plays a key role and is also the initiator of this event, withdrew from the TPP, leaving 11 countries and an unborn Agreement. Not stopping before these difficulties, the remaining members including: Australia, Brunei, Canada, Chile, Japan, Malaysia,

Mexico, New Zealand, Peru and Vietnam have made great efforts to research, exchange, and unify changes. The name of the Trans-Pacific Partnership Agreement - TPP became the Comprehensive and Progressive Agreement for Trans-Pacific Partnership - CPTPP and on March 8, 2018 in the city of Santiago, this agreement was officially born.¹

1.2. Overview of dairy farming industry in Vietnam

1.2.1. Dairy husbandry concept

Currently, the current law has not provided an official definition for the term “dairy husbandry”. However, according to the Vietnamese Dictionary: “*Livestock in general is raising livestock and poultry*”². Thus, in simple terms, animal husbandry is a practice in which humans affect specific livestock species to create products based on the characteristics of each species. For example: chicken is the type that lays eggs, so the products that farmers aim at this time will be eggs and meat, pigs provide very high meat production, so the target will be meat,... and similar. Thus, when it comes to dairy farming, people often immediately think of fresh milk because this is a species with a huge milk production, with a high level of nutrition.

1.2.2. The role of dairy farming industry in Vietnam

The livestock industry in general and the dairy farming industry in particular hold a certain importance in the development of the whole country, this is shown from the economic perspective to the society.

1.2.2.1. For economy

Along with the livestock industry in general, dairy farming is likened to a “supporting platform” for the economy³; This is because dairy farming is not only a channel to contribute to the state's budget revenue, but also a solution to social security problems such as hunger eradication, poverty reduction, unemployment, and poverty reduction,... in countryside.

The dairy industry plays the role of a source of input materials for the domestic dairy industry. In other words, this is the industry that creates the source of input materials to promote the development of the dairy industry and the position of the dairy industry in the economy, through quality, price,... Accordingly, the total output that The dairy industry provided as of June 2021 can only meet “40-50% of the domestic market's consumption demand”⁴, so this is a promising industry that can bring high efficiency for future economic growth.

¹ Phong Nguyen Minh, *The US returns to CPTPP – not soon but inevitable*, People's newspaper of the Communist Party of Vietnam, <https://nhandan.vn/my-quay-lai-cptpp-khong-som-nhung-la-tat-yeu-post639571.html>, accessed June 19, 2022

² Hoang Phe, *Vietnamese Dictionary*, Da Nang Publishing House, Da Nang, 2003, p. 137.

³ The General Department of Vietnam Customs, *Agriculture promotes the role of the pedestal of the economy during the pandemic*, <https://www.gso.gov.vn/du-lieu-va-so-lieu-thong-ke/2021/10/nong-nghiep-phat-huy-vai-tro-be-do-cua-nen-kinh-te-trong-dai-dich/>, accessed June 21, 2022

⁴ Anh Quang, *Promoting the dairy farming industry*, [https://nhandan.vn/thuc-day-nganh-chan-nuoi-bo-sua-post651647.html#:~:text=%C6%AFu%20ti%C3%AA%20giao%20%C4%91%E1%BA%A5t%2C%20thu%](https://nhandan.vn/thuc-day-nganh-chan-nuoi-bo-sua-post651647.html#:~:text=%C6%AFu%20ti%C3%AA%20giao%20%C4%91%E1%BA%A5t%2C%20thu%20)

1.2.2.2. For society

Firstly, the dairy industry ensures the supply of nutrition for the people. When the dairy industry is popularized in our country, the issues of community nutrition are also improving day by day, thanks to the abundant raw materials from the exploitation of the industry's resources, the issues of improving nutrition have also improved. health care for the people is increasing day by day. Among them is the explosion of product lines for children, food supplements for pregnant women, the elderly, etc. Nowadays, milk is considered as one of the essential goods in the food industry. Thanks to the strong development of the dairy industry, the health and physical health of Vietnamese people are increasingly improved.

Secondly, the dairy industry plays an important role in solving poverty across the country. Excluding the present time, in 2012 the dairy farming model received many positive reviews from researchers in improving the lives of low-income people⁵. Accordingly, dairy cows are easy animals to raise and when raising, farmers can be partially self-sufficient in food by planting grass and harvesting grass from other places to replace animal feed. On the other hand, thanks to the advantage of low investment capital, plus in some times high purchasing prices have created a driving force to solve poverty in the rural areas of our country.

Thirdly, the dairy industry promotes the development of related economic sectors. Accordingly, when the dairy industry develops, industries related to dairy farming such as dairy industry, animal feed processing, or dairy food processing industry (butter, cheese, etc.) also developed, thereby contributing to creating many jobs for the society.

Fourthly, the dairy industry contributes to saving costs to pay for gas demand for households. With the installation of Biogas tunnels in the livestock system, people can freely use natural gas without having to worry about the price increase or decrease. At the same time, the dairy industry is contributing to providing effective organic fertilizers, limiting the use of chemical fertilizers that pollute the environment.

Finally, the dairy industry contributes to the protection of land resources. Basically, the dairy industry is the most effective channel to consume fresh grass, because of that, the cattle industry in general and dairy farming in particular contribute a significant part in limiting the area. fallow land, not cultivated for a long time; instead, these places will be used by farmers to grow grass to serve their livestock benefits, thereby minimizing the situation of unused land.

1.3. The provisions of the CPTPP agreement affecting the dairy farming industry in Vietnam

[C3%AA,thu%E1%BA%A7n%20gi%E1%BB%91ng%20b%C3%B2%20s%E1%BB%AFa%20HF.](#), accessed June 21, 2022

⁵ Huu Nguyen, The first step efficiency of the project on replicating the poverty reduction model to develop dairy farming, Journal of Labor and Social Affairs, Issue 439, 2012, p.21.

1.3.1. Tariff commitments

Basically, the dairy industry largely depends on the prosperity and decline of the dairy industry, which also means that if the dairy industry is negatively affected, the farmer's life will also receive negative impacts. similar actions because after all, their income comes from the buyer, so the requirements they set out mostly affect people's lives; In addition, the effects of the market such as the increase in the price of feed, medicine, and livestock equipment also create huge spending pressures on farmers.

When the CPTPP comes into effect, a total of 40 dairy products will be reduced to 0% with a roadmap of 4 to 6 years⁶, in addition, there are 10 items in the EIF list, which means that The products on the list above will be eliminated from tariffs right from the time the Agreement is signed. The remaining 30 items will be eliminated according to a tariff schedule, but the tax reduction schedule is also very sudden for some lines with relatively high import tax rates, specifically: in the Tariff, there are 12 items. has a basic tax rate of 15% or more, but the time for businesses to adapt is mostly only 4 years (ie category B3). The remaining items keep the tariff rate reduced year by year not exceeding 4% according to the roadmap, so the level of impact will also be lower.

With 23 items in list B3, 5 items in list B4 and 02 items in list B5. It is predicted that the dairy industry will likely suffer almost all of these impacts from the fifth year after the agreement's implementation.

Observed that among the 10 countries participating in the CPTPP, there are 4 countries that export milk to the Vietnamese market with great value such as New Zealand, Australia, followed by Singapore and Japan. As of 2015, New Zealand's milk exports alone accounted for over 24% of total dairy imports in Vietnam.

From these things we can see, the potential for dairy businesses to be competitive in the “home field” is very high in the future. This indirectly affects dairy farmers, because:

In the context of having to compete with potential competitors in the CPTPP in the Vietnamese dairy market, the important goal that businesses set is how to reduce costs as well as increase the quality of raw materials from farmers.

Regarding the price of milk, according to a survey by the Research Group, Euromonitor, Vietnam's dairy products are rated as one of the most expensive milks in the world (1.4 USD/Liter), while in other countries in the agreement such as New Zealand is 1.3 USD/Liter and Australia's range is 1.1 - 1.2 USD/Liter. This requires farmers to invest in more modern equipment, along with having to have an alternative feed source for the current animal feed at the present time. In fact, the domestic dairy industry is still too “small and fragmented”, it is estimated that about 95% of dairy cows in our country are raised scattered among households. According to the survey results in 2015. Therefore, it is quite difficult for farmers to meet the technical requirements to achieve the goal of reducing production costs.

⁶ Vietnam's tariff commitments in the CPTPP.

On the other hand, in order to improve the competitiveness of products as well as product quality, businesses are required to set strict standards for the selection of input materials. Faced with this, farmers are forced to make a choice between changing their care methods to meet the buyer's requirements or having to convert dairy farming to beef cattle to protect their health. best risk the risks of not having an output for the dairy product they create.

Besides, the response level of the majority of dairy farmers according to household method is quite poor, passive to other economic and social impacts that directly affect the livestock production process because for example such as: the increase in the price of the product, the feed input and the output cost of the product. Their common mentality is to provide products at the request of the “dealers”, as well as being heavily dependent on the market.

1.3.2. Non-tariff measures:

Regulations on animal and plant quarantine (SPS):

As stipulated in Chapter 07 of the CPTPP Agreement, member countries agree that: the application of SPS measures to protect public health or protect animals and plants in their territories is fully legal, but conversely, countries applying SPS measures must demonstrate “reasonable” for this decision, which means that the applying country needs to provide partners whose goods are subject to SPS measures are scientifically based, international standards, guidelines, recommendations and applied to the extent necessary. However, this should not be the basis for any non-tariff barriers.

Looking back on the situation of small-scale livestock production in our country, some parts of the breed cannot be guaranteed to have the origin, in addition, partly because the climatic conditions in Vietnam are mostly subtropical in the south. Northern and tropical monsoons in the South thus partly affect the productivity of imported cattle breeds; In addition, with the hot, negative and rainy climate, it is very difficult to spread and control the disease, because livestock production is mainly concentrated on a small scale across the country plus understanding. Farmers are still limited, so they have not fully participated in disease vaccination programs. Milk extraction in some areas is still too manual, while milk can be contaminated during milking if hygiene is not ensured. Normally, with modern milk processing lines, sterilization is carried out according to strict procedures, so milk infection is unlikely to occur, while harvesting work at households in some areas is not possible. mainly by hiring an individual to do the work. This partly makes the products of a part of farmers not meet the requirements of food hygiene and safety in livestock, besides it is also easy to spread dangerous diseases such as foot-and-mouth disease. or nodular dermatitis in cows.

Commercial technical barriers (TBT):

Located in Chapter 8 of the CPTPP Agreement, like Chapter 7, the Technical Barriers to Trade Regulations recognize that member countries can apply technical measures as a measure to prevent this type of trade. goods that the country considers that the

import of such goods affects national security, protects the health and safety of people, animals, plants or the environment. However, it is necessary to provide scientific evidence for the application of technical barriers in cases where such regulations are likely to significantly affect the trade of other members, when requested by other Members, the country of application will have to explain the technical regulation in accordance with the process required by the TBT Agreement.

In terms of livestock industry, in general, these regulations of TBT do not have much impact on trading activities in the industry. However, in a broader view, TBT is a factor that directly affects the export rate of the dairy industry in the bloc, as a result, a series of regulations to tighten the quality of raw milk are applied, making income of the population is shrinking. In addition, regulations on Investment also cause limitations for the domestic livestock industry: According to the CPTPP Agreement, the investment regulations of the member countries are provided for in chapter 9, whereby, the Agreement requires fair, non-discriminatory investment protection and investment policies in order to ensure the basic principles of competition. this creates many obstacles that prevent the state from implementing protectionist measures on the domestic market.

2. THE IMPACT OF THE CPTPP ON THE DAIRY FARMING INDUSTRY IN VIETNAM: FROM A DIGITAL ECONOMY PERSPECTIVE

2.1. Overview of the digital economy

Basically, the digital economy is an economy that develops on the basis of digital technological advances. In Vietnam, this term has only been popularized in the last few years, while in developed countries around the world, it has started to recognize the appearance of this term since the end of the 19th century.⁷

Accordingly, most of our daily lives have the existence of constituent elements of a digital economy, for example, up to the present time, the needs for buying and selling goods or using services (booking Grab, booking tours,...) almost all of you can operate online completely (except for businesses that have not yet digitized) and of course the payment can also be in the form of payment online or in person. Even, in the years 2020 and 2021, to limit the negative effects of Covid - 19, online teaching forms are also gradually being widely applied by educational institutions across the country... Those are the elements that make up the digital economy.

2.2. Requirements for the dairy farming industry in Vietnam to adapt to the CPTPP in the digital economy

In fact, when looking at the digital economy to assess the impact of the CPTPP on the dairy industry, in the long term, the CPTPP can be considered a great advantage that our country has gained. Because when joining the CPTPP, the opportunity to access the digital technology market is huge.

⁷ To Trong Hung, *Awareness of the digital economy and some solutions to develop the digital economy in Vietnam*, <https://tapchicongthuong.vn/bai-viet/nhan-thuc-ve-kinh-te-so-va-mot-so-giai-phap-phat-trien-nen-kinh-te-so-o-viet-nam-81304.htm> , accessed June 26, 2022

Since the CPTPP took effect, all import tax rates for modern livestock equipment from member countries have been kept at 0%, which creates many advantages in technology access. new. In addition, for members with a developed dairy farming background such as New Zealand, Japan, Australia, etc., the CPTPP also opens the door for us to have the opportunity to learn how they apply digital technology in exploiting the potential of the livestock industry, thereby determining an effective direction for the livestock industry in general and dairy farming in particular.

However, if looking at the short term, it can be said that the dairy industry in Vietnam at present cannot synchronously apply these advantages in practice, because when looking back at the domestic livestock industry, the number of small-scale livestock households accounts for almost the majority. To make it easier to imagine, if we look at the dairy cow structure of what is considered the main distribution channel of raw milk for Ho Chi Minh City - Cu Chi district, we will see that, in 2021, the number of households raising livestock with small and medium scale (from 01 to 19 children) accounting for 2,412 out of 3,230 households, which means that this number accounts for nearly 75% of the total⁸.

In fact, during the time the country was affected by the pandemic, there were also many digital technology models applied in the agricultural sector to help farmers improve their income status, especially E-commerce platform model - Postmart.vn initiated by Vietnam Post Corporation (Vietnam Post) is highly appreciated. This is the place to link the chain of 2.5 million agricultural production households across the country, supporting people in bringing agricultural products to reach the needs of consumers⁹.

However, if evaluated from the perspective of the dairy industry, in general, this option is almost not effective, the reason lies in the nature of the trade in livestock products of this industry (milk) need to go through more processing stages of dairy factories to be able to bring to the market for consumption, in addition, the quality will be inversely proportional to the storage time, so skipping the intermediate step to reach the customers It's really difficult for consumers. Strictly speaking, the purchasing agent is almost the only customer who buys milk from the farmer.

Therefore, in order to take advantage of the advantages brought by the CPTPP, the first thing we need to do is to thoroughly understand the characteristics of the industry as well as grasp the situation in the most clear way to ensure the application of the CPTPP to apply guidelines and policies that can be implemented as effectively as possible.

3. SOLUTIONS TO DEAL WITH THE IMPACT OF THE CPTPP ON DAIRY FARMING INDUSTRY IN THE DIGITAL ECONOMY

⁸ Report No. 81/BC-TCNTY of Ho Chi Minh City Veterinary Sub-Department on Cattle Herd Statistics in 2021.

⁹ Do Huong, *Digital transformation in agriculture: Positive expectations*, <https://baochinhphu.vn/chuyen-doi-so-trong-nong-nghiep-nhung-ky-vong-kha-quan-102220120135403691.htm>, accessed June 27, 2022.

In conclusion, order to limit the impacts that CPTPP brings in the digital economy, in the author's opinion, the following things can be done:

Firstly, focus on synchronizing livestock production in order to apply digital technology on a large scale.

Secondly, there should be research by the state in setting a reasonable policy in an effective roadmap.

Thirdly, it is necessary to have the support of the authorities at all levels in guiding and encouraging people to be aware of the importance of improving livestock production in order to promote the synchronization process that the state can achieve.

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GAMIFIED SOLUTION TO ENHANCE STUDENTS' INTEREST IN HISTORY - IMMERSION LEARNING AND GAMIFICATION

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ABSTRACT:

This study aims to research development trends in education technology in Vietnam and around the world from students' perspectives, specifically how gamification has become more popular within Edtech. Gamification in learning involves using game-based elements such as point scoring, peer competition, teamwork, and score tables to drive engagement, help students assimilate new information, and test their knowledge. The pandemic caused by COVID-19 has enforced a shutdown of educational institutions of all levels, including high school and university students, and has forced educators and institutions to adapt hastily teaching strategies. In general, students reported that gamification was innovative, engaging, and an efficient strategy to deliver curricula material; moreover, it was perceived as a fun activity. Moreover, the study will go through immersion learning - Immersion learning refers to any education approach that teaches by placing a student directly in an environment. There have been many studies showing positive results from immersion learning, provided a student also receives explicit instruction of the target information on some level - and introduces a Gamified Education Model that may garner interest in History from students.

KEYWORDS:

Education, covid-19, technology, gamification, digital transformation, games, immersion learning, history

1. PROPOSAL AND RESEARCH OBJECTIVES:

1.1. Definition:

1.1.1. Gamification

Gamification is the strategic attempt to enhance systems, services, organizations, and activities by creating similar experiences to those experienced when playing games to motivate and engage users. This is generally accomplished through the application of game-design elements and game principles (dynamics and mechanics) in non-game contexts. Gamification is part of persuasive system design, and it commonly employs game design elements to improve user engagement, organizational productivity, flow, learning, crowdsourcing, knowledge retention, employee recruitment and evaluation, ease of use, the usefulness of systems, physical exercise, traffic violations, voter apathy, public attitudes about alternative energy and more. A collection of research on gamification shows that a majority of studies on gamification find it has positive effects on individuals. However, individual and contextual differences exist.

1.1.2. Immersive Learning

As the world becomes increasingly technologically driven, traditional classroom-based learning where a teacher, lecturer, or trainer stands at the front of a class is increasingly becoming a thing of the past. Creating a participatory environment where educators are facilitating active, immersive learning can be hugely beneficial to a learner's development; enriching their knowledge base and practical skills.

Immersive learning is a hugely effective way for many learners to develop their knowledge and skills. It provides artificial, digitally created content and environments that accurately replicate real-life scenarios so that new skills and techniques can be learned and perfected. Learners aren't simply passive spectators; they get to be active participants who directly influence outcomes. And what's more, it offers a risk-free and safe space where learning can be repeated and success can be accurately measured. It's practice-based learning where the sky is the limit.

1.2. Proposal

Gamified Education Model - This is a role-playing game based on event prediction and real events that happened in history. Players can actively make their own decisions for the outcomes of historical simulations. They can actively learn history by analyzing given factors and directly deciding the outcomes of historical simulations. As for the customer value proposition, the model enables better decision-making, a deeper understanding of historic events, and more importantly, practice in predicting future events (risk management). Ideally, the model should be accessible through an internal application on PCs, smartphones, and VR devices.

There are 4 main game mechanics to the model. One of our key mechanics is Knowledge Points KP. Students can gain KP by choosing the right outcome of an event and competing with others. Once they get to a certain milestone, the game will open more scenarios, rewards, time-limited challenges as well as new journeys. Artificial Intelligence will play a part in creating and generating randomized but related events for each map, creating a layer of "speculative history". Furthermore, real history will be applied as part of the game mechanics for each map, thereby forcing the players to learn history to understand the mechanics

1.3. Research Objectives

According to our recent survey, the experience of learning History in high schools these days is quite diverse. Many students say that the traditional teaching methods in their schools are monotonous and that they find it hard to pay attention to the lesson. Besides, teachers are trying to catch up with the teaching trend nowadays. Furthermore, the unruffled syllabus is one of the elements that prevent students from enjoying their process of learning History in school. In recent years, MS Powerpoint has become a familiar teaching tool. However, in *The Journalist* journal, Professor Bent Meier Sorensen of Copenhagen Business University says that this approach is overused and discourages students from brainstorming and thinking about

complicated problems.

Understanding the benefits of gamification and immersive learning, as well as digitally transforming education amid post-covid recovery, we've come up with a gamified education model on History, based on Immersive learning theories.

2. RESEARCH METHODOLOGY:

2.1. Sentiment Analysis

According to our recent survey, the experience of learning History in high schools these days is quite diverse. Many students say that the traditional teaching methods in their schools are monotonous and that they find it hard to pay attention to the lesson. Besides, teachers are trying to catch up with the teaching trend nowadays. Furthermore, the unruffled syllabus is one of the elements that prevent students from enjoying their process of learning History in school. In recent years, MS Powerpoint has become a familiar teaching tool. However, in The Journalist journal, Professor Bent Meier Sorensen of Copenhagen Business University says that this approach is overused and discourages students from brainstorming and thinking about complicated problems.

2.2. Results

Gamification is still a novel concept for not only teachers but also students in Viet Nam. According to our survey, 42.9% of participants know about this definition. Nevertheless, some educators have applied gamified instruments into their curriculum and courses with the main goal to entertain students after an intense learning process and to review what they have learned. With a sample size of 500 participants, our surveys have shown that 81% of students are disinterested in traditional History teaching methods, and only 57.1% of students are aware of gamified education. Within those who are aware, most students have an average-to-high demand in roleplaying games as part of gamified education

In essence, customer personas are fictional representations of segments of buyers based on real data reflecting their behaviors. Their purpose is to put the people in charge of company decision-making in the shoes of the customer. From our survey, our target demographic are as follows:

- Age: 16 - 18
- Accommodation: Ho Chi Minh city
- Income: Financially dependent, less than 900.000VND/month
- Education: High school
- Marital status: Single and living with parents or guarantees

Our target audience desire to access creative ways of learning History rather than the current traditional method; to expect better academic performance and results; to have a lively and active lesson, knowing more about their country's glorious history.

As for our audience's psychographic, they are modern, tech-savvy youths, who are disinterested in traditional learning methods in History. They spend a majority of their time in extra-classes or with tutors, and are active with out-of-textbook knowledge. Despite this, as a result, they mostly lack communication skills.

3. Conclusion:

The pandemic acted as a catalyst for the concept of gamification, as it propelled all educational institutions to foster hybrid learning environments. The whole idea of gamification in EdTech was introducing the video game kind of layout or interface to encourage interactive learning. There is a huge demand for change in traditional History learning methods, especially from high school students that desire to access creative ways of learning History rather than the current traditional method and to expect better academic performance and results. Therefore, the study suggests role-playing games based on event prediction and real events that happened in history. Students can benefit themselves by enabling better decision-making, to deeply understand historic events, and more importantly, practice predicting future events.

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APPLICATION TO CLASSIFY VIETNAMESE COMMENTS ON YOUTUBE INREAL TIME

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SUMMARY:

Society needs to develop a system to detect hate and offense to build a healthy and safeenvironment. However, censoring hate and offensive comments on social media faces many challenges because of their enormous volume and variety in both magnitude andtopics. In addition, current research in this field still faces limitations in both data andtechnical aspects. This study proposes a novel system that applies advanced natural language processing techniques to classify the hate and offensive comments on socialnetworks towards a healthier, safer online space. Our research can handle issues as small as single comments to as vast as continuously processing enormous amounts of data in real-time. The main scientific contributions of our research are summarized asfollows three main techniques such as streaming Youtube comments in real-time, comment classification using PhoBERT-CNN [5] model and deploy application to display comments and statistic comments. Our recommendation system uses several advanced techniques like Spark Streaming, Flask, Spark SQL, Kafka, and API.

KEYWORDS:

Spark Streaming , Hate Speech Detection, state-of-the-art, Spark SQL, PhoBERT-CNN,Kafka, API.

1. PROPOSAL AND RESEARCH OBJECTIVES:

1.1. Proposals:

Along with the advances in the technology of the Fourth Industrial Revolution, the rapid rise of social networks has been astoundingly altering our daily life. In that situation, safety in cyberspace is an issue that directly affects the user's life, especially objects such as children or vulnerable people. According to Mohan et al. reports, the social media environment in which many harmful contents such as hateful comments,fake news, and content that violate community standards influences not only the largeproportion of users but also online moderators. Hate speech is typically described as any communication that disparages a person or group based on any attribute such as race, color, ethnicity, gender, sexual orientation, nationality, religion, or other traits. Besides, according to the prestigious statistics reporting site,

Statista, Facebook had to remove more than 11.3 million pieces of offensive and hateful content globally in 2018. In 2019, YouTube also removed over 1.800 million comments that violated community standards, and these statistics have risen dramatically on both platforms. In 2020, Facebook must remove more than 81 million hateful and offensive posts, a seven times increase from 2018. While YouTube must remove over 4,800 million comments in 2020, this tripled the figures in 2019. The above result inspired us to build a novel system that applies advanced natural language processing techniques to classify the hate and offensive comments on social networks towards a healthier, safer online space. This study aims to detect whether a comment on social media is HATE, OFFENSIVE, or CLEAN. From the task of classifying small comments, we develop an application that classifies a large number of social media comments in real-time.

We use the ViHSD [3] dataset as the main dataset for comment classification. Then, inspired by Tran et al., 2022 [5], we train the dataset on the PhoBERT - CNN model. After that, we build an app for streaming comments and classification comments in real-time on social media by using core technologies such as Spark Streaming and Flask. The application not only provides users the labels of comments but also statistics the number of comments by each label and lists the hate comment objects.

Our recommendation system can be applied to businesses that need to moderate user comments. The system helps to improve the comprehensive censorship of offensive and hateful comments on cyberspace in Vietnam. We contribute to building a positive, civilized environment or satisfying the need to orient and protect vulnerable subjects such as the elderly and children. Moreover, the application is also a basis for agencies and organizations to evaluate and control management, psychological research, and education behaviors.

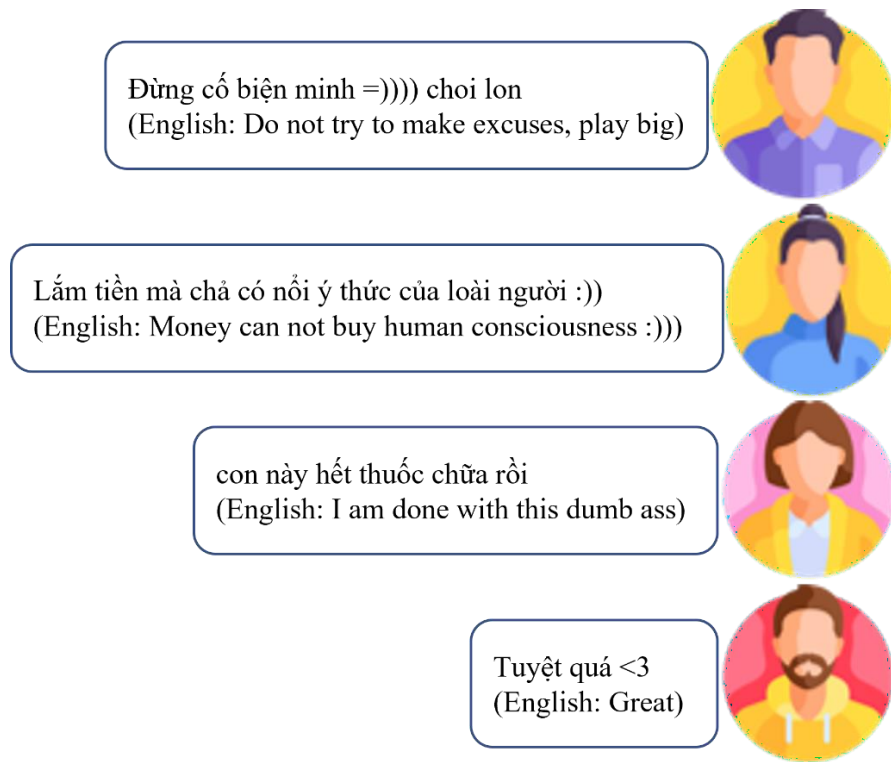


Figure 1.1. Several examples of social media comments

1.2. Research Objectives:

We focus on building an application that continuously streams data from the massive data source of social media platforms to detect hate and offensive comments. Our application also has high economic efficiency, such as low investment costs, low resource consumption due to the combined model PhoBERT-CNN, saving human costs, and continuously updating trending social network comments.

For our application, we propose the following simplified flow and corresponding technology.

- Streaming real-time data on Youtube using Spark Streaming.
- Classify real-time comments into one of three labels HATE, OFFENSIVE, or CLEAN using PhoBERT-CNN model.
- Displays classified comments on the dashboard, statistics the comment labels, and lists the hate comment objects using Flask.

2. RESEARCH METHODOLOGY:

2.1. Tools/Technology Used: Spark Streaming and Flask

In this trial, we successfully constructed a system capable of handling large amounts

of data in real-time from social networking platforms, especially from YouTube comments, by conducting surveys and experiments on processing streaming data. Our system was built using the following technologies: We use Spark Streaming to collect real-time data from Youtube using API. Then, the PhoBERT-CNN model classifies comments into one of 3 labels HATE, OFFENSIVE, or CLEAN. Finally, we deploy our application using Flask².

Spark Streaming is an extension of the core Spark API that allows us to process real-time data from various sources such as Kafka, Flume, TCP sockets, and Amazon Kinesis. In this research, we use Spark Streaming to collect live incoming data streams from Youtube and separate them into batches, then data in each batch will be processed by the Spark engine to provide the final batch of results. Our Spark Streaming pipeline is as follows:

- We authenticate and connect to the Youtube Data API using our developer credentials. First, we need to set up the essential information to log in and utilize the Youtube Data API, such as DEVELOPER_KEY, YOUTUBE_API_SERVICE_NAME, YOUTUBE_API_VERSION.
- Next, in the QUERY section, we change the URL to query the video that needs to be processed. In addition, parameters such as textFormat to set the format of return comments, maxResults to set the number of comments are limited to each session. We also build a TCP socket between the Youtube Data API and Spark, which waits for the Spark Streaming call and delivers data.
- Then, comment data collected and stored through Youtube Data API will be transmitted to the primary system to perform pre-processing by using Spark Structure. After that, the normalized and high-quality data are used to predict their labels using the combined PhoBERT-CNN model. We use SparkSQL to query and visualize how Spark Streaming organizes and presents predictions relative to comments.
- Finally, the query results are converted to DataFrame format so that the administrator can observe and monitor it more efficiently and are stored in a parquet file.

¹ <https://spark.apache.org/docs/latest/streaming-programming-guide.html>

² <https://flask.palletsprojects.com/en/2.1.x/>

After collecting and classifying comments in real-time, we deploy the application using Flask. Flask is a web framework that provides programmer tools, libraries, and technologies to build a web application in python. Flask is a microframework because it does not require specific tools or libraries. So the advantage of Flask is that it is a lightweight framework, less dependent on updates, and easy to find security bugs. In addition, Flask is very easy to use and can easily extend the functionality of Flask Framework for complex applications. Therefore, we use Flask to build an app for the automatic classification of social media comments. Our application has the following functions:

- Display Hate and offensive comments: Displays a list of classified comment information such as User name, Timestamp, comment, and label
- Statistics the ratio between comment labels: Statistics the percentage and graphs of HATE, OFFENSIVE and CLEAN comments that have been classified.
- Lists the hate comment objects: Displays a list of users and their hate comments.

These findings in our application will be used to assist administrators in deciding whether to delete comments containing hate or offensive content or not

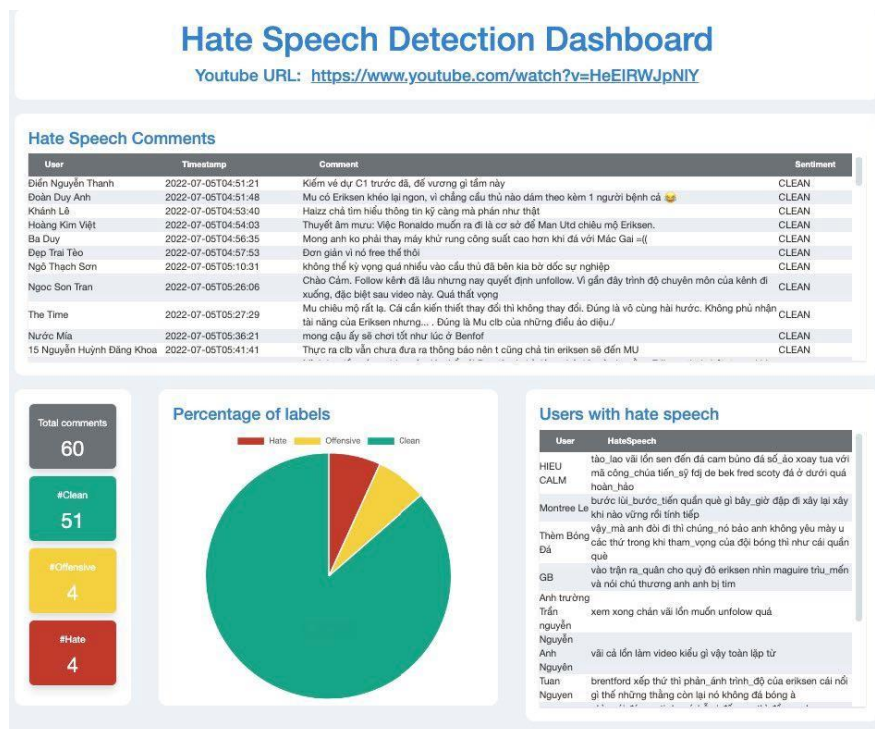


Figure 2.1. Hate and Offensive Detection Application.

3. CONCLUSION:

We have successfully built a real-time hate speech detection system for Vietnamese. This application is capable of classifying a large number of comments on social networking platforms in real time easily using Spark Streaming and deploy using Flask. Besides, our application also provides comment statistics and lists the hate comment objects, this will help administrators easier to follow up and make appropriate decisions in the future. The results obtained are pretty optimistic and reliable for solving the task, helping to reduce the occurrence of hate or offensive comments, and building a healthy and safe environment.

The proposed system can be applied to online newspapers or websites with low comment volume but need high censoring, as well as large social networks or forums. It creates a positive, civilized environment or satisfies the need to orient and safeguard vulnerable subjects such as the elderly and children. The application also serves as a foundation for agencies and organizations to review and monitor for management, psychological research, teaching, and other purposes.

In the future, we will extend the dataset size, thereby improving the performance of the classification model. We also focus on developing apps with more functionality like spam detection in comments.

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THE IMPACT OF THE COVID 19 PANDEMIC ON CONSUMER HABITS TOWARD ONLINE SHOPPING IN HANOI, VIETNAM

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ABSTRACT:

The Covid-19 pandemic has caused a fundamental shift in the habitual purchasing behavior of Vietnamese consumers. It is accountable for shattering the market trend's stereotype. This research attempts to comprehend the shift in consumer purchasing behavior triggered by the Covid-19 outbreak. The conventional offline shopping habits of Vietnamese consumers were almost substituted by online shopping. Additionally, customers' purchase preferences were grouped around essential items such as groceries, toiletries, and household cleaning products. All other items were deemed as secondary importance. It was also shown that the usual attraction of consumers regarding promotional offers and discounts on products has a significant impact on their purchasing habits. According to the study's findings, customers favoured purchasing critical commodities mostly and preferred contactless payments through e-shopping.

KEYWORDS: *online shopping; e-commerce; COVID-19 pandemic; habitual buying behavior; Vietnamese consumer.*

1. INTRODUCTION

It should be unequivocally stated that online shopping has become a popular modern channel for Vietnamese customers in recent years, thanks to strong internet penetration. The Vietnamese market has gradually warmed up to e-commerce adoption, and many traditional brick-and-mortar stores have begun to investigate or have already introduced an e-commerce service to make buying easier for their customers. In addition, various specialist e-commerce platforms have arisen, as well as a plethora of delivery and logistics applications to assist organizations with consumer demand. Nevertheless, the market response to all of this was restricted to the early adopters. All of the competitors were competing for market share solely among the digitally savvy population, but a sizable portion of the population was untouched.

However, once the pandemic hit, Governments of numerous nations imposed restrictions on human movement to curb the spread of the virus. International borders were closed, and within the country, only essential services were permitted to operate. For this reason, many conventional brick and store shoppers increasingly turned online, resulting in the e-commerce boom. Businesses needed to accelerate their digital transformation. The Covid-19 pandemic has affected the lifestyles and motivations of many people, it caused consumers to stay at home more so their purchasing habits also changed. Furthermore, at that time, the lack of vaccines and changing norms forced people to prefer buying online rather than waiting in long

lines at the supermarket and risking their lives. This study investigates the impact of Covid-19 on consumer habits toward online shopping in Vietnam and then, the author would like to recommend some solutions to it.

2. RESEARCH

2.1 Setting of the study

The Covid-19 pandemic has spread to every corner of the globe, putting governments under pressure to act quickly to stem the spread of the pandemic. Vietnam, like most other countries, has been suffering and will most likely continue to suffer from the disastrous effects on health, economy, and society in the next months and years. In response to the pandemic, the government has made significant measures such as using contact tracing, mass testing, quarantining, and lockdowns to aggressively suppress the transmission of the virus. The Vietnamese market has been seriously affected by a novel coronavirus outbreak. After the declaration of lockdown, fear of disease spurred higher frequencies of online shopping for food and medical products and so many other things. That is why the Covid-19 pandemic has transformed the habit of buying and payment options around the world, including in Vietnam.

Online buying is no longer a unique concept in the world. According to Liao and Cheung (2000), the UK established "Fraud-free electronic shopping" in early 1995, and Europe and Singapore jumped on the bandwagon two years later when they introduced secured electronic transactions (SET).

In recent years, online shopping is quite popular in Vietnam and it has become the choice of many Vietnamese consumers. Currently, four businesses dominate the internet market for general purchases: Lazada, Shopee, Tiki, and Sendo, each of which has established massive online marketplaces supported by advanced web technology and apps. However, before the Covid-19 pandemic, online shopping apps were only well-liked by young people but a huge part of the population was unfamiliar with online shopping.

In order to have a comprehensive view of this issue, the author has compiled a list of definitions of consumer habits or habitual buying behavior? A habit forms when a pattern of behaviors becomes linked through repetition and is associated with some kind of outcome that makes us want to do it again, whether we consciously want to or not. Habitual Buying Behavior is one of the types of Consumer Buying Behavior in which the involvement of consumers in the purchase is low along with the few differences among the alternative brands. In this case, the products offered are cheap and purchased frequently. In the choice process, habitual buying behavior refers to consumer decisions made out of "habit" without much deliberation or product comparison, according to American Marketing Association, AMA Dictionary.

On the other hand, Pantano et al. (2020) emphasize that customers have reconsidered their buying habits while also discovering benefits from services they have never utilized before.

In this context, it is also reasonable to speculate that customers' purchasing patterns may shift in the long run. According to Sheth (2020), four key settings control or disturb consumer habits. They are social context (changes in the workplace and interactions with people), the implementation of new technology (including e-

shopping and delivery), the impact of consumption habits due to new rules (the COVID-19 pandemic regulations), and less predictable context (the emergence of a global COVID-19 pandemic)

For the above reasons, due to the Covid-19 pandemic, the traditional in-person shopping habits of the consumers were almost replaced by e-shopping.

2.2 Research Methodology

To clarify the impact of the Covid-19 pandemic on consumer habits toward online shopping in Hanoi, Vietnam, the research uses the Meta-analysis method and Questionnaire instrument. First of all, through Meta-analysis, the author collected articles, journals, papers and websites on the internet relating to this study. More importantly, in order to implement this study, the author chose to conduct an online survey, giving a questionnaire and adopting a descriptive approach based on the data collected from the Vietnamese consumers' responses from different districts in Hanoi, Viet Nam. The participants of the survey are 60 people from different districts in Hanoi, Vietnam. 30 people are male and 30 people are female aged between 20 and above 50.

The first part of this questionnaire includes a set of questions about the characterization of people whose main objective is to characterize the sample of data obtained, such as gender, age, the districts they live and other similar things. The second part includes a set of questions about the impact of the Covid-19 pandemic on consumer habits toward online shopping in Hanoi, Vietnam. The questionnaire was then applied to people in Hanoi, Viet Nam and was available between July 24 and July 27, 2022. The findings are discussed in the next section.

3. RESEARCH RESULTS

3.1 Vietnamese consumers turned to essential goods, reduced the number of things chosen based on transitory preferences

As mentioned earlier, this survey has been conducted among Vietnamese consumers. Figure 1 shows the products that were purchased by Vietnamese consumers during the Covid-19 lockdown.

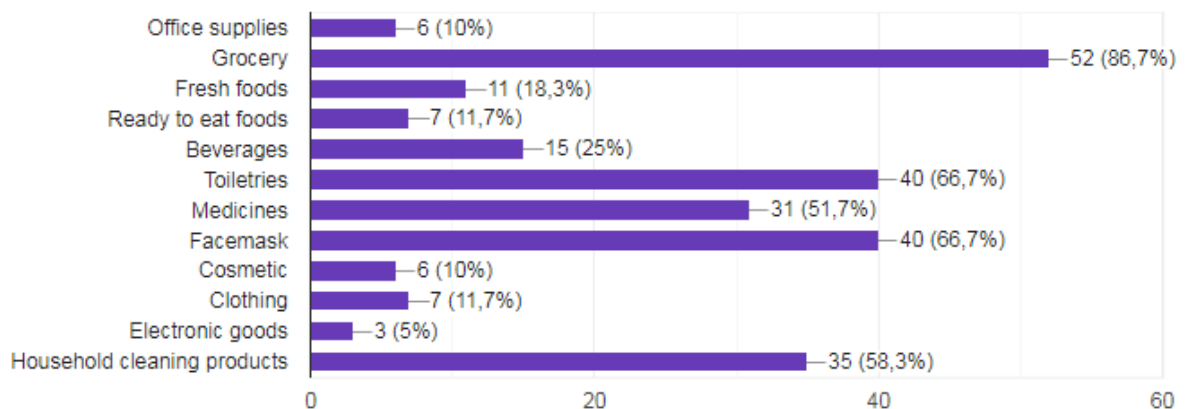


Figure 3.1: Products that were purchased by Vietnamese consumers during the Covid-19 lockdown

Figure 3.1 represents the products that were purchased by Vietnamese consumers during the Covid-19 lockdown. According to the above figure, groceries reached 86.7% per cent were largely purchased during the pandemic since they are a fundamental requirement, followed by 66.7% toiletries and facemask as it is a basic daily necessity, especially since the Covid-19 happened, 58.3% of the purchases were made towards household cleaning products. Predictably, sales of household cleaning and antiseptic products increased dramatically. “...Overall, consumers want very high standards of hygiene, so the reality is cleaning and disinfectant products are going to be in demand for quite some time to come,” said Pannuti, Head of the European Food, Home and Personal Care Research. 51.7% of the selling happened of medicines since they were considered crucial things and Vietnamese consumers bought them as speculation during the Covid-19 pandemic. 25% of the purchasing happened for various kinds of beverages. 18.3% of the respondents had bought fresh food online. The percentage of Ready to eat food and Clothing was the same at 11.7%. Covid-19 forced people to stay at home more so people were not wearing make-up when working from home and that is the reason why only 6 participants (10%) had purchased cosmetics while shopping online whereas the purchase of office supplies and electronic goods was 10% and 5% respectively and they were also found to be sold the least during the Covid-19 outbreak. We can see that Vietnamese consumers tend to buy low-priced items while shopping online after the Covid-19 happened.

3.2 Most Vietnamese consumers prioritized things with reasonable cost and discounted merchandise.

The following figure indicates the percentage of the factors affecting consumers’ online shopping buying behaviour during the Covid-19 pandemic.

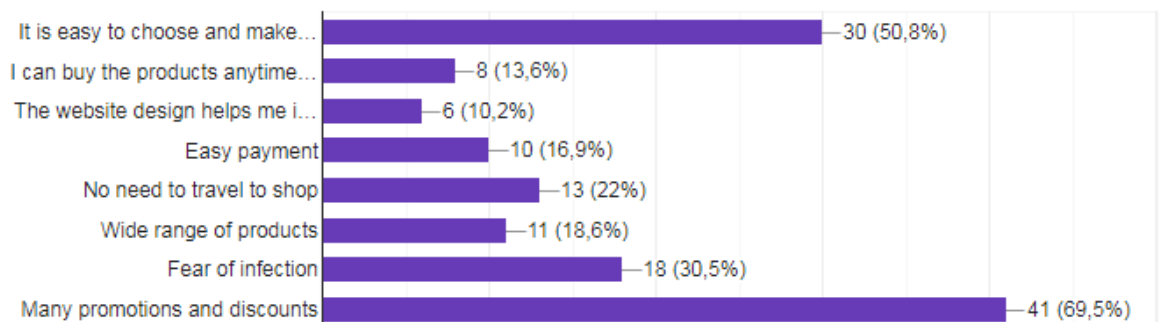


Figure 3.2: Factors affecting consumer’s online shopping buying behavior during the Covid-19 pandemic

According to the above figure it can be stated that the majority of the respondents i.e. 69.5% were found to be of an opinion that the discounts that are offered by the online sites had a significant influence on their buying behavior, 50.8% of the respondents were agreeing with the fact that on the online shopping sites, it can be easy to choose and make comparison with other products, whereas 30.5% of the respondents had a fear of Covid – 19 infection, followed by 22% the participants answered that they did not need to travel to shop. The other factors that affected their habitual buying behavior were: the wide range of products (18.6%), ease to make payments (16.9%),

and consumers can buy stuff anytime they want (13.6%). There are only 10.2% of participants answered that the website design that can help them in searching the products easily and quickly left an influence on them. It is seen that during the Covid-19 pandemic, consumers are highly interested in product discounts and comparisons to get the greatest option while shopping online. In other words, they are the things that have a massive impact on the Vietnamese habitual buying behavior.

3.3 Contactless payments were preferred by Vietnamese consumers during the Covid-19 pandemic

Figure 3.3 highlights the payment methods used by Vietnamese consumers during the Covid-19 pandemic while doing e-shopping.

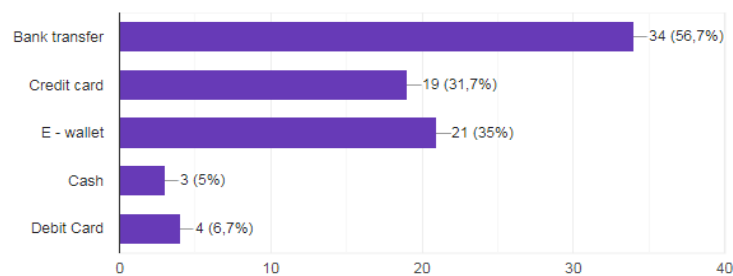


Figure 3.3: Payment methods were used during the Covid – 19 pandemic

According to the survey, when COVID-19 revolutionized the way Vietnamese shop, they were already on their path to increasing acceptance of contactless payments. Data now reveal that contactless payments will become the new normal for many people, even after the pandemic with 56.7 % of the respondents saying that they preferred bank transfers. Consumers also chose other contactless payment options such as E-wallets (35%), Credit cards (31.7%), and Debit cards (6.7%) and only 3 people said that they still used cash while shopping online.

3.4 During the Covid-19 pandemic, Vietnamese consumers faced a lot of challenges while shopping online

Through the online shopping process, Vietnamese consumers were suffering from several obstacles. The author has highlighted some of the most typical obstacles encountered when shopping online, such as It is hard to touch, feel, smell, and try the products that they want to buy, some websites provide very little information about their companies and sellers, there is a lack of interactivity in online shopping, the consumers were afraid of damaged products while shipping or delay in deliveries, they also had a fear of bank transaction.

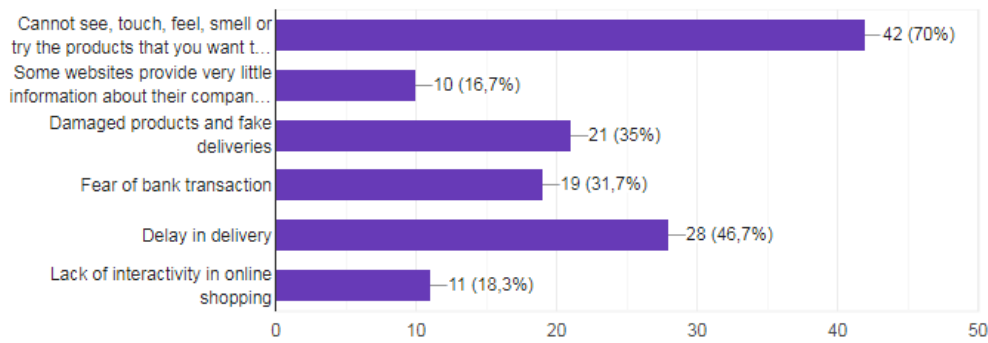


Figure 3.4: Challenges of E-shopping during the COVID-19 pandemic

Figure 3.4 represents that the most prevalent challenge was that Vietnamese consumers cannot see, touch, feel, smell or try the products that they wanted to buy making up 70% of the total, followed by their fear of delay in delivery 46.7%. In addition, figure 4 also shows that 35% of the respondents had a fear of damaged products and fake deliveries, and 31.7% of the respondents experienced a fear of bank transactions. The number of consumers who self-identified as having a problem with lack of interactivity was more than the number of consumers who experienced some websites lacked a lot of information about their companies and the sellers while shopping online with a percentage of 18.3% and 16.7% respectively. It cannot be denied that digital transformation is important in the Fourth Industrial Revolution and has many benefits, particularly in e-commerce, but the truth of the matter is, that the digital transformation process in e-commerce in Vietnam is still fraught with difficulties, especially when it comes to shopping online during Covid-19 pandemic.

3.5 Even though the epidemic ends, online shopping will continue to grow constantly because it has established a habit among consumers.

Before the Covid-19 pandemic, the majority of consumers did not spend too much time on online shopping. Table 1 compares the frequency of online shopping that Vietnamese consumers did before and after the Covid-19 pandemic happened.

Table 3.1: The frequency of online shopping that Vietnamese consumers did before and after the Covid-19 pandemic happened.

Online Shopping Frequency	Before the Covid-19 pandemic	After the Covid-19 pandemic	Change
Daily	8.5%	85%	76.5%
Weekly	6.8%	11.7%	4.9%
Monthly	40.7%	1.7%	39%
Annually	44.1%	1.7%	42.4%

It was noted that, before Covid-19, most consumers bought things on online shopping platforms annually (44.1%), whereas the percentage of consumers who have shop monthly (40.7%), weekly (6.28%), and daily (8.5%) were insignificant. Overall, we can see that before the Covid-19 epidemic, the majority of Vietnamese consumers were unfamiliar with online shopping and they spent more time on in-store shopping.

Nevertheless, Vietnamese consumers have been compelled to purchase differently and adjust their frequency of online purchasing after months of lockdown and social distancing as a result of Covid-19. As can be seen from Table 1, 85% of shoppers said that they did online shopping every day, 11.7% did it each week, and only 1.7% was belonging to those shoppers who did it every month and every year. Table 1 shows the percentage of Vietnamese consumers doing e-shopping every day reached a peak of 76.5%. Similarly, there was a considerable increase in weekly internet buying, with data reaching 4.9 per cent amid the Covid-19 outbreak. Monthly and yearly shopping had fallen to 39% and 42.4% respectively.

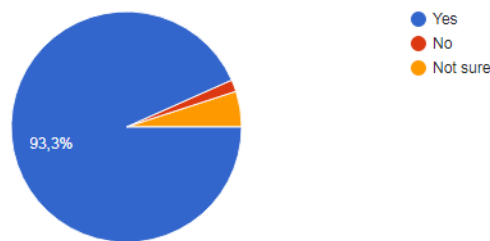


Figure 3.5: The respondents of the Vietnamese consumers about doing online shopping in the long run

When asked about their buying habits even if the Covid-19 was over, 56 of the surveyed consumers (93.3%) answered yes. Furthermore, 3 of the surveyed consumers (5%) answered that they are not sure about this hypothesis. Only 1 person (1.7%) answered that they would get back to in-store shopping if the Covid-19 ended.

3. DISCUSSION AND RECOMMENDATIONS

E-commerce is regarded as a promising industry in Vietnam, where the number of internet users is constantly increasing and habitual online purchasing behaviour has become a part of their life since the Covid-19 pandemic. To capitalize on the opportunities and overcome the challenges so that Vietnamese consumers can manage well and avoid being left behind throughout the time of digital transformation in the digital society, we need to do well with the following recommendations that the author would like to suggest. First of all, to encourage e-commerce sustainably, the government should continue to evaluate, revise, supplement, and disseminate the legislative framework and procedures for e-payment in the coming years. More focus should be put on encouraging and attracting societal investment in the development of e-payment technological infrastructure, as well as strengthening policies to stimulate the growth of prospective markets for e-payment applications such as transportation, logistics, and so on. Moreover, enterprises and e-commerce platforms must also improve network and information security, increase the product quality control process, and take steps to prevent and punish enterprises that sell imitation goods. Businesses in the field of e-commerce should research and make suggestions for policies that are no longer conducive to the development of e-commerce. Simultaneously, the government and businesses should collaborate with consumers to promote communication and education activities aimed at guiding the population

in the use of electronic payment systems, as well as developing the human resources required to meet the demands of developing e-payment services in particular e-commerce in general.

4. CONCLUSION

The Covid-19 Pandemic has caused a substantial shift in consumer habitual purchasing behavior. Consumers' buying habits have evolved as a result of the various limitations imposed by the government on market timing, availability of items based on necessity and social distancing rules. Because of the government laws, a big number of customers have shifted to internet purchasing rather than conventional offline shopping. It was also chosen because of its ease in purchasing, suitability and also from safety perspective. According to the investigation, promotional offers and price comparisons generate an impulse for an increased buying trend among customers, which has a considerable effect on the consumer buying behavior approach. Groceries, household cleaning products, medicines, facemasks, and toiletries were discovered to be the most popular during the pandemic since they were a necessity during the terrible period. Clothing, beverages, and fresh and ready-to-eat foods, on the other hand, were observed to be purchased abstemiously comparatively throughout the epidemic. Goods like electronics, cosmetics, and office supplies were discovered to be less frequently consumed by consumers.

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DEVELOPMENT OF PIGHEALTH SECURITY-X APPLICATION FOR BIOSECURITY ASSESSMENT IN SUSTAINABLE PIG PRODUCTION

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ABSTRACT

The Vietnamese pig production has been facing high pressure from diseases, especially African Swine Fever (ASF), which has been causing huge damage to this industry. When commercial vaccines have not been developed successfully, implementing strict biosecurity in the modern approach is an effective solution to control and prevent disease transmission. The study aimed to develop an application (App) for biosecurity assessment named Pighealth Security-X in pig farms toward modern biosecurity. The App Pighealth Security-X has 165 questions divided into two assessing options: 1. The traditional approach includes eight biosecurity assessments: Location and structure, Husbandry practice, Farm management, Transport, Husbandry equipment, Vermin and bird control, Feed/Water/Equipment, Visitors, and Farmworkers; and 2. The modern approach includes external biosecurity and internal biosecurity. External biosecurity aims to prevent pathogens from entering and leaving the farm. Internal biosecurity aims to prevent pathogens from spreading within the farm, separated into three distinct zones of a pig farm (Risk zone, Buffer zone, and Clean zone). The result of the biosecurity assessment displayed in percentage (%) of biosecurity scores combined with comments and solutions helped the users investigate the gaps in biosecurity and find suitable solutions. The App was operated on smartphones to improve processing time. The assessment can perform anytime and anywhere. The result can be presented, stored, and reported quickly. The application of biosecurity assessment from thirty pig farms showed that the result of the biosecurity assessment from the Pighealth Security-X was reliable as there was an inverse correlation with the disease status of farms (farms with low biosecurity tended to have higher disease incidence, $R=-0,715$, $P<0,05$). In short, Pighealth Security-X is looking toward a new era of biosecurity, contributing to the improvement of disease control, improving productivity, and reducing cost of labor.

KEYWORDS: *ASF, biosecurity, Pighealth Security-X, pig, Vietnam*

1. INTRODUCTION

In Vietnam, pork plays a large part in the national meat reserve. In 2020, the total amount of pork accounted for 64.25% of the total important meat in the country (GSO, 2020). Pig farming is planned to develop into a modern economic and technical industry by 2030, with a herd of between 29 and 30 million heads to ensure food security and export orientation (The Vietnamese Government, 2019). Currently, pork productivity and price in Vietnam are less competitive compared to other countries. Disease pressure is one of the causes leading to the above problem.

Important infectious diseases have frequently occurred in the pig herd, such as Porcine Reproductive and Respiratory Syndrome (PRRS), Classical Swine Fever (CSF), Foot-and-mouth Disease (FMD), Porcine epidemic diarrhea (PED), and diseases caused by PCV2, etc., Emerging diseases such as African Swine Fever (ASF), Circovirus type 3 (PCV3) have also become potential threats to the swine industry (Dixon *et al.*, 2019; Mazur-Panasiuk *et al.*, 2019; Ouyang *et al.*, 2019). Since the outbreak of ASF in Vietnam, more than 6 million pigs (in 2019) and 86,000 pigs (in 2020) have died or been culled (Ha, 2021). In addition, other threats are equally crucial in pig production, such as the increasing prevalence of antibiotic resistance (Cuong *et al.*, 2016), residues of chemicals used in livestock production, and increasing climate change (Ha, 2017).

It's vital to find new solutions for that problems. Biosecurity is one of the critical solutions to prevent the transmission, establishment, and spread of diseases from outside to the farm, within the farm, and spread out to other farms (Dietze and Depner, 2019). Improving biosecurity in pig production has many positive effects on animal health and production performance and reduces antibiotic misuse (Laanen, 2013; Merel Postma *et al.*, 2016; Rojo-Gimeno *et al.*, 2016; Dewulf and Immerseel, 2019). The Vietnamese Government has found that biosecurity is the key to the sustainable growth of pig production by promulgating regulations to force farmers to apply strict biosecurity strategies. The "National Plan for the Prevention and Control of African Swine Fever for the period of 2020 - 2025" was endorsed on July 7th, 2020 (972/QD-TTg) for ASF control and pig farm biosecurity application (FAO, 2021).

In fact, the implementation of thorough and effective biosecurity in pig production is not easy, depending on several factors such as the current situation of husbandry, human resources, and supporting tools. Biosecurity classification and rapid identification of risk factors in pig farms should be carried out by experts with a deep understanding of biosecurity. Several information technology application tools have effectively supported biosecurity assessment in pig production in recent years, such as BioCheck-Ugent® and Combat ASF software (Ingelheim, 2018; Introducing Biocheck ugent, 2021). However, the above two software were developed in western countries. The evaluation criteria are not suitable for the characteristics of pig production in Asia and Vietnam. Other traditional biosecurity assessment methods are often paper-based, manual, time-consuming, and inconvenient. Moreover, the recent continuous emergence of dangerous infectious diseases in animal husbandry, particularly pig production, has led to the formation of a new thinking "*new biosecurity concept*" in pig production: safer and more sustainable. Therefore, this study aimed to develop an application software Pighealth Security-X to assess biosecurity for disease prevention in pig production towards safety and sustainability.

2. MATERIALS AND METHODS

2.1. General structure of the study:

The study has three objectives: (1) Establishing the set of questions for biosecurity assessment, (2) developing the software Pighealth Security-X and (3) Applying the

App Pighealth Security-X in the field of pig farms to evaluate the effectiveness. The App Pighealth Security-X was established with traditional and modern approaches. In the traditional approach, eight aspects of biosecurity assessment were concerned, including Location and structure; Husbandry practice; Farm management; Transport; Husbandry equipment; Vermin and bird control; Feed, water, and equipment supply; Visitors and farmworkers. In the modern approach, the eight aspects were put into space separated into regions of a farm (external and internal biosecurity). The internal biosecurity was divided into three distinct zones: Risk zone, Buffer zone, and Clean zone (**Figure 2.1**). The risk zone is related to the dirty area, where risk factors from outside the farm occur, so it is the first layer of protection; the Buffer zone is the second layer of protection where all risk factors have to be entirely eradicated before entering the Clean zone; Clean zone is the final layer of protection where the husbandry activities occur safely.

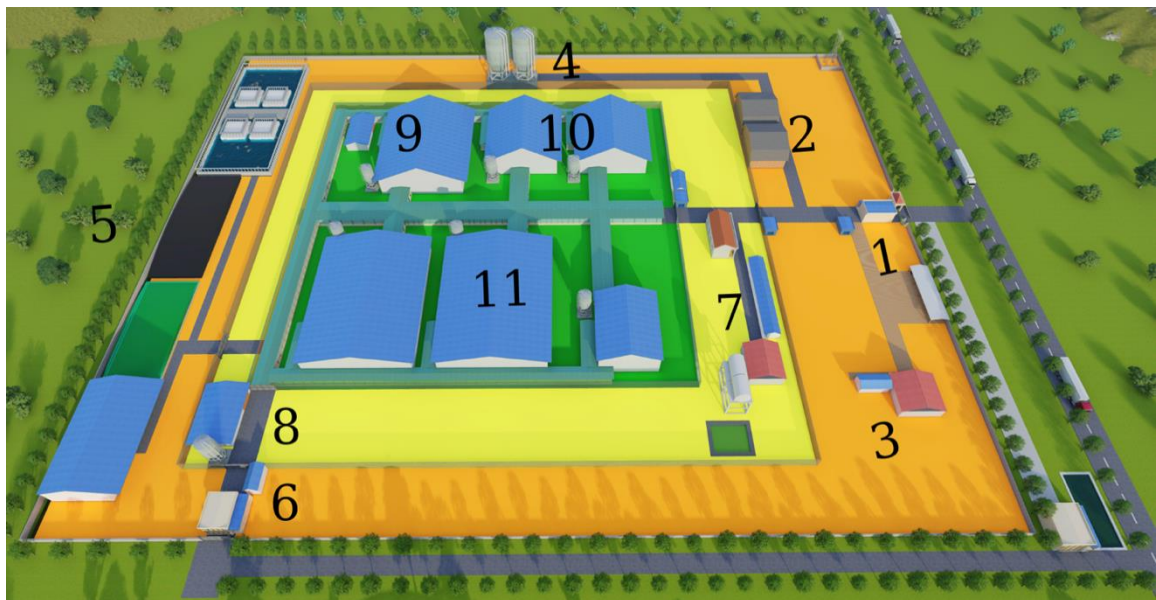


Figure 2.1. Swine production model with three distinct zones: Risk zone (1: area for vehicle washing facility, human disinfection room, car park; 2: area for warehouse and isolated room of new equipments; 3: area for guest house and quarantine; 4: feed silos; 5: area for the treatment of feces, placenta, wastewater, and biogas; 6: area loading for pig selling), Buffer zone (7: area for admin office, dormitory and human disinfection room; 8: area quarantine for introducing pigs), and Clean zone (9: boar and pregnant facility; 10: farrowing barn, 11: area for weaning and fattening pigs).

2.2. Establishing the set of questions for biosecurity assessment

Pighealth SecurityX application software (App) was built based on answering a set of questions, including biosecurity implementation measures. The questionnaire was created by reviewing scientific reports, research articles from universities, conferences, and experts's presentations and opinions on biosecurity measures from representatives of veterinary companies and farms. The "filtering funnel method" was used to select the information and documents most relevant to biosecurity. This

method was described by Andraud and Rose (2020). Research documents were collected on the databases Pubmed, Google scholar, and Veterinary research, including articles with search terms: "Biosecurity", "Pig", "Farm", and "ASF". The documents were then selected if related to biosecurity, duplicate reports, articles related to bacteriological, virological, or immunological aspects, etc., were removed. Then, reviewing the content of selected scientific reports and related sources of knowledge to select critical biosecurity criteria in the farm to establish a set of evaluation questions.

The questionnaire focused on biosecurity in general and common aspects of the transmission of infectious diseases mentioned by OIE (Madec *et al.*, 2010). The questionnaire was designed to suit the farm models. Questions that do not match with the farm model were removed. Each question had multiple choice answers. The answer options were either qualitative (yes or no) or quantitative. Every answer resulted in a score between 0 (when this measure was not implemented at all or the least optimal answer was given) and 0.5 (when the measure was fully implemented). Depending on the importance of the measure, the score was multiplied by a weight. The weight was high when the question was important, the frequency of violations was high, and the ability to overcome was difficult. The final score can vary from 0, indicating the total absence of biosecurity measures, to 100, indicating a complete application of measurements. The final score was calculated by the score that users get divided by the score of the aspect category and multiplied by 100%. The App did not give the total score for the entire assessment process; instead, the App gave the assessment results for each biosecurity aspect separately. In summary, the App has 165 evaluation questions; the maximum total scores achieved for the entire question were 100 points.

2.3. Building the software Pighealth Security-X

The App was technically developed by the IT team. The App was run in both IOS and Android systems. To build the software, a programming language was used for smartphones, the writing application software was Dart, and using Frameworks (which are pre-written pieces of code that make up a framework and packaged programming libraries) were Flutter. The three steps to write App included: Step 1, building a database for the application software based on a set of questions; Step 2, developing application software including the contents of Login, Evaluation of biosecurity criteria; and Step 3, check the operation and appearance of the application software.

2.4. Applying the App in the field of pig farms to evaluate the effectiveness

To evaluate the effectiveness of Pighealth SecurityX software in the field, a survey was conducted on pig farms. Thirty pig farms were randomly selected in Binh Phuoc province for biosecurity assessment by using App. The models of these farms include breeding sow farm models raised from piglets to weaning; and fattening pig farms that raise from weaning to finishing. In addition, the above thirty farms were also divided by size, including ten large-scale farms and twenty medium-sized farms;

regulations on the division of farm size are mentioned in the Circulars 13/2020/ND-CP 20/01/2020. Biosecurity was assessed by both traditional and modern approaches. The results were recorded in the system and converted into an excel file for further data analysis. The farm owners, farm veterinarians, and epidemiologists were interviewed about disease incidence on the farms. The number of cases in each symptom category (respiratory disease, gastrointestinal problem, lameness, nervous system problem, skin problem, mastitis, and reproductive problem) within each pig group (sows, sucklers, weaners, fatteners, and boars) of the herd was converted into percentages then encode into disease incidence. The below formula calculated the percentage of each disease symptom in each pig group. The data were analyzed to examine the correlation between the farm's biosecurity score and disease incidence over the last six months.

The interviews were conducted face-to-face between the researchers and the interviewees. The users were guided through installing and using the App Pighealth SecurityX. The results of the assessment were recorded and saved in the system. Information on estimates of the disease incidence was also collected. There were five predefined disease symptom categories for the sucklers, weaners, fatteners, and boars: respiratory, gastrointestinal, lameness, nervous, and skin problem. The symptoms of mastitis and reproductive disorders were added to this list for sows. The levels of disease score range from 0 to 5 (0: no disease, 1: $\leq 5\%$ morbidity; 2: $\leq 10\%$ morbidity; 3: $\leq 15\%$ morbidity; 4: $\leq 20\%$ morbidity; 5: $> 20\%$ morbidity). For suckling piglets, weaning pigs, growing pigs, and boars, the maximum disease score for each group of pigs was 25 points. For the sow group, the maximum disease score was 35 points. So with breeding sow farms with suckling piglets, sows, and boars, the maximum disease score was 85; in the case of fattening pig farms, the maximum disease score was 50. The disease incidence results on the farm were converted to a percentage (%) by dividing the total disease score on the farm by the maximum disease score and multiplied by 100%.

2.5. Data analysis

The data was recorded and calculated by Microsoft Excel 2016. The correlation between the biosecurity score and disease incidence of the farms was assessed by the Pearson Correlation method. The differences in the mean score were evaluated by the T-test in R software.

3. RESULTS

3.1. The questionnaire for the App Pighealth Security-X

The questionnaire was designed with the first part related to general information about the farm, including the name of the farm, farm address, farm area, the herd structure, the number of pigs for each group (sows, boars, suckling piglets, weaning pigs and fattening pigs) and the year of farm establishing. There were 165 questions, with the maximum total score achieved for all questions was 100. The general structure of the questionnaire included the questions for biosecurity assessment,

options answer for each question; comments and suggested solutions were given in each answer not optimal.

The questionnaire was designed to be suitable for farm models. The set of assessment questions included main questions and sub-questions. Sub-questions appear to further clarify the answer choices for the main question. Therefore, the sub-questions appeared when the selected answers in the main questions did not adequately describe the level of biosecurity, so these additional questions were needed to clarify the evaluation aspect. The questions related to African Swine Fever (ASF) were highlighted to emphasize the assessment criteria closely related to the route of disease transmission.

Table 3.1. Number of questions in each biosecurity aspect

Traditional approach				Modern approach			
Biosecurity aspects	No. of questions	Score		Biosecurity aspects		No. of questions	Score
Location-structure	46	27.5		External biosecurity		32	19.0
Husbandry practice	43	25.5		Internal biosecurity	Risk zone	30	18.0
Farm management	13	6.5			Buffer zone	40	25.5
Transport	12	7.5			Clean zone	63	37.5
Husbandry equipment	22	14.5		Total		165	100
Vermin and bird control	6	3.5					
Feed, water, and equipment supply	10	6.5					
Visitors and farmworkers	13	8.5					
Total	165	100					

3.2. Building the software Pighealth Security-X

The Pighealth Security-X was announced on the App Store on January 27, 2022. The App can be downloaded freely. There were two options for registration: for farm

owners and farm staff. The farm owners can monitor the biosecurity of the whole farm, while staff can only check the biosecurity status that they made themselves. After signing in, the interface of the history of biosecurity assessment appeared if the user had made any prior biosecurity assessment. Data was saved in a system and could be checked. To begin the assessment, users must create a farm account and fill out its general information, including name, address, area of the farm, number of staff, and the year of farm establishment. The farm model was identified by filling in the herd structure (boars, sows, piglets, growing pigs, weaned pigs).

The structure of the App was similar to the general design with two biosecurity assessment options: the traditional approach and the modern approach. The users must answer all questions in each assessment. Sub-questions automatically appeared as appropriate, and questions related to ASF were highlighted in red and bold. After answering all the questions, the result appeared. App results showed a biosecurity score in percent. Detailed results for each assessment question were also displayed when the user selected "View details". In the detailed view, users could choose to review the criteria that need improvement, or the entire evaluation criteria have just been implemented. Biosecurity assessing questions that have not been performed well were shown in red or yellow, and questions that the farm performed well were shown in green. In addition, each question appeared with comments for each answer choice and solutions if the answer option was not the most optimal, so the users knew which biosecurity aspects should be improved and how to improve them properly. The results were saved in the system, monitored, and compared in later evaluation. A radar chart was used to describe the farm's score and biosecurity status. The results also were able to be sent to other people by email.

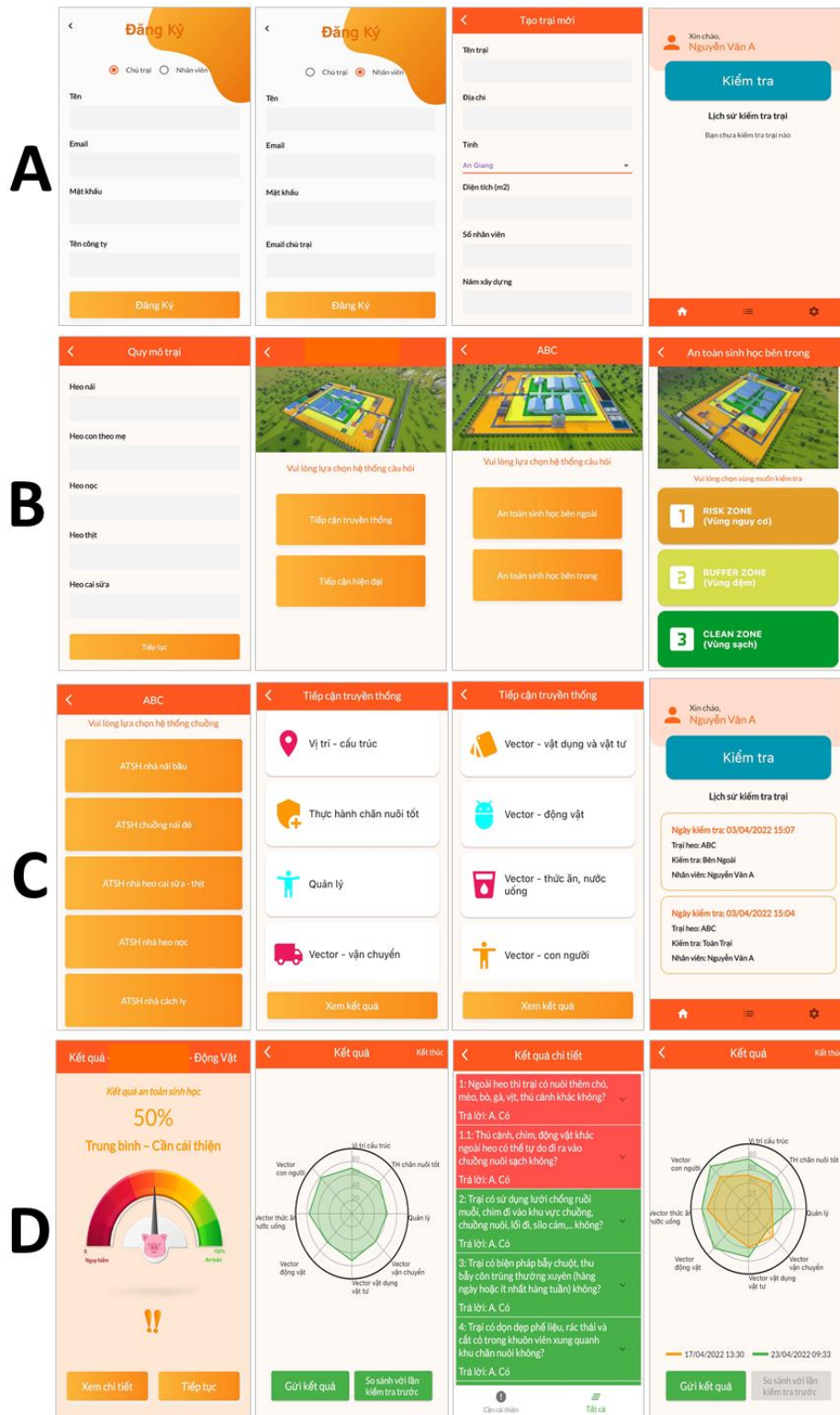


Figure 3.1. The interface of filling farm structure information and biosecurity assessing options (A); The information registration and approach selection of biosecurity in the App (B, C) and The interface presents the results of the biosecurity assessment of the

3.3. Applying the App Pighealth Security-X in the field of pig farms

The study showed that, in terms of farm size, large-scale farms had a higher biosecurity score than medium-sized farms ($P < 0.05$). The disease incidence of large-scale farms was significantly lower than that of medium-sized farms, especially in respiratory and digestive failure groups ($P < 0.05$). In terms of farm models, the mean biosecurity score of breeding sow farms was higher than that of fattening pig farms ($P < 0.05$). The breeding sow farms had a lower incidence of respiratory and digestive diseases but a higher incidence of other diseases ($P < 0.05$). In 24 fattening pig farms, there was an inverse correlation between the biosecurity score and disease incidence ($R = -0.656$, $P < 0.05$).

In short, the survey results showed an inverse correlation between the biosecurity score and the disease incidence of farms in the study. It means that farms with higher biosecurity scores assessed by the App Pighealth Security-X tended to have lower disease incidence than farms with lower biosecurity scores (**Figure 3.2**).

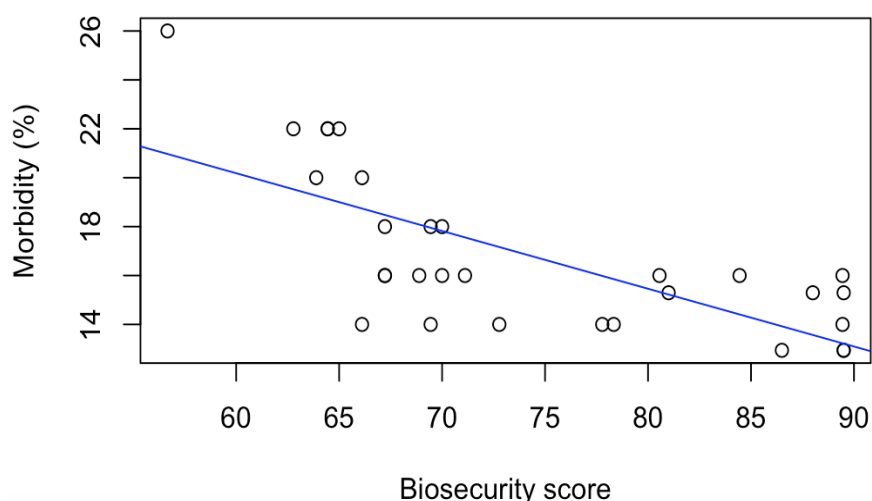


Figure 3.2. The inverse correlation between the biosecurity score and disease incidence of pig farms in the study.

$$R = -0.715; P < 0.05.$$

In terms of the farm model, breeding sow farms had a high biosecurity score (87.34) while fattening pig farms had a lower (70.95). In detail, breeding sow farms had a higher biosecurity score in all eight aspects ($P < 0.05$), especially in location and structure; vermin and bird control. In modern biosecurity assessment, there was a significant difference in biosecurity scores between breeding sow farms and fattening pig farms. Breeding sow farms had a higher score than fattening pig farms. In the disease status, all breeding sow farms had problems with mastitis and reproductive disorders; however, these problems were not serious ($< 5\%$). In terms of farm size, large-scale farms got 86.79 biosecurity score, while medium-scale farms got 67.94. In detail, large-scale farms had a higher score in all eight aspects with a statistical difference ($P < 0.05$). In the modern approach, large-scale farms had a higher biosecurity score in all aspects ($P < 0.05$). Respiratory and gastrointestinal failures

contributed significantly to the disease status of study farms, especially on medium-scale farms.

4. DISCUSSION

The application of biosecurity on livestock farms is the most effective measure to prevent the spread of pathogens from outside into the farm and among farm areas. However, the current biosecurity assessment approach is still inadequate and inconsistent. Researching and development of software Pighealth Security-X contribute to solving the existing problems. The application is aimed at Vietnamese farmers with several different models and sizes of pig farms. The reference source for the assessment questionnaire is a combination of scientific documents which have updated and improved biosecurity from developed agriculture countries with characteristics of livestock, environment, and epidemiological features in Vietnam. The questionnaire is presented closely to Vietnamese. In general, the clarity, and ease of understanding are highly appreciated by users. One of the most improved parts of the App is the processing time. Users felt excited because they got the result immediately without spending time calculating the score.

The results of the application evaluation on the farms partly prove that the biosecurity score assessed by the Pighealth Security-X application is reliable. In general, farms with high biosecurity status have better herd health. This result is similar to previous studies on the relationship between biosecurity status and herd health status (Laanen, 2013; Postma *et al.*, 2016; Postma *et al.*, 2016). There was a huge difference in the biosecurity score between large and medium – scale farms: The larger the farms, the better the biosecurity implementation. The study also showed that large-scale farms had higher biosecurity scores in all eight aspects of biosecurity compared to medium-scale farms. It indicated that large farms tend to invest methodically in all aspects of biosecurity.

The recent continuous emergence of dangerous infectious diseases in pig production, particularly African swine fever (Dixon *et al.*, 2019; Woonwong *et al.*, 2020), has led to the formation of a new thinking "*new biosecurity concept*" in pig production. Therefore, the development of an application software to assess the biosecurity standard of pig farms is useful for disease prevention in pig production towards safety and sustainability.

5. CONCLUSION

Pighealth Security-X application software is successfully built, an effective tool to assess the levels of biosecurity on the pig farm. The software with advanced features makes the evaluation process more convenient and faster. Pighealth Security-X is looking toward a new era of biosecurity, contributing to the improvement of disease control, productivity, and labor cost; however, the application is firstly developed and continues to be upgraded in the next higher version.

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A LOOPHOLE OF LAW IN DETERMINING THE SUBJECT WHO HAS LIABILITY FOR THE DAMAGE CAUSED BY ROBOT IN A NON-CONTRACTUAL RELATIONSHIP

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SUMMARY

In the course of digitalization, a notable and further development of the application of robots in production activities and daily life is becoming popular so as we can easily foresee new spheres of relationships that still have not been covered by current legal regulations. Such a shifting advent in the role of law over non-contractual relationships build up to certain risks for economic sustainability, for instance, the damages caused by robots that do harm to humans do not stop at daily-basis stories but now become actual legal issues. The trend in robot applications makes robots even more closely associated with human rights and legal benefits, posing a necessity to protect people against these “intelligent objects”, especially when the law seems to be gradually showing signs of slowing down, compared to the intensifying progress of digitalization and technology. This article examines the subject responsible for compensation for non-contractual damages in the case of damage caused by robots, thereby pointing out several shortcomings in the current provisions of Vietnamese law, as well as researching the laws of some other countries in order to propose recommendations to contribute to the improvement of relevant legal regulations.

KEYWORDS: *AI, robot, damages caused by robots, liability for non-contractual compensation*

1. CURRENT VIETNAMESE LEGAL FRAMEWORK ON LIABILITY FOR NON-CONTRACTUAL DAMAGES IN CASE OF DAMAGE CAUSED BY ROBOTS

First and foremost, in terms of the definition of robot, it is accessed as a type of machine that can perform tasks automatically with the control of a computer. Modern robots rely on artificial intelligence (AI) - allowing them to perform complex tasks in a constantly changing environment. Robots perform tasks through two methods: deterministic algorithms (performing pre-programmed behavior) and stochastic algorithms (the ability to learn and self-calibrate algorithms to adjust behavior). With the deterministic algorithm, the programmed robot (usually robots used in industry...) can perform highly complex tasks, requiring little or non-human supervision because it has been pre-programmed. As for stochastic algorithms, cognitive robots (usually humanoid robots like Sophia...), their behavior is difficult to predict. Both types of robots have potential risks, because it is not possible to guarantee the correct operation of the robot, but it can completely cause certain damages if errors happen to occur in the production process, setup or maintenance.

According to the Vietnamese Civil Code 2015, the liability for non-contractual compensation of damages caused by robots arises when the following conditions are met: (i) there must be damage; (ii) must have committed illegal acts; and (iii) there must be a causal relationship between the damage and the illegal act.

Besides, Article 585 Civil Code 2015 stipulates some principles of compensation for copper damage such that actual damage must be fully and timely compensated; the subject responsible for compensation can be compensated if there is no fault or unintentional fault and the damage is too great for his or her economic ability; the aggrieved party is not entitled to compensation for the damage when it is at fault in causing the damage or the aggrieved party fails to apply necessary and reasonable measures to prevent or limit the damage, etc...

Personally, the above-mentioned regulations were mostly outdated as the matter of fact that being enforced many years ago, but now the advent of robots are increasingly being applied in life. Therefore, the appearance and rapid transformation of robots in particular as well as artificial intelligence in general have revealed many inadequacies in the provisions of the law when applied to practice. Specifically, the fact that robots exist differently from other types of assets when robots contain machine-learning programs will lead to the need to develop more detailed regulations on who is responsible for compensation for damage caused by AI. Damage caused by robots is not only attributed to the current owner or the possessor of the robot, but also has to be extended to other objects, especially manufacturers and programmers.

2. THE INADEQUACIES IN THE PROVISIONS OF CURRENT VIETNAMESE LAW ON COMPENSATION FOR NON-CONTRACTUAL DAMAGES CAUSED BY ROBOTS

Currently, the promotion of robot application on daily-basis activities is drawing more and more attention, however, Vietnamese law has not really expanded its scope of regulation to relevant legal regulations to robots, not commensurating with the rapid and strong advent of this object. Therefore, many limitations are increasingly revealed in the current regulations.

Firstly, the robot is still not clearly defined and has not been recognized as a kind of subject in legal relations. Under the provisions of the 2015 Civil Code, the subject of legal relations is an individual or a legal entity. The robot is an artificial entity, so it cannot be included in the group of individuals, as well as the fact that robot does not have the characteristics to be recognized as a legal entity. In addition, robots should not be considered as just a type of property today because in the future, the prospect of robots participating in social relations independently is entirely possible and that seeing robots are merely assets is not suitable for the development level of robots.

Secondly, when considering a robot as an asset as it is today, following the provisions of Article 584(3) in Civil Code 2015, in case a robot causes damage, the owner of the robot is responsible for this compensation. Hence it can be understood that all damage caused by robots is limited to the subject responsible for compensation - the owner or the possessor of the robot at that moment. However, as aforementioned,

robots are a special type of asset, with a nature that is not similar to other types of assets, so many shortcomings will arise if the general provisions on compensation are used to adjust for the actual damage caused by the robot. Therefore, it is necessary to consider the impact of each subject to attribute the responsibility for compensation to the people involved. Because the cause of damage caused by robots in reality can appear at many different stages and can come from the impact of many objects. For instance, from the manufacturer's perspective, there will be a first person responsible for electronics such as sensor systems, actuators and mechanical parts. And the programmer will be responsible for the robot's training process related to software errors including learning ability, image processing, decision making... Besides, when the robot allows a certain degree of personalization, the user can manually adjust the basic algorithm through which to guide the robot's behavior, if damage occurs, thus, the user is also responsible. Accordingly, damage caused by a robot due to causes during manufacturing, assembly or design is usually accounted for the responsibility of the manufacturer, but when mechanical damage resulting from not maintaining the robot in good condition or from the using process, that responsibility belongs to the owner because they are responsible for maintaining, preserving and upgrading the machine. In addition, with the spirit of the current legal provision of non-contractual damages, when the robot causes damage, strict liability will be applied, that is, without considering the element of fault and not requiring the aggrieved party to prove the fault of the faulty party when making a claim. However, it can be seen that this change only helps the aggrieved to be guaranteed the right to claim compensation, but focusing only on the responsible person who is the owner and owner of the property is very limited. and is in a very narrow scope compared to the cases of damage caused by robots, unintentionally ignoring the responsibility of manufacturers, programmers... as analyzed.

The determination of who is liable for damages can also be supplemented by the provision of joint obligations. For the problem of damage caused by robots, the cause of damage as mentioned can come from many stages and is affected by many subjects including manufacturers, programmers, users, etc. Based on an agreement or according to the law, when the owner is the person responsible for compensation for damage caused by his robot, the manufacturer, programmer, etc. can also be considered as related parties. In addition, the reality also arises that the owner may be the one to suffer the damage, then the owner is not responsible for compensation, and cannot form the above-mentioned related parties. That stipulates the liability of compensation on the part of the producer in the relationship between the producer and the consumer in the case of determining the cause of damage arising from the quality of the goods that the manufacturer has provided to the market, which is the robot. Pursuant to Article 23 Law on Protection of Consumer Rights 2010, organizations and individuals trading in goods are responsible for compensating for damage in case such goods do not meet the quality standards, causing damage to the life, health and property of consumers. However, robots even with proven quality assurance, compliance with safety standards, testing steps and certification before commercialization still have the potential for problems to arise, mostly coming from

the robot's ability to self-learn based on the algorithm. At that time, the subject is responsible for compensation if it is only imposed on the manufacturer, on the programmer or on any other specific party, there will certainly be injustice.

It can be seen that the current Vietnamese law only applies compensation for non-contractual damages to cases that can be compared based on a regulated relationship such as the relationship between the producer and the consumer, between the owner of the property and the person damaged by the property... However, with the ability to make decisions and act independently, robots can be a vehicle for another subject to take advantage of to cause damage, such as military robots, or it can be a direct subject of damage doing harm to people or other objects.

The above inadequacies have shown that determining who is responsible for non-contractual damages if only based on current regulations will exist many loopholes. Besides, if we consider the claim of the manufacturer to pay compensation based on strict liability in accordance with the provisions of the Law on Consumer Protection 2010 as a measure to protect the interests of the person who suffers damage or ownership as it is today will mean limiting the development of automation. Because the manufacturer or the owner bears a greater responsibility, more risks for robots than if they use human labor. Concerning this issue, some research papers have suggested that, in order to encourage automation and improve safety, it is necessary to apply the compensation measure to the robot as a human instead of treating the robot as a human being an asset as it is today. Based on that, a comparison is made between robots and companies when companies were not previously considered separate legal entities with human owners. Over time, however, legislators abandoned the model of treating companies as just assets and gave them legal status. Therefore, for robots, it is also necessary to set up such a status in this day and age. Nevertheless, because robots do not have full awareness and thinking ability through the machine-learning process, the rights of robots must also be limited, not exactly the same as the rights of the subjects in the relationship.

Lastly, in order to timely solve the current problem, it is also necessary to determine that, even cognitive robots - which are said to have the ability to judge, are still unable to set goals for themselves, cannot recognize themselves. aware of the social and ethical consequences of their actions. Robots are not yet able to make autonomous decisions about goal setting, but simply make choices that are consistent with the established program. Therefore, in order for the regulations on who is responsible for non-contractual damages caused by robots to become clearer, it is also crucial to derive from the classification and specific identification of the role of humans in each contract of the robot operation. Accordingly, parties such as manufacturers, programmers, distributors or even users should be placed within specific areas of responsibility, minimizing the case of damage caused by the robot.

3. SUGGESTIONS

In the face of the advanced development of robots, the author would like to make some suggestions to contribute to the improvement of the Vietnamese legal system on liability for non-contractual damages caused by robots.

First, in addition to applying the current regulations in determining the person responsible for compensation, the legislators need to have a clear definition of the robot along with specific guiding documents related to the classification of cognitive robots and programmable robots. Then, it becomes easier to set up separate regulations to determine who is responsible for compensation for damage caused by robots. For example, legal documents should contain provisions on the liability of manufacturers, robot owners, legal or illegal possessors of a robot system and a robotic entity in an unaffiliated or affiliated relationship.

Second, the law needs to simplify the process of claiming compensation if damage arises from the robot side: Specifically, where the aggrieved or injured should start off to sue when the robot causes damage. This claim need not be whether a detour from the aggrieved party suing the owner, then the owner will claim for the manufacturer, and then the manufacturer will contact the robot programmer to compensate in case there are errors in the programming process.

Third, with a clear classification of programmable robots and cognitive robots, we will then need to separate legal tools to avoid unintended problems caused by them. For programmable robots, we need to focus on building legal corridors on how to manage and use them. With cognitive robots, with more complex behavioral self-learning and machine-learning processes, legislators may consider promulgating regulations on requesting guidance and enforcing ethical standards for both manufacturers and users. use and possibly a robot. The establishment of a separate international support fund or insurance systems to compensate those who suffer damage due to the robot's behavior is also a worthy contribution, when the problem of determining the fault of the robot. whose damage perception robot encounters many obstacles.

Last but not least, from where the author stands, machine-learning robots should be recognized as a special legal entity and can be granted Citizenship. However, granting legal status or Citizenship to a robot should only be done when the robot has reached a conditional threshold with appropriate features. For example, a cognitive robot that can operate on its own and be independent of humans, can be recognized as a new entity of legal relations. Therefore, in addition to the granting of legal status, the State needs to develop a standard framework for assessing the capacity of these special robots. From there, humanity will begin to create potential management mechanisms, not only to limit the power of the robot and give the robot the appropriate rights, but also to limit the power which this AI approaches and even beyond human cognitive and physical abilities. However, this mechanism also needs to be taken a step further to be able to create a separate set of rights related to certain robots, regulating social relations, industrial sector, employment, liability, ownership, privacy, security, etc.

Above all, assessing the ability of a cognitive robot to recognize legal status needs to go through a full range of research and testing, monitoring as well as consulting stages with experts to develop an appropriate set of standards and inspection procedures.

4. CONCLUSION

In respect to the trend of the digital economy and society with the continuous development of AI such as robots, it is urgent to research and supplement appropriate legal frames to regulate this issue. Practically speaking, Vietnam and other states on a global scale still believe that robots should not have legal status, and if robots do harm, the aggrieved party will be dealt with according to current municipal laws on liability to compensate for non-contractual damage depending on certain circumstances and conditions. Besides, it is also obligatory and essential to consider the legal challenges that robots can bring, because robots are constantly being applied and manufactured while the legal corridor on the most general level still remains out-of-date with many disadvantages and loopholes. Not only Vietnamese law, but also worldwide legal systems are still confused when facing this intelligent object, hence, with the prospect of robots becoming a legal subject, the author believes that legislators should introduce separate legislation to limit human rights and obligations, and stop delaying the adjustment of legal issues related to robots with an objective need for the development and implementation of scientifically-based models of legal evolution, which could ensure stable economic and social growth in the conditions of intensifying digitalization.

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**RESEARCH ON POLICIES, LAWS, E-GOVERNMENT
ADMINISTRATION IN THE DIGITAL ECONOMY - DIGITAL SOCIETY
AND STUDENTS' SUGGESTIONS AND PROPOSALS FOR SOLUTIONS
TO PERFECTING THE LEGAL POLICY FRAMEWORK.**

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I. INTRODUCTION

The fourth internet Revolution is changing the economics, which is opening a lot of opportunities, but it's also going to be challenging for the economy. Many countries in the world have been building, working on different policies to exploit the benefits of new technologies, pushing out economic growth and raising the ability to compete. The fourth rate of industrial Revolution has the potential to provide great use for the economy like: cutting costs, upgrading the power; The sales models have a very small receipts, creating a network effect; The opportunity to develop other products and services... Receiving the benefits of the advanced industrial Revolution, the Party and the water have decided to build a policy and some programs to avail the Revolution of the fourth time, in which to promote scientific and new technology, Raised the resources of the resources, made a decision to alter the number, build the economy, social media, set the investing factor of the mass structure, push the realms, solve the work.

II. BODY PART

A. DEFINITIONS OF DIGITAL ECONOMY - DIGITAL SOCIETY

1. Overview

1.1 What is Digital Economy

The digital economy is the economic activity that results from billions of everyday online connections among people, businesses, devices, data, and processes. The backbone of the digital economy is hyperconnectivity which means growing interconnectedness of people, organisations, and machines due to the reliance on internet connectivity, mobile technology and the internet of things (IoT).

The digital economy reflects the move from the third industrial revolution to the fourth industrial revolution. The third industrial revolution, sometimes called the digital revolution, refers to the changes that happened in the late 20th century with the transition from analog electronic and mechanical devices to digital technologies. The fourth industrial revolution builds on the digital revolution as technologies today continue to bridge the physical and cyberworlds.

1.2 What is Digital Society

Digital society is a modern, progressive society that is formed as a result of the adoption and integration of information and communication technologies (ICT) at

home, work, education and recreation, and supported by advanced telecommunications and wireless connectivity systems and solutions.

1.3 E-Government Administration

By definition, e-government is simply the use of information and communications technology, such as the Internet, to improve the processes of government. Thus, e-government is in principle nothing new. Governments were among the first users of computers. But the global proliferation of the Internet, which effectively integrates information and communications technology on the basis of open standards, combined with the movement to reform public administration known as New Public Management, has for good reason generated a new wave of interest in the topic. E-government promises to make government more efficient, responsive, transparent and legitimate and is also creating a rapidly growing market of goods and services, with a variety of new business opportunities.

2. National Strategy On Digital Economy And Digital Society Development

Vietnam is among the countries issuing the strategy on developing digital economy and digital society early.

Digital transformation was mentioned in the Politburo's Resolution 52- NQ/TW. The Prime Minister issued the national digital transformation program in 2020, the national strategy on digital government development in 2021 and then the national strategy on digital economy and digital society development.

In the current trend of digital economic development in the world, experts mention many new models, including blockchain. Is the technology a part of the Government's digital economy development strategy?

Blockchain is a special highlight of digital economy, because the technology allows transactions to be made in an easy, transparent and safe way.

The role of blockchain in digital economy in the near future can be compared with essential technical infrastructure, like electricity, roads, schools and stations in traditional economy. That is why we can see the trend of switching transactions, payments and trade platforms from old infrastructure to Blockchain-based distributed infrastructure, with two-digit growth rates each year. Developing blockchain technology could be one of the strategies for Vietnam to develop a digital economy and make a breakthrough for Vietnam.

Vietnam's national strategy on digital economy and digital society is the result of selective reference to international practice combined with domestic practice.

Developing digital economy and digital society is bringing the activities of people and businesses to the digital environment. The digital environment is a global environment. Therefore, the national strategy is built to clearly define the concept of digital economy and digital society.

Vietnam's economy comprises three elements – ICT digital economy, which is the information technology industry and telecommunication services; platform digital

economy which is the economic activities of digital platforms, online systems that connect demand and supply, and online services; and sectoral digital economy which means digital economic activities in different fields and sectors.

Vietnam's digital society comprises eight major elements:

First, the digital means which allow each citizen to have one smartphone to do what they want (all in one).

Second, digital connection which allows each household to have optic fiber to the home cable line and popularize mobile broadband connection.

Third, digital identity. Every citizen has a digital identity which can be authenticated easily from a distance, over the internet, instead of being physically present.

Fourth, every citizen has a digital account which serves payments for electronic and digital transactions.

Fifth, digital signature.

Sixth, digital addresses.

Seventh, digital skills.

Eighth, digital culture.

B. SUGGESTIONS AND PROPOSALS FOR SOLUTIONS

1. Concentration, improve the quality of the market economic economy, which determines socialism, which is better than the relationship between the state, the market and society.

Continue to improve and enhance the quality of the constitution, the law's fully, synchronized, integrated, specifically, intensely, effectively, the laws of law, guaranteed to enforce the law. Developed the market and contract factors, especially the major of the land, science, technology. Make sure you're free, safe and sound in business; Mobilize, distribution, using efficient resources according to the market principle. Build, completing the legal frames, testing the mechanics, policy to promote the process of changing numbers, economics, developing new economics, starting to create, providing industrial services, preserving the environment preservation... The water works well as building and management of strategy, planning, the plan, the policy, distributing resources to the market. Protecting the rights of legal property and business rights, to enforce the contract of the people, business by law, by the law, the resources, the tools, the mechanics, the distribution policy, the distribution policy, to distribute, and distribution distribution of the process, in order to the process, the process, Make sure you're safe, raise the welfare of society and protect the environment.

Conducting the role of the people, the business, the political organizations, the occupation and the community in the constructive process, the acts and supervision of the law, the policy of the state, the Founding of the great nation, The front and the civil corps for the race to develop economics, security, security, and to build the

government.

Reform the administrative process, sync, efficiency, abolish the barricades from business, improve and enhance the quality of business environment, guaranteed to heal, equality, equality, equality, equality, transparency.

Building up modern background, based on the staff, the office, the high-profile officer, the high-tech who has the ability to create, the moral virtues, the politicians, the people, the business; Run the protocol, the government manager's stool is mainly by the constant, intensely overprotective; It takes a maximum of legal risk and expense to the people and business, pushing hard to build an electronic government, going to the number of factors, concentrating on the service of the domestic agencies, concentrating all over and focused; Designed synchronized, built and put into the combination system, connected to the major database, especially the residential data data, health, health, health, insurance, businesses, land, land, land, home, at the service, It is effective to develop economics and social life and people's lives, to make a change of national numbers in a way to develop digital economy, build social media.

Changing the power of rank, rank, proxy and enhance the efficiency of the leadership, the leader, the director. Support, to complete the local authorities; Specify responsibility, the power between Central and local. A combination of harmony between local economics and regional economy on the facility that activates the potential, the power of every region, local. Change new budget for the state budget, specify the source, the mission of budget, the focus of the budget is to enhance the leader of the central budget, and also ensure its own discretion, encourages and an upgrading to create of the local authorities.

2. Developing scientific strength, technology and new technology to create a massive boost of energy, energy, energy, effect and competition of the economy.

Assemble the patent, policy, law consistent with the market and international policy to develop the background of Vietnam; Develop science, technology and new inventions, a business of downtown; An impulse to develop a new business model, economics, social number. There are mechanics, economics, financially encouraging businesses to participate in developing and new technological development. Allows you to perform a new policy test, progress, progress and new technology application, new production model, new business model. Specify the quotes, action programs to develop and develop science, and make new technologies in every action program. Local jobs, local ones.

Promotes to develop social science and humanity to have the best-serving scientific establishment of our new career in economics, economics, social growth, rise to creative energy, Raising responsibility and respecting the difference in social science and literature, trying to close a social science and social science and humanity with scientific science and technology in the process of developing economics, the economics.

Developing sciences, technology, new inventions and changing numbers is the main

motivation of the economic growth. Making changes in national management, government manager, business, social holdings, social holdings and national management. Fast-moving numbers for some industry, field has the condition, especially the small business area and just, uh, improving and development of new technology, number-number-four G, and after 5G, intellectual structure, series series, blockchain, network, network, 3rd-bent network, network, network, network-bending, Pure energy, environmental technology to convert, enhance efficiency, effective in the economy.

Changing the ability to run research, science management, technology, creative technology, make good for research, exchange for research, which is consistent with the market organ, improve the autonomy of scientific research. Focus on research, Core tech applications, digital technology. Technically, upgrading abilities, effective in research facilities; Yeah, pushing scientific research, technology in businesses, university, the facility that specializes in market demand. Increased, integrated businesses with research institutions, university, which concentrated on the ability of the revenue business, mastered and took part of the new technology and started to promote the investment industry, and started business to evolve the major research, New creative changes in Vietnam. Changing the basic government government's banking system for science, technology; It's a matter of fact. It's a matter of science and technology. Reset the programs, the science mission, technology, attach to the social needs, the value of the product, the values of the value.

To enhance the technology of the economy is the effect of the effect of science, technology. Pressed hard on research, development, in which to focus on the application and commercial sales. Options and focus support support for the application development of technology for some field and key field.

Developed and enhanced the efficiency of a new nation's innovative system, a new ecosystem of innovations, a business of industry, industry, industry, industry, industry. It's highly effective to operate the research facilities, national science labs, high tech facilities. Conducting the role of the fund of science and new technology in the study, a new development, a new development, applications and transferring technology.

Raise the potential and the science, the technology in the water to be able to deploy scientific research and develop new technology, focus the advanced technology, which is highly efficient, especially the technology, the biotechnology, energy, environmental.

Developed the scientific market, the technology that built a national database on science, technology. The connection is effectively the national tech trading floors with the app centers and transferring scientific progress and technology in the local sector. Developing the network of the broker service agency, estimating the transfer of technology. Embrace importing import, transfer the world's advanced technology to promote the gravitational energy, master and change the technology of business.

Creating the competition in business environment to promote the industry to promote the industry, productive the energy to boost the energy. Increase the custody of the guardian and enforce the intellectual ownership.

3. Developing the manpower, education and learning the response requires the manpower of the industrial Revolution and international Inquisition.

To build a man of the Vietnam who thrives, in health, power, power, power, knowledge, high responsibility to himself, family, society and country, to push the strength of human resources, especially the people, the quality of high quality, Respectfully the request of the Fourth Revolution and the international Inquisition. Develop an expert team, head scientist; Respect the technical team, the manpower, the manpower, the tech manager, the management, the business manager; The social management and organising life, taking care of the human, the new recruits, using, the talent in management, the administrator, the science, the technology, and the new inventions.

New change and enhance the profession education quality in the open, flexible; Make sure to unify the original and basic education and nurture, focus on the energy resources, accelerate the engine in the country; It appears to be a good work team, contribute to the high-edge edge of the national competition, bonding tight between training and working.

Create basic, strong geometry, educational efficiency, educational studies, study to complete, stabilize the textbook system and institutions at the level of education. The Responsibility, learn the team to restore the team that demands to restore all new education. Invomiting. Moving the Education from the crucial component of knowledge to develop all physical and human qualities; From the top of the class to the multi-dimensional geometry, attention and online studies, internet, television, television, social activities, foreign courses, science; Studying the family's education and social education, the human nature of morality, discipline, self-discipline, awareness of the public, social education; The skill of living, the skills of work, the language, the technology, the digital thinking of creative and international immigration.

It's a common knowledge of non-non-non-existential education. It's required to enter a common education program in common knowledge and foreign language, which is important to build the basis of knowledge and behavior for academic students. Pressed hard on the stream after base high school; I mean, I'm supposed to be in high school. Decrease the indigenous illion areas of extreme distinction, minority countrymen.

Reset the school system; Developed the harmony between neutral and neutral education, among the region, domain, priorities, difficult areas, common popularity countrymen, border border, and marine icons. multiplies, diversity diversity diversity of diversions, diversions of diversions, created policies, creating policies, creating policies, To perform a master structure with the university fit for the general

coin of the world, changing the infertility university efficiency to work on a project of private cooperation. Planning, rearing the colleges, college; There's a structure for constructing some of the great colleges and college students became a highly-trained workplace in the area and the world.

Progress of a certain high-profile institution in major cities, places where there are conditions; I'm sorry, but, uh, technically, rentals rent some of the education facilities have a principle, making sure all students get to school. Build an open education system, learn all your life and build a class; Do the training on the needs of the work market. Specifically, notice, nurturing, nurturing, attracting talent to develop social economics, high-quality, efficiency, educational studies and education, and use English languages.

4. To step up industrialization, modernization and economic restructuring in association with renovating the growth model, ensuring the substance and efficiency; develop the digital economy; promoting fast and sustainable growth on the basis of macroeconomic stability.

Continue to promote industrialization and modernization on the basis of science, technology, innovation and technological achievements of the Fourth Industrial Revolution. Formulate national, regional, and regional development master plans and plans in line with the country's reality in order to improve the economy's autonomy, adaptability and resilience. To step up the development of a number of key economic sectors and fields, which have potentials and advantages and have great room left to act as a driving force for growth in the spirit of catching up, progressing with and surpassing in some fields compared to other fields. with the region and the world.

Promote the development of new services based on modern technology, digital technology, and build a service ecosystem in the fields of finance, banking, insurance, medical insurance, education, telecommunications technology, logistics and logistics. . International standards applicable to accounting, auditing and commercial banks. Establish a national product brand. Promote the development of domestic trade, rapid growth and sustainable development in a modern way, conquer Vietnamese consumers by enhancing reputation and quality of Vietnamese goods, and meet the increasing demand of Vietnamese consumers for quality and food safety; Protect the legitimate interests of the state, producers and consumers. Speed up exports, make effective use of free trade agreements, expand and diversify exports, do not depend on the big market, ensure the balance of imports and exports, and import and export goods and services. Having a trade policy that conforms to international integration; Studying appropriate defense measures to protect consumers' production and interests is in line with the international commitments to which Vietnam is a party. Accelerate the structural adjustment of tourism industry, and ensure the synchronization of specialty, modernization and development, sustainable development and international integration; Pay attention to the link between tourism and various industries, while other areas of the value chain form tourism products, and truly become cutting-edge economic areas. Establish, develop and position the

national tourism brand with unique and national cultural characteristics.

III. CONCLUSION

In this research, us student focused on the main factors that can lead to the ability of transforming relations with citizens, businesses, and other parts of government refers to the E-Government and the usage of information technologies. This would yield different outputs such as better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information and more efficient government management.

BUILDING A DIGITAL GOVERNMENT IN VIETNAM AND EXPERIENCES FROM SINGAPORE

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INTRODUCTION

Digital transformation is the change of an entire organization, creating a new process, a new organizational model, and a new method of providing services (not just computerizing an existing process) based on digital technology and digital data. Digital transformation includes three main groups: (i) digital government, (ii) digital economy, and (iii) digital society with three main actors: government, businesses, and citizens. In particular, digital government, which is a pillar, needs to be focused on and quickly build a complete model, because the government is of absolutely national importance, as well as the higher perfection of digital government is, the more that promotes the comprehensive development of digital economy and digital society. Within the scope of the article, the authors will give an overview of digital government, orientations for building the digital government in Vietnam, and experiences from the digital government model of Singapore.

KEYWORD: *Digital government, Digital transformation, Digital Government Blueprint, LifeSG, Singapore.*

1. OVERVIEW OF DIGITAL GOVERNMENT

1.1. What is a digital government?

According to Decision No. 942/QĐ-TTg approving the e-Government Development Strategy towards the digital government in the period of 2021-2025, oriented to 2030 issued by the Prime Minister stipulates: "*The digital government is the government that has all safe operations in the digital environment, has a redesigned operating model and operates based on data and digital technology, to be able to provide more quality services, make more timely decisions, enact better policies, use more optimal resources, create development, lead national digital transformation, effectively solve major problems in socio-economic development and management. In other words, this is the digital transformation of the government.*"¹⁰

If e-government is a "4 no" government which includes: paperless text processing, meeting without a meeting, handling of contactless administrative procedures, and non-cash payments. The digital government is e-government, adding "4 yes" that is to have the whole operation safely in the digital environment, capable of providing new services quickly, capable of using optimal resources and capable of creating development, leading the national digital transformation, effectively solving major

¹⁰ Decision No. 942/QĐ-TTg stipulating "Phê duyệt Chiến lược phát triển Chính phủ điện tử hướng tới Chính phủ số giai đoạn 2021-2025, định hướng đến năm 2030"

problems in socio-economic development and management.¹¹

1.2. The urgency of building a digital government in Vietnam

In industrial revolution 4.0, the internet and other digital technologies have been an essential part of the daily lives of people and businesses around the globe. Especially, when we have just experienced the COVID-19 pandemic, which has greatly affected the life and economy of the world in general and Vietnam in particular. The pandemic has changed the process of operating daily life, other processes in commerce, and business,... and also the organization, operation, and provision of public services by state agencies. Thereby, it has been shown that digital transformation is an inevitable trend, in which, with strong demand and development in two other pillars (digital economy and digital society), it is necessary to develop more quickly to complete a digital government model in Vietnam.

Recognizing the importance of national digital transformation, the Government of Vietnam has the orientation and road to build and develop digital government from the Government platform and complete the digital government in the near future. Some important milestone policies should be mentioned such as Resolution No. 17/NQ-CP on a number of tasks and solutions focusing on e-Government development in the period of 2019-2020, oriented to 2025; Decision No. 749/QĐ-TTg dated June 3, 2020 approving the National Digital Transformation Program to 2025, oriented to 2030; and especially decision No. 942/QĐ-TTg dated June 15, 2021 on approving the e-Government Development Strategy towards the digital government in the period of 2021-2025, oriented to 2030. As recently as April 26, 2022, during the study of this article, the Prime Minister of Vietnam issued Directive No. 02/CT-TTg on the development of e-Government towards the digital government.

1.3. Vietnam's e-government development strategy towards digital government:

On June 15, 2021, Prime Minister Pham Minh Chinh issued Decision 942 approving the Government Development Strategy towards digital government in the period of 2021-2025, oriented to 2030. This strategy has opened a new turning point for the development of Vietnam's digital government. Setting a target for Vietnam is to have an e-Government development index, a high-level digital government in the world, in the top 50 countries by 2025, in the top 30 countries by 2030 according to the UN ranking. The new strategy has also emphasized that the digital platform created by excellent digital technology enterprises is a breakthrough solution to promote faster digital government development, reduce costs, and increase efficiency. The strategy has given an open orientation so that people and businesses can participate in

¹¹ Anh Lê, "Chính phủ số là chính phủ điện tử bổ sung "4 Có"", [\[https://viettimes.vn/chinh-phu-so-la-chinh-phu-dien-tu-bo-sung-4-co-post146900.html\]](https://viettimes.vn/chinh-phu-so-la-chinh-phu-dien-tu-bo-sung-4-co-post146900.html) (Accessed 6/20/2022)

discussions and support the activities of state agencies to improve the quality of services, jointly solve problems and create value for society. Finally, besides serving people, businesses are better. This strategy also equips working tools such as virtual assistants or digital collaboration platforms so that employees can perform their tasks best.

2. SINGAPORE'S DIGITAL GOVERNMENT

2.1. The reason for choosing the digital government development model in Singapore

Also a country in Southeast Asia, Singapore has a dynamic economy very similar to Vietnam, this country also has nearly 50 years of establishing diplomatic relations and 10 years of a strategic partnership with Vietnam. Recently, on the morning of May 20, 2022, the Prime Minister of the Socialist Republic of Vietnam also asked Singapore to share its digital transformation experience when he received visiting Speaker of the Singaporean Parliament Tan Chuan-Jin during his official visit to Vietnam.¹² Thereby, it shows that the Vietnamese Government is also deeply aware that it is necessary to learn from the experience of digital transformation and build a digital government model from its neighbor Singapore, which has an outstandingly developed economy that is considered the dragon of Asia, and especially the successful development in the application of 4.0 technologies to the management and operation of the country.

Some of the ratings that show Singapore's success in building e-Government and Digital Government can be reviewed as a United Nations survey of 193 member countries on the relative ability of their governments in harnessing Infocomm technologies (ICT) to deliver online services and engage its citizens in public policies in 2018, Singapore ranked 7th in the E-Government Development Index and 2nd in the Online Services Index.

Publication Year	2012	2013	2014	2015	2016	2017	2018
UN eGov Survey (released biennially)							
(i) Development Index	10th	No Report	3rd	No Report	4th	No Report	7th
(ii) Online Services Index	1st	No Report	2nd	No Report	3rd	No Report	2nd
(iii) e-Participation Index	3rd	No Report	10th	No Report	8th	No Report	14th

Source: Government Technology Agency

Another annual study by the World Economic Forum Global Information Technology

¹² Hải Anh, “Đề nghị Singapore chia sẻ kinh nghiệm chuyển đổi số cho Việt Nam”, *Lao Động*, [https://laodong.vn/doi-ngoai/de-nghi-singapore-chia-se-kinh-nghiem-chuyen-doi-so-cho-viet-nam-1047219.lido?fbclid=IwAR0SJHtzbiTrCPISf9OABQITeHQCxqNimNwShw6ZY_H572US_U2jwaAmpnFE]

Report, ranks 148 economies and examines their preparedness to leverage information and communication technologies (ICT) for increased competitiveness and development, Singapore ranked first in this category in the 2016 survey.¹³

Publication Year	2012	2013	2014	2015	2016	2017
World Economic Forum Global Information Technology Report(released Annually)						
(i) Government Usage Sub-Index	2nd	1st	1st	1st	1st	Not Available
(ii) Social Impact Sub-Index	3rd	1st	1st	1st	1st	Not Available

Source: Government Technology Agency

On the basis of the successful implementation of e-government, in 2018 Singapore enacted a detailed plan for developing digital government with the name Digital Government Blueprint and the vision of “Digital to the Core, and Serves with Hearts”. According to the official website of the Digital Government Blueprint, at the end of 2019, 86% of Singapore’s citizens and 77% of Singapore’s businesses reported that they are “very” or “extremely” satisfied with their Government’s digital services, 95% of transactions (by volume) are completed digitally from end-to-end. All 20 Ministries

of Singapore have submitted plans to use Artificial Intelligence and they have met the target for a number of officers trained in data analytics and data science.¹⁴

All of the above information and data have shown Singapore's success in building and developing a Digital Government on a sustainable foundation with the ambition of a Smart Nation. Therefore, it will be very valuable if Vietnam can learn from the experience of Singapore, which is a leading country in Southeast Asia in the field of digital government building.

2.2. Overview of Singapore’s Digital Government - Digital Government Blueprint

2.2.1. History of Construction

Singapore took its first steps in the development of e-government about 30 years ago and in its 30-year journey of e-government development Singapore has launched national programs and action plans to become a leader in the development of e-government towards the digital government in the world. This journey began with the National Informatics Programme in the 1990s until the E-commerce Action Plan

¹³ Government Technology Agency, "Our Digital Government Rankings", Singapore Government, [https://www.tech.gov.sg/who-we-are/our-digital-government-rankings/?fbclid=IwAR1soFv7AZ6CzRjhWObesYAZNOvJOSuGRiGhq4DQZ0B60OZ1d8vDIapql_M]

¹⁴ Government Technology Agency, "Digital Government Blueprint", Singapore Government, [<https://www.tech.gov.sg/digital-government-blueprint/>] (Accessed 6/22/2022)

I of 2000-2003, at which time 90% of public services were provided online in Singapore. CBD ACTION PLAN II (2004-2006), IGov 2010 (2006-2010).¹⁵

In 2011 Singapore published the eGov Master Plan 2015 to develop ICT infrastructure for the entire next-generation government. By 2014, this was an important milestone, with his macro vision, Prime Minister Lee Hsien Loong outlined a plan to make Singapore the world's first Smart Country and established the Smart National Program Office to accelerate national efforts to turn Singapore into a smart country with three main pillars: the digital economy, digital government, and digital society. This is also a milestone marking the transition from e-government to digital government.

In 2016, the Government's Technology Agency - GovTech was established. The agency is responsible for strengthening internal technical capacity, providing government digital services to the public, and developing infrastructure to support the Smart Nation initiative. In 2017, the Smart Nation & Digital Government Office (SNDGO) was established under the Prime Minister's Office, which plans and prioritizes key Projects of the Smart Nation such as the National Digital Identification Platform and the Smart National Sensor Platform.

2.2.2. Six Construction Strategies

At the Symposium on Smart National Innovation Week 2018, the Government of Singapore announced the Digital Government Blueprint from June 2, 2018 to June 6, 2018. The Blueprint serves to mobilize all government-wide resources to draw insights from data and build digital technologies capable of changing the way the government operates. The Blueprint with the goal of shifting arguments to the core and serving its citizens with all your heart highlights six strategies for building digital government as follows:

1. Integrating services around citizen and business needs

The Government of Singapore does not follow technology to meet its needs, but it has decided to build technology towards service, meeting the needs and desires of people and businesses in the process of developing digital government services.

2. Strengthening integration between policy, operations, and technology

Towards digital government and achieving the ideal of a smart country, no digital technology must meet two factors: policy and practical activities. In addition to the strong application of Artificial Intelligence (AI) technologies, and the implementation of Internet of Things (IoT) technology, the Government of Singapore has also appointed more digital strategy directors to lead the implementation of

¹⁵ Phạm Văn Nghĩa, "Phát triển chính phủ điện tử hướng đến chính phủ số kinh nghiệm của Singapore", [<https://ictvietnam.vn/phat-trien-chinh-phu-dien-tu-huong-den-chinh-phu-so-kinh-nghiem-cua-singapore-20201112105342939.htm>] (Accessed 6/20/2022)

digitalization plans in their respective ministries and agencies.

3. *Building common data and digital platforms*

Being able to share data between agencies requires simultaneously addressing legislative, policy, capacity, and technical challenges. Meeting all will lay the foundation for shared infrastructure to share data safely and efficiently, improve policy analysis and provide interdisciplinary services. Digitally, the Government's digital platforms will open up more for businesses to participate, enabling Enterprise-to-Business and Business services with Consumers.

4. *Operating reliable, resilient and secure systems*

The Government of Singapore has committed to developing its Cybersecurity Strategy and Smart Systems. The Government of Singapore conducted a comprehensive review of data security practices across the board in 2019, accepted the recommendations of the Public Sector Data Security Review Commission, and implemented them so that people could trust the Government to take data security very seriously.

5. *Raising our Digital Capabilities to Pursue Innovation*

The Government has been consolidating and developing available talent through the Center for Excellence in Information Technology and Smart Systems. At the same time, the Smart National Scholarship aims to attract and train the next generation of developers and leaders.

6. *Co-creating with Citizens and Businesses, and Facilitating Adoption of Technology*

The government will step up efforts to engage in working alongside people and businesses, weighing their opinions as well as finding new ideas that can better serve people. Accordingly, the Government has launched the Government's Developer Portal (www.developer.gov.sg) with the desire to incorporate a variety of perspectives to allow the product or digital platform to eventually be the most complete.

Through these 6 outstanding criteria of DGB, it can be seen that Singapore has prioritized building a solid foundation for its model before aspiring to develop it to the next level. It can be seen that there is a big point as the foundation for all 6 criteria and the entire plan that the authors draw from the DGB plan:

First, the Government of Singapore sees its people as the most basic foundation, as well as the ultimate goal, promoting the Singapore Together movement. Therefore, they allow people to participate in the construction process, co-create with the government as well as always listen to the feedback, and contribute to the opinions of the people after using to modify and improve these DG services. That is why, Singapore always has a great resource to participate in the development of DGB with them and the application programs and websites of the Singapore digital government are easy to use, accessible to people of all ages, all professions and get high satisfaction from their people.

Second, the Singapore government focuses on cybersecurity, secure storage and technologies used in digital transformation. They prioritize the development of secure digital services, ensuring the confidentiality of people's information. As well as always focusing on the technologies used for digital transformation need to align with the goals they aim for, ensuring the safety and seamlessness of data storage and sharing. With such a desire, Singapore has always maintained and developed its policies as well as constantly improving the awareness, knowledge, and skills in the digital transformation of its people and also their civil servants.

Digital Government Blueprint

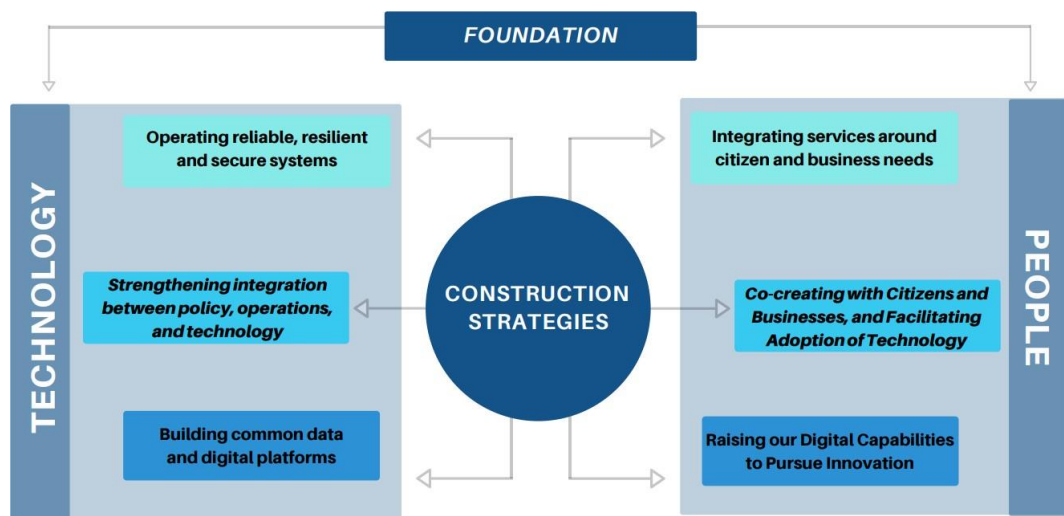


Figure 2.1: Foundation and strategy for building Digital Government Blueprint

2.2.3. Key technologies applied in the model

In addition to setting the criteria for the development of digital government, Singapore also selectively applied specific roadmaps of technologies to the digital transformation of government. For example, the introduction of AI to support the work to develop and deploy AI solutions to create economic value and improve lives. At the same time, deploying AI in the fields of improving analysis, policy formulation, and automation of processes to overcome the shortage of human resources. The government also set out the direction to continue developing IoT sensors, while using sensor data to recognize and automate to improve efficiency in the city's operations. Experiment to put blockchain into a widespread application. In the process of harnessing blockchain technology, the Government Technology Agency, the Ministry of Education, Ngee Ann Polytechnic, and SkillsFuture Singapore have developed a new blockchain-based platform, OpenCert, which provides a service that allows people to easily check and authenticate their academic credentials, it can resist the forgery of certificates. In particular, through the Secure Application Programming Interface (API) and the Government-developed data platform (MyInfo), the Government of Singapore allows registered businesses to

digitize their business activities by requesting the personal data of citizens with their consent. Once accessed, businesses can retrieve verified personal

data for B2C transactions (business models used in the e-commerce sector between businesses and consumers) in data items from more than 10 government agencies.¹⁶

2.3. Singapore's Government digital services - LifeSG

As mentioned in the previous section, Singapore's Digital Government is geared towards people, so all digital services need to be easy to use and occupy a small area on smartphones but integrate many utilities. LifeSG App is an application that meets those conditions, and it is also the most prominent application of Singapore's Government digital services.

LifeSG was originally an app conceived for newborns. This app was initially aimed to help by providing information about birth registration, and immunization records. However, in addition to the LifeSG app, in the process of developing government digital services, there are many websites and apps that have been formed separately. According to the Government digital services development team, separate development would be quicker than moving towards a unified application. However, having so many different programs in the form of such websites and apps makes people take up a lot of space on their phones as well as they are easy to get lost and are bombarded with information they can't process. So, they created one app with one user interface, one simplified user experience, across all multiple government services – learning to use the app will be easy and actually using it will be even easier, it's LifeSG.¹⁷ Therefore, this application has been upgraded from the original, aimed at users who are all Singapore citizens, and focused on developing the application based on two things: (1) personalize the application to suit the purpose of users and (2) become an application that integrates many different public services aimed at many different citizens.

(1) In terms of application personalization, LifeSG relies on user profiles to select and push to the application the information that is relevant to the user, creating an application that is compatible with each different user.

(2) Regarding the integration of multiple government services in one LifeSG app, as of 2020, the LifeSG app is navigating over 40 Government digital services. By bundling services based on user needs with large, easy-to-understand icons, citizens can now easily navigate to where they need to be. And in the future, aspiring application developers will integrate more Government digital services into LifeSG.

In short, LifeSG is an application that meets the criteria: easy to use, personalized for

¹⁶ Government Technology Agency, "Digital Government Blueprint", Singapore Government, [<https://www.tech.gov.sg/digital-government-blueprint/>] (Accessed 6/22/2022)

¹⁷ Government Technology Agency (2020), "Moments of life is now LifeSG - the story so far", Singapore Government, [<https://www.tech.gov.sg/media/technews/moments-of-life-is-now-lifsg-story-so-far>] (Accessed 6/20/2022)

users, providing many government public services but taking up a small space on users' phones, and saving people time when using and dealing with their government. As a typical application for digital government programs when it has created secure transactions with the government in the digital environment, has a redesigned operating model and operates based on data and digital technology in an easy-to-use and time-saving way for users. This is a typical application model that the Vietnamese government needs to pay attention to when building digital government programs in Vietnam.

3. EXPERIENCE IN BUILDING DIGITAL GOVERNMENT FROM SINGAPORE

Firstly, an obvious insufficiency of the current system of Vietnamese government applications is that there are too many apps and websites for only one public service and too few digitally converted public services, as well as the process of computerization, is still going on. Unlike Singapore, these apps mostly only serve the government, in order to make data entry and control of people's information easier, and do not aim to build public service apps for the people and build it together. Typically, during the Covid-19 epidemic, Vietnam had up to four applications for medical declaration and tracing support as well as a series of applications to support epidemic prevention and control. That made people confused, difficult to identify and took a lot of time to use, leading to dissatisfaction from the people.¹⁸

It is possible that because Vietnam is still in the process of perfecting e-government and is only aiming for digital government in the future, it is quite difficult to bring novelty and creativity into existing programs. But this is also a point we need to see and learn from Singapore when it comes to building a digital government, building digital programs needs to start from the needs of the people. Our people are people of all ages, and all professions, they need programs that are practical and easy to use, take up little space and little of their time, so that people can easily access them. In this way, people can easily access and perform public services with high interest and satisfaction.

Specifically, the LifeSG application model is a model that meets the above needs. Vietnam should consider learning to build government digital services that are linked together and people can easily access those services with just a single application.

Secondly, currently, crime in the field of information in Vietnam is having complicated developments, causing serious damage in many aspects. According to the results of the cybersecurity assessment conducted by Bkav, in 2021, the damage caused by computer viruses to Vietnamese users alone amounted to VND 24.4 trillion,

¹⁸ Trần Yến, "Loạn ứng dụng khai báo y tế, các app "sức khỏe điện tử" gây phiền hà cho dân", [<https://www.qdnd.vn/giao-duc-khoa-hoc/chuyen-doi-so/loan-ung-dung-khai-bao-y-te-cac-app-suc-khoe-dien-tu-gay-phien-ha-cho-dan-672039>] (Accessed 6/30/2022)

and more than 70 million computers lost data due to the spread of malicious code, Red alert for the security situation in Vietnam.¹⁹ The phenomenon of illegal exploitation and use of national databases and the personal data of users is complicated. From 2001 to 2019, there were more than 80% of cases of loss of state secrets through information systems.²⁰ Note that in December 2021, Bkav company specializing in cybersecurity exposed information about 200 customers. From there, it is easy to see that Vietnam's information security system still has many weaknesses and vulnerabilities that need to be quickly repaired and completed.

Looking at how the Government of Singapore deals with these inadequacies can look at some of the following tributes: The Government of Singapore has enacted a comprehensive but comprehensive coverage of cybersecurity in the Public Sector Act (PSGA) and the Personal Data Protection Act (PDPA). The Government of Singapore has also launched programs such as Vulnerability Rewards Programme-VRP, Government Bug Bounty Programme - GBBP, and Vulnerability Disclosure Programme²¹, through which the government has worked together with "white hat" hackers to detect and fix vulnerabilities in its network protection system.

Thereby, when aiming for digital government, Vietnam also needs to consider summarizing the field of personal data protection in certain legal documents, but in each document, it is necessary to expand the scope of protected data information to minimize the overlap of regulations, inconsistency in the interpretation and interpretation between texts as well as content that can be overarching compared to the practice of technological development. The Government of Vietnam should work together with the community to improve its digital defenses as Singapore has tried, as well as to build a channel to strengthen and develop its cybersecurity system by allowing everyone to participate in reporting unauthorized forms of intrusions to government data. At the same time, the construction of a standard cybersecurity system is to receive the trust of the people, people see the reliable security of the government to use government services, thereby creating a solid momentum step towards the digitization of the Government.

CONCLUSION

In a nutshell, to develop the digital economy and digital society, the government

¹⁹ BKAV (2021), "Báo cáo tổng kết công tác an ninh mạng năm 2021", [<https://www.bkav.com.vn/tin-tuc-noi-bat/-/view-content/1014158/tong-ket-an-ninh-mang-nam-2021-va-du-bao-2022>] (Accessed 6/28/2022)

²⁰ Lê Văn Thắng (2019), "An ninh thông tin của Việt Nam trong điều kiện hiện nay: Thực trạng, vấn đề đặt ra và giải pháp", [<https://tuyengiao.vn/bao-ve-nen-tang-tu-tuong-cua-dang/an-ninh-thong-tin-o-viet-nam-trong-dieu-kien-hien-nay-van-de-dat-ra-va-giai-phap-128496>] (Accessed 6/27/2022)

²¹ Lê Minh Toàn, Dương Hải Hà, "Kinh nghiệm của Singapore trong việc xây dựng quốc gia thông minh an toàn", [<https://ictvietnam.vn/kinh-nghiem-cua-singapore-trong-viec-xay-dung-quoc-gia-thong-minh-an-toan-20220222142804843.htm>] (Accessed 6/10/2022)

needsto digitalize as soon as possible. According to that, shaping policy of the Government must be specific, base on preceding experiences of other contries at the same field and go into detail. The study of the digital government model in Singapore has also given usan overview of how to start a digital government as well as some important orientations that Vietnam needs to pay attention to and learn from Singapore's experience. Thereby,the authors said that the digital government model in Singapore is a model worth referencing and considering piloting in the future. However, with the size and quality of the population varying between the two countries, Singapore's model is best suited to develop as a model of digital government in some highly intelligent provinces and ciitiessuch as Ho Chi Minh City and Hanoi.

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4/ BKA V (2021), “Báo cáo tổng kết công tác an ninh mạng năm 2021”, [<https://www.bkav.com.vn/tin-tuc-noi-bat/-/view-content/1014158/tong-ket-an-ninh-mang-nam-2021-va-du-bao-2022>] (Accessed 6/28/2022);

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LAW ON PROTECTION OF MINORITY SHAREHOLDERS OF JOINT STOCK COMPANY IN VIETNAM: CHARACTERISTICS RESEARCH WITH US

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SUMMARY:

Towards the goal of building a developed economy and promoting market efficiency, countries around the world are focusing on implementing and perfecting the corporate governance mechanism. In particular, the OECD Code of Conduct is applied by member and non-member countries. This is the common basis that is considered essential for the development of good corporate governance practices. This Code of Conduct focuses on public joint stock companies in the financial and non-financial sectors. Although not a member of the OECD, Vietnam has also selected the quintessence of the OECD Principles to apply to building a legal framework for corporate governance in joint-stock companies. The Vietnamese corporate law on protecting the interests of shareholders (the Enterprise Law 2020 (formerly the Enterprise Law 2014), the Securities Law 2019 and other relevant documents sets forth the framework principles, and detailed rules and regulations) over time there have been many advances, practical updates and changes, but still in general principles, there are many limitations, especially for shareholders. majority minority. Protecting minority shareholders is very necessary, because minority shareholders always account for a large proportion in the market and in each company, they are investors who lack linkage, have an individual nature. so they are also subject to passive damage from the abuse of power, illegal by the manager.

Stemming from this reason, in order to minimize the damage caused by the manager's illegal acts, ensure the difference between the actual damage caused by that act and the total value assets they own at the lowest level, the article will focus on clarifying the following three issues: firstly, the general arguments about the law to protect the rights of minority shareholders in joint-stock companies; second, analyzing the current situation of protecting the rights of minority shareholders in Vietnam, the author focuses on analyzing property

rights, information rights and governance rights, and compares them with the United States; third, propose legal solutions to protect minority shareholders in Vietnam.

KEYWORDS:

Joint stock company, minority shareholder protection

1. OVERVIEW OF GENERAL THEORIES ON LAW TO PROTECT MINORITY SHAREHOLDERS:

1.1. Features of the law to protect minority shareholders in Vietnam:

Minority shareholders are shareholders who own a small percentage of shares in a joint-stock company and have little ability to control and control the operations of that

joint-stock company directly or indirectly. The protection of the interests of investors in Vietnam in the spirit of the Enterprise Law 2020, LDN 2020 has many progressive regulations, initially in accordance with some principles of corporate governance of the OECD; There are additional regulations to shape the mechanism to protect minority shareholders. According to the principles and methods of corporate governance of the OECD, the rights of minority shareholders that need protection include 3 groups: Group 1 on the right to access to information; Group 2 on rights related to the general meeting of shareholders; Group 3 on the right to appoint and nominate members of the Board of Directors. According to the Enterprise Law 2020, the rights of minority shareholders are also extended to the right to sue managers when necessary; The order and procedures for lawsuits have been shortened and simplified, overcoming inadequacies in costs for shareholders - plaintiffs.

1.2. Features of law protecting minority shareholders in the United States:

In the United States, the nature of the relationship between a company and its shareholders is that of a trustee and a beneficiary. Shareholders' rights derive from the right to enjoy legal benefits from the assets deposited in the company without having to directly exercise the rights to property ownership. Regarding the basic rights of shareholders: Shareholders' rights are also compared to the basic rights of citizens that the State must ensure. The basic rights of shareholders include property rights, dividend enjoyment in addition to corporate governance and management rights. Some important rights of shareholders and shareholders are the right to vote (electing or dismissing members of the Board of Directors, approving amendments to the charter, merging and dissolving the company); the right to access information of the company and especially the right to sue for derivatives; The right to sue derivatives according to the law, when the interests of the company are infringed or threatened by a third party, the Board of Directors will represent the company, or shareholders have the right to sue the third party on behalf of the company.

In particular, US law stipulates that the company and its shareholders are the trustees and the company managers are the trustees. Therefore, the company manager has the obligation to receive trust from the company and its shareholders along with two basic obligations, the duty of loyalty and the duty of prudence. On the other hand, large shareholders must also have fiduciary obligations towards small shareholders. This is a regulation that has many important and effective meanings in protecting the rights and interests of minority shareholders. The fiduciary duty requires large shareholders to be in the interests of the company and small shareholders.

1.3. Features of the law to protect minority shareholders between the laws of Vietnam and the United States:

Basically, the laws of Vietnam and the United States on the protection of minority shareholders are compared according to the three groups of OECD rights mentioned above, there are similarities and contrasts.

Similarities:

LDN 2020 has some similarities with the US in terms of general principles: protection

of property rights; amend and supplement the responsibilities and obligations of the company's managers; on the obligation to disclose information; on derivative lawsuits; on controlling potentially self-interested transactions.

1) Regarding the rights of minority shareholders: in addition to basic rights (property rights, governance, access to information), LDN 2014 has the following additions: Regarding derivative lawsuits; complete details of regulations on information disclosure and transparency.

2) Regarding responsibilities and obligations to ensure shareholder rights of managers and companies: Vietnamese law has some similarities in principle with the United States in making regulations on responsibilities and obligations of the company manager. Basic obligations of US corporate managers such as loyalty, honesty and due care have been adopted.

Contrast point:

1) On minority shareholder rights: Based on the US Commercial Companies Model Act - more than 30 states compiled; The Louisiana Company Law (LBCA) is similar, fundamentally revised in 2015, the LBCA ushers in a new phase, strengthening shareholder protections. With similarities to the Federal Model Companies Act, the LBCA established one of the most notable regulations being the proliferation of provisions for minority shareholder protection (particularly in closed corporations).

In particular, the most interesting regulations on the protection of fixed assets include: (i) Legal solutions for shareholders who are unfairly and unfairly treated by the company; (ii) Shareholder-friendly amendments with simplified procedures for exercising shareholder rights to request the company to buy back shares. (iii) Right to agree to establish a new governance mechanism in the company. This regulation allows shareholders to stick, voluntarily commit to establishing a new, non-traditional corporate structure. (Article 165 Enterprise Law 2020).

2) Regarding the responsibility of ensuring shareholder rights of managers: Vietnam has a number of general principles, no applicable explanations, or precedents on the obligations of company managers, especially the role of the court explaining the duty of loyalty, prudence, and protecting the interests of shareholders.

In the United States, the interpretation of the obligations of the manager, the courts all approach the relationship of board members, executives and shareholders as fiduciary. Therefore, the manager has the obligation to receive trust from the company and shareholders along with two basic obligations, the duty of loyalty and the duty of prudence; Prioritize the interests of the company and shareholders before the individual manager.

2. ACTUAL SITUATION OF APPLYING LAW TO PROTECT MINORITY SHAREHOLDERS IN VIETNAM

2.1. Actual situation of property rights protection

First, the priority right to buy new shares offered for sale of a joint-stock company.

Pursuant to Point c, Clause 1, Article 115 of the Enterprise Law 2020, the priority right to buy shares depends on the share ownership ratio of shareholders. Large shareholders with a high percentage of share ownership will be given priority to buy at a higher percentage. Besides, new shares will be offered to shareholders in the company first and then offered to other investors. This leads to the consequence that large shareholders increasingly concentrate on management rights, which, in the end, will affect the property rights of minority shareholders.

On the other hand, there is an overlap between the legal provisions. The model charter applicable to public companies is issued together with Circular No. 116/2020/TT-BTC, "Common shares must be given priority to be offered to existing shareholders in proportion to their ownership percentage of common shares in the Company, unless otherwise decided by the General Meeting of Shareholders, the number of shares that shareholders have not registered to buy will be decided by the Board of Directors of the Company. Thus, for a joint-stock company in the case of a share issue, the General Meeting of Shareholders has the full right to decide on the sale of shares to each shareholder with a different ratio without necessarily following the ownership ratio. their shares in the company. This leads to difficulties when resolving disputes arising, importantly affecting the right to buy shares and participate in the governance apparatus in joint stock companies of minority shareholders.

Second, the right to ask the company to buy back shares.

According to the Enterprise Law 2020, the issue of share repurchases at the request of shareholders shows that minority shareholders have the right to request the company to buy back their shares in case the minority shareholders have voted against the resolution. of the General Meeting of Shareholders on the reorganization of the company or changes in the rights and obligations of minority shareholders as stipulated in the company's charter.

For minority shareholders, it is very rare for them to ask the company to buy back their shares for many reasons such as: Small percentage of shares, minority shareholders are not interested in the reorganization of the company. company or change the rights and obligations of shareholders, etc. That is why usually minority shareholders accept to sell at a high price when the shares increase, instead of using the right to ask the company to buy back shares. despite having many risks such as: i) The joint stock company made a loss, leading to a decrease in the share price for a long time; ii) minority shareholders cannot sell the number of shares they offer.

For a Joint Stock Company, the sale of shares by a minority shareholder will increase the number of shares offered for sale and the sale of such shares will increase the charter capital of the company. With the repurchase of shares, the charter capital of the company does not decrease immediately, but if the offering of shares expires, but the company cannot offer to sell the repurchased shares, the company must register for a decrease in charter capital. This disturbs and affects the development and management of the company.

2.2. Status of protection of administrative rights:

First, the right to nominate people to the Board of Directors and the Supervisory Board. The Supervisory Board in a Joint Stock Company in Vietnam is “designed” as a separate agency (which can be simply understood as “judicial”) within the internal governance structure of the Joint Stock Company. The Board of Directors also has a very important role in the company, which is understood as the body that manages the company's operations.

Enterprise Law 2020, a shareholder or group of shareholders owning 10% or more of the total number of ordinary shares or a smaller percentage as prescribed in the company's charter has the right to nominate people to the Board of Directors and Board of Directors. control. In fact, in order to exercise the governance rights of minority shareholders in terms of nominations for the Board of Directors and Supervisory Board, there are still many shortcomings and difficulties. The majority of minority shareholders only care about groups of property rights, but pay little attention to other rights groups such as governance rights, leading to a lack of linkage between minority shareholders, making it difficult to qualify. shareholders or groups of shareholders owning 10% or more of the total number of ordinary shares or a smaller percentage as prescribed in the company's charter.

Second, the right to attend the General Meeting of Shareholders.

Enterprise Law 2020 stipulates that common shareholders have the right to attend, speak and exercise voting rights in the General Meeting of Shareholders. Accordingly, share holders have the right to vote on issues in the General Meeting of Shareholders and each ordinary share has one vote.

In fact, the right to attend the General Meeting of Shareholders and minority shareholders is not focused. Specifically, many joint stock companies have made regulations that require shareholders to have a minimum share of shares to participate in the General Meeting of Shareholders. According to the online source of Securities Investment (May 13, 2020), “Restriction of shareholder rights during the epidemic season: Beware of breaking the law!” said that: “(TCK) Using the reason to prevent the spread of Covid-19 epidemic, some listed companies announced that they only invite shareholders to own 2,000 shares or more, or “recommend” shareholders to be officers - employees authorize the company's leadership to vote at the General Meeting of Shareholders (AGM)... According to current regulations, restricting shareholder rights in all cases is against the law. It can also be seen that minority shareholders have limited participation rights attending the General Meeting of Shareholders, although they have the right to participate according to the law, the number of minority shareholders exercising this right is very small. Partly due to the low awareness of minority shareholders' right to participate in the General Meeting of Shareholders compared to major shareholders. In addition, the company's management department also suppresses and restricts the rights of minority shareholders. Especially during the complicated Covid 19 epidemic, the inadequacy of benefits is even more obvious.

2.3. Status of protection of information rights:

Joint-stock companies are obliged to disclose certain information required by the provisions of Article 176 of the Enterprise Law 2020: Charter of the company, curriculum vitae information of the company's manager, financial statements Annual report approved by the General Meeting of Shareholders, the annual performance evaluation report of the Board of Directors and the Supervisory Board.

The Law on Enterprises does not stipulate a mandatory condition on the percentage of shares owned by shareholders, so we can understand that it is an open regulation, enabling all shareholders to have the right to information. . But in fact, some businesses still set conditions on the percentage of share ownership to restrict minority shareholders from exercising this right. It is a common practice that companies will issue a separate disclosure policy, which is applicable within the scope of the company's activities.

3. SOME RECOMMENDATION:

On the basis of clearly recognizing the remaining limited issues of the law on the relationship of rights and interests of major shareholders with minority shareholders, the author proposes the following legal solutions in order to maximize income. narrowing the gap between shareholders, contributing to harmonizing the relationship of interests between them.

First, about property rights.

In particular, the time limit for paying dividends to shareholders must be more strictly regulated in the corporate law. The payment of dividends to shareholders in fact still negatively affects the interests of shareholders when the statutory payment period and the time of holding the General Meeting of Shareholders make the payment of dividends delayed. lengthen. In order to ensure the right benefits for shareholders, especially minority shareholders, a joint stock company needs to commit to the time of paying dividends in addition to the dividend payment amount, and concurrently hold a General Meeting of Shareholders. early shareholder meeting and early payment of dividends to shareholders, do not wait until the expiration of 06 months after the date of holding the meeting as prescribed by law. At the same time, the Law on Enterprises needs to stipulate more payment Timely dividends are the responsibility and obligations of the Director/General Director and the Chairman of the Board of Directors; if they do not comply with the regulations, they must take personal responsibility similar to the disclosure of information. Minority shareholders need to be aware of the time to pay dividends and can include this deadline in the resolution of the Annual General Meeting of Shareholders.

Second, about the right to information.

In order to enhance the access to information of minority shareholders, it is recommended to consider supplementing and adjusting a number of legal provisions on the obligations of managers in creating favorable conditions for minority shareholders to have access to information. access to company information.

Accordingly, the law should stipulate the responsibilities of the Board of Directors and the Supervisory Board in creating favorable conditions for worthy minority shareholders to easily access the information required by them.

Third, about administrative rights.

The US legislation on minority shareholder protection in governance is considered effective because of the mechanism in the fiduciary relationship. The relationship between company managers and the company and with shareholders, between major shareholders and minority shareholders. Entrustment will help the company managers, the shareholders holding the management rights will work more carefully, perform their obligations quickly, and limit the abuse of power and positions for self-seeking purposes. affect small shareholders. Therefore, if it is suitable with economic and political conditions, Vietnam can consider and learn these lessons from the US to change and improve the law.

4. CONCLUSION:

The article has generalized the general theories on the basis of traditional research methods (synthetic analysis method, comparative method, document research method), at the same time, the author has done clearly understand the differences and similarities between Vietnamese law and US law, combined with an analysis of the current situation of minority shareholder protection in Vietnam on three basic rights groups, namely property rights, information rights and group administrative rights; Since then, the author has proposed a number of solutions with common legal principles, shaping and orienting to improve the law of Vietnam.

During the research process, the author found that, although the Enterprise Law 2020 promulgated to replace the 2014 Law on Enterprises, the issue of protection of minority shareholders is still essentially the same, only different. At some points, typically, the requirement for a lower percentage of share ownership, and the conditions for the duration of share ownership to exercise the right are also eliminated.

In general, from the point of view of the author, the inadequacy of minority shareholder protection will still exist for a long time, the only difference is how the law can narrow the gap between rights and interests. legal differences between shareholders, towards building a healthy corporate culture environment, promoting investment, thereby, promoting economic development.

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CRIMINAL LAW ON OFFENCES AGAINST THE HONOUR AND DIGNITY OF PEOPLE: PROPOSAL TO IMPROVE LIMITATIONS IN THE PROVISIONS OF THE LAW ON THE CRIME OF LEWDNESS AGAINST PEOPLE UNDER THE AGE OF 16

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ABSTRACT

Yonack (2017) once said that: "Sexual assault news or incidents have always been tremendously controversial matters that have shaken the community." With a rapidly growing human civilisation, there is a lack of security from the market economy or the interchange of unusual cultural flows and unhealthy lifestyles. It is a fact that violence and pornography make a significant contribution to sex crimes. This hazardous problem is increasing in number over time, threatening the safety of citizens in a country and the world in general. This research and development study will demonstrate the reality of the situation, as well as the flaws in the legislation, and give potential responses as suggestions and proposals for solutions to perfecting the legal policy framework on policies, laws, e-government administration in the Digital Economy - Digital society

KEYWORD

Laws; Policies; Legal; Proposal; Suggestions; Crime; Molestation; Sexual; Limitation; Society.

INTRODUCTION

There are diverse kinds of sexual harassment including sexual abuse, rape, molestation, and indulging in sexual intercourse however we will only emphasise on molestation for those under the age of 16. While the Oxford Languages Dictionary defines molestation as "a confrontational or consistent pestering or harassing of someone", according to Article 146 of Vietnam Criminal Code 2015: "Any person who is over 18 years of age molests a person under 16 for purposes other than sexual intercourse or other sexual activities shall face a penalty of 06 - 36 months imprisonment." We can also say that molestation is defined as an act of direct or indirect physical contact via clothes to a person under the age of 16's genital tract, affected areas, or other sections of the body that is sexual in character but not meant for sexual attraction.

LITERATURE REVIEW

With the current overpopulation, the proportion of youths is experiencing exponential growth. Households with two to three children are becoming much more common in many areas and since there are only two people in the house including the father and mother, in many situations there is only one person to manage all of them, especially

when the children are small and do not appear to be conscious of the risks in everyday life. Seeing the real weakness, some individuals and organisations begin to take advantage by approaching and simulating corrupt or inappropriate behaviors, still for some reason they have no intention to have intercourse or engaged in sexual acts. Their actions are listed in the tasks below:

- Making contact (e.g touching, massaging, rubbing) with private parts, sensitive areas, or other sections of individuals under 16;
- Using another body part (e.g hands, feet, lips, tongue) in contact (e.g stroking, rubbing, pressing, poking, kissing, licking) with the genital area, sensitive parts of persons under the age of 16;
- Using sexual equipment that makes contact (e.g touching, massaging, rubbing) with a person under the age of 16's private parts or sensitive areas;
- Seducing and persuading a person under 16 years of age to use a certain part of the body to interact (e.g caress, touch, squeeze, pinch, kiss, lick) with the sensitive place of the offender's sin or someone else's;
- Other sexual activities that are not meant to have sex (eg: kissing on the mouth, neck, ears, nape... of a person under 16 years old).

Furthermore, that's one of the reasons why many criminals exploit it to "escape the law", because not all criminal crimes reflect the above mentioned signs. In truth, there are still a variety of different kinds of child abuse that do not include direct physical contact between the criminal and the kid and have not yet been specified in the 2015 penal code, therefore there are no punishments, such as: soliciting, seducing, and flirting with teenagers over the internet.

METHODOLOGY

The first thing that we have to mention is that these kinds of prosecutions have various punishments, such as administrative sanction or imprisonment from 3 to 12 years, as well as other restrictions, for instance, a disqualification from holding public office. Additionally, there is a prohibition on having particular professions, including doing specific occupations for 1 to 5 years. In comparison to the mental, physical, and sexual consequences that victims have to suffer, the following sanctions appear insufficient. Molestation is not only criminal and dishonourable but also causes extreme suffering and long-term physical and mental trauma to the victim. Furthermore, the crime causes harm to the child by violating the right to preserve the dignity and honour of children. The offenders' illegal crimes also create instability and chaos in the community, leading others to be confused and worried. As a result, people who commit sexual assault should face longer maximum sentences and be heavily punished.

According to data from the Ministry of Labour, Invalids, and Social Affairs' Department of Child Care and Protection, there are several reasons why crimes are not reported soon after they occur. In many situations, the act was committed two to three years ago and was then reported to the police, thus leaving many families unable

to provide proof to verify the offender's conduct. Because the violation had occurred for far too long, it had to be excluded. In most situations, such as obscene offences, there is insufficient evidence, making it impossible for officers to investigate and effectively report incidents. The lack of cameras in places where most children congregate, like schools, is dangerous and does not promote public safety.

Due to the obvious and speedy expansion of the internet in today's society, effective control is impossible to maintain. As a result, cultural exchanges such as pornographic films or sexually suggestive photographs, information violence, and unhealthy lifestyles are widespread. Such factors make a significant contribution to the rise in sex crimes, and the government still lacks many information security policies.

More importantly, the country's most significant drawback is that in terms of protecting children's rights, there have been no strong messaging methods specifically aimed at securing children, and there is a lack of teaching methods and approaches from professionals to teach children how and when to protect themselves.

EMPIRICAL RESULTS

We claim it is generally applicable: A molest behavior is a sexual act committed on another child to mentally excite and satisfy his or her sensuous desires. Since inappropriate misbehaviour reveals itself in so many multiple ways, it is impossible to name all of them. There are other options, such as removing fines and penalties due to their insufficiency, which irritates the public, as well as too small fines for the serious crimes that they have already committed. The victims had to contend with emotional distress for the rest of their lives, as well as a psychiatric illness known as post-traumatic stress disorder (PTSD) (University of Oxford, 2009). So, instead of imposing a fee, increasing the length of time spent in prison or restricting specific occupations will be more beneficial.

Moreover, lowering the age of intentional wrongdoing for sexual assaults towards persons under the age of 16 is required since this regulation does not contradict international law and does not weaken the humanistic purpose of legislation in Vietnamese criminal law. It is recommended to improve the legislation to specifically state throughout the legal procedure that the offender must know that the victim is a minor under the age of 16 before partaking in improper actions with the victim.

DISCUSSION

According to National Society for the Prevention of Cruelty to Children (NSPCC) statistics, the average age of a child being abused is 9 years old, and one in every four girls is sexually abused, including over 93% of victims and their families knowing their abuser, and more than 47% of abusers being relatives and neighbours around the victim's family. As a result, the government must spend greater effort to dramatically improve the constitution and community. In comparison to industrialised countries such as the UK, Russia and Germany, the punishment for molesting children under the age of 16 will be "chemical castration". Thich is a type of injection or pill containing female hormones for prisoners, there are different

countries with many more types for instance, Poland applies "chemotherapy" after imprisonment, not only minimise sex desire and the risk of rehabilitation but also improve the mental health of the convicted person.

Comparable to traffic infractions, cameras on main highways and even more transit police force are required to arrest offenders on the spot. As previously stated, most sexual situations lack sufficient proof due to a lack of cameras and operational agencies such as child care security or police officer's patrol near the crime scene.

You may not realise it, but sex offenders are the only sorts of crimes in which the victim is considered to be at fault because she dresses seductively or works at night. But why do they believe the offender is capable of such behaviour? If that is the case, then everyone is already a target for criminals, and that form of crime will be legalised; criminals are not supposed to be approved for any reason.

CONCLUSION

To sum up, private actions and signals can sometimes be misinterpreted with sexual conduct, especially when the person is over the age of 16, although sexual behavior is not a crime. The improper behaviour is only prosecuted for this offence if the victim is under the age of 16, thereby the state should have more laws and regulations in place to protect and care for children, particularly the underage. Whether a country is internationally regarded for safety and development is partly determined by how the government treats the country's future generation.

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DATA PROCESSING AND TRANSMITTING UNDER EUROPEAN UNION REGULATION – IMPLICATIONS FOR VIETNAM

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ABSTRACT

The rapid growth of e-commerce has gradually changed the way consumers purchase goods and services. The growth of e-transactions has had a positive impact, as it provides convenience, flexibility, and low costs for businesses and consumers. However, e-transactions also increase the risks of using customer's personal data illegally.²² The General Data Protection Regulation (“**GDPR**”) has emerged as a reference point and acted as a catalyst for many countries and States around the world considering how to modernize their privacy rules.²³ Processing, and transferring data internationally are important activities to protect personal data. Therefore, GDPR imposes several limits, and requirements on everyday data processing, as well as external dealings with customers and foreign countries. By establishing a harmonized framework for the protection of personal data, the GDPR ensures that all businesses in the internal market are bound by the same rules, and benefit from the same opportunities, regardless of whether they are established, and where the processing takes place.

Currently, there is no effective enforcement mechanism to handle violations regarding consumer's personal data processing and transferring in e-commerce in the Vietnamese legal system. The heaviest penalty on violation of cross-border data transfer is only 03 years in prison.²⁴ On June 30, 2019, Vietnam and the European Union (“**EU**”) signed the EVFTA, which will be useful for Vietnam to learn more about GDPR in order to unify the two countries' data protection standards and acquire additional economic opportunities. Thus, the author will provide information on the development of EU's legislation on the protection of consumer's personal data in e-commerce; discusses how GDPR controls data processing, and international data transfers; and analyzes remedies for violations of those two processes. The author then clearly highlights important gaps in Vietnam's current legislations, as well as solutions to these inadequacies.

KEYWORDS: *General Data Protection Regulation (GDPR), EU, data processing,*

²² Some examples include files containing 163,666,400 Zing ID accounts of VNG, more than 05 million emails and thousands of payment card details (Visa, Mastercard, etc.) of The Gioi Di Dong and Dien May Xanh, nearly 02 million customers of Maritime Bank were published online.

²³ Chile, South Korea, Brazil, Japan, Kenya, India, Tunisia, Indonesia, Taiwan, and the State of California, to name but a few. International instruments, such as the modernized “Convention 108” of the Council of Europe, or the “Data Free Flow with Trust” initiative launched by Japan are also based on principles that are shared by the GDPR. See European Commission, “Two years of the GDPR: Questions and answers”, *European Commission website*, 24/6/2020, available at: https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_1166 (access date: 10/7/2022).

²⁴ Art.159 of the Penal Code 2015.

cross- border data transfer, personal data.

1. DATA PROCESSING UNDER GDPR

1.1. General principles of processing

Article 5.1 defines the principles and Art.5.2 imposes the responsibility of upholding them on the Controller²⁵. Translating these terms into their respective duties, they can be summed up as follows. Firstly, lawful requires that processing operations follow the law in full, including written common law, legislation, judgments, municipal decrees, constitutional principles, fundamental rights, and even other legal principles. Essentially, the test is whether a court determining the case would consider the source as a law.²⁶ Secondly, fair demands data collection must be minimized, and limited to its stated purpose. Personal data should only be collected for specified, explicit, legitimate purposes, and not further processed in a manner that is incompatible with those purposes.²⁷ It is permissible to process personal data for purposes that are not derived from consent nor from EU or Member law, provided that such processing is necessary, proportionate, and to ensure that the objectives of the restrictions are satisfied (Article 23). Last but not least, transparent means that all aspects of processing, and data collection must be disclosed to the users, and the relevant authorities. The data held by Controllers must also be accurate, and up to date. The corporate should take all reasonable steps to ensure that the data held is correct, giving their users the options of rectification, or erasure without undue delay (Article 5.1.d).

1.2. Legal grounds for data processing

GDPR requires a legal basis under the regulation. Article 6 of the GDPR lists out legally authorized situations under which personal data may be processed, including processing based on Consent, and processing based on Legal Sanction. Those situations listed are abstract as Member States are allowed to add further specifics. For instance, Member States can define what qualifies as a “vital” interest under Article 6.1.d. Therefore, companies bear responsibilities to keep track of multiple standards for determining their legal bases even though they may exclusively provide services within the EU. A lawful basis for processing personal data consists of at least one of those legal grounds, and can vary per personal data processing activity, and purpose.

²⁵ In the context of this Article, e-commerce companies are understood as Controllers under Article 1 of the GDPR.

²⁶ Article 29 Data Protection Working Party, “Opinion 03/2013 on purpose limitation”, 02/4/2013, p.20, available at: https://ec.europa.eu/justice/article-29/documentation/opinion-recommendation/files/2013/wp203_en.pdf (access date: 02/7/2022).

²⁷ Data Protection Commission, “Guidance Note: Legal bases for processing personal data”, 10/2019, p.5, available at: <https://www.dataprotection.ie/sites/default/files/uploads/2020-04/Guidance%20on%20Legal%20Bases.pdf> (access date: 02/7/2022).

1.2.1. Processing based on Consent

Consent is mentioned first as a legal basis for the lawfulness of processing personal data in Article 6. The definition of consent is stipulated in Article 4.11 of the GDPR. Consent must be freely given, specific, informed, and unambiguous, as well as that it must be made by way of a statement or “clear affirmative action”. For example, ticking a box when visiting a website, choosing technical settings for a website, or app, or another form of statement, or conduct which clearly indicates the individual’s acceptance of the proposed processing should not constitute consent. Moreover, Controllers need to ensure that the consent to processing is specific, and informed. As noted in Recital 42 of GDPR, individuals should be at least aware of the identity of the Controller, and the purposes of the processing for which the personal data are intended.

To comply with the element of “specific”, the Controller must apply purpose specification as a safeguard against function creep, granularity in consent requests, and clear separation of information related to obtaining consent for data processing activities from information about other matters.²⁸ Finally, consent must also be “freely given”. The element “free” implies real choice, and control for users. As a general rule, the GDPR prescribes that if the users have no real choice, feel compelled to consent, or will endure negative consequences if they do not consent, then consent will not be valid.²⁹ They also have the right to withdraw consent easily, at any time, and on their own initiative.

1.2.2. Processing based on Legal Sanction

Along with consent requirement, Article 6 of GDPR provides other circumstances under which personal data may be processed, namely performance of a contract, compliance with a legal obligation, protection of vital interests, protection of public interest, and exercise of Official Authority, and exercising legitimate interests. However, in this Article, the author only analyzes the first three cases as Vietnamese law regarding data processing only mentions these three circumstances³⁰.

Firstly, in case of performance of a contract, as set out in the wording of Article 6.1.b and Recital 44 of GDPR, the users must be a party to the agreement for processing, or a third-party beneficiary to a contract initiated for processing of their data.

²⁸ European Data Protection Board, “Guidelines 05/2020 on consent under Regulation 2016/679”, 04/5/2020, p.14, available at: https://edpb.europa.eu/sites/default/files/files/file1/edpb_guidelines_202005_consent_en.pdf (access date: 04/7/2022).

²⁹ OECD, “Report on the implementation of the recommendation of the council concerning guidelines governing the protection of privacy and transborder flows of personal data”, 17/3/2021, p.15, available at: [https://one.oecd.org/document/C\(2021\)42/en/pdf](https://one.oecd.org/document/C(2021)42/en/pdf) (access date: 04/7/2022).

³⁰ Article 17.1.c of the Law on Cyber Information Security; Article 21.3.c, Article 21.2, Article 22 of The IT Law; Article 71.1 of Decree No. 52/2013/ND-CP on E-commerce; and Article 10.1 of Draft Decree governing personal data protection 2021.

Specifically, this legal basis would not apply in the absence of a direct contractual relationship with the users concerned. A Controller cannot use a contract between themselves and another service provider, or advertising partner as the legal basis for the processing of a user's personal data simply because the processing is needed to execute that contract.

Secondly, in case of compliance with a legal obligation, if the Controller has a legal duty for which particular personal data need to be processed then processing is permitted. A legal obligation must be laid down by EU or National law. As set out in both Article 6.3 and Recital 45 of GDPR, any such law which grounds a legal obligation should at least make clear the purposes of any processing which is undertaken to comply with that obligation, and must meet an objective of public interest, being proportionate to a legitimate aim, or goal which is being pursued.

Thirdly, processing personal data for the protection of vital interests is only considered in certain specific situations when no other legal basis can be claimed. Personal data may be processed when there is a necessity to protect the vital interests of the user, or any other natural person (Article 6.1.d). The term "vital interests" has not been defined in the GDPR. However, Recital 46 of GDPR stipulates that it is "necessary to protect an interest which is essential for the life of the user, or that of another natural person". Thus, vital interests can be understood as situations which very seriously threaten the health, or fundamental rights of an individual. For example, paramedics are called to a residential care facility to assist a seriously ill resident, who is unconscious when the paramedics arrive. The medical history, and other relevant health data of the resident may be shared with the paramedics as it is necessary to do so to protect their vital interests, even in the case the resident has not previously consented to the sharing of this data for such purposes. In short, lawful processing exists when there is either consent, or necessity. This severely restricts data access, and the amount of processing that may be done. Instead of mining personal data from users indiscriminately, the Controller entity should only do so when necessary. A good rule of thumb to follow is to determine whether there is a link or nexus between the entity's economic activity, and the data processing it does, whether legal, financial, functional, administrative, or otherwise. If the processing benefits the Controller entity's economic situation, they cannot avoid GDPR by decreasing their operations. However, the above circumstance will not apply to public authorities carrying out processing for their tasks. This modest loophole allows for misuse since public authorities are not compelled to process only for the advancement of their legitimate interests. In any other case, the Controller would be obliged to handle data only when executing his/her job (or under other conditions stated in Art.6), but public authorities, particularly their Controllers, are not subject to such a restriction. This creates a hazardous uncertainty that can be exploited.

2. INTERNATIONAL DATA TRANSFER UNDER GDPR

2.1. General principle for transfers

Under Article 44, all other relevant provisions of the GDPR must be complied with

before personal data may be transferred outside the EU. In particular, Controllers bear the obligation to inform users that their data are to be transferred internationally³¹, keep records concerning data processing³². The principle of accountability must also be complied with (Article 5.2 and Article 24). However, there are some loopholes in this provision.

Firstly, the GDPR does not define what constitutes an international data transfer. This concept is of central importance, since it determines when Article 44 applies. There is a term “cross-border processing” under Article 4.23. Nevertheless, it deals with situations where a Controller has establishments in more than one Member State, or where processing substantially affects or is likely to substantially affect data subjects in more than one Member State, in order to help determine the lead supervisory authority under Article 56.

Secondly, the term “onward transfer” has not been described in GDPR. Based on common usage of the term, an onward transfer refers to a further transfer of personal data after they have been transferred to a data importer outside the EU, or European Economic Area (“EEA”).³³

For example, a company (the data exporter) outsources the operation of a database to a service provider (the data importer), which then subcontracts some of the maintenance to another company. This would result in an onward transfer of the data from the service provider to the third-party maintenance company.

Finally, and most importantly, there is a prevention of circumvention of the law. Some countries do not have data protection, and privacy laws, which is what raises the risk of circumvention of EU Law when data are transferred to and processed in third countries. Most data protection legislation is based on the same international instruments so that the fundamental, high-level principles of the law are similar across regions, and legal systems. However, there are always differences in the cultural, historical, and legal approaches to data protection. Up to now, what constitutes “circumvention” has never been a clear explanation.

2.2. Data transfer mechanisms

GDPR establishes a three-tiered structure for legal bases for data transfers, with adequacy decisions at the top, appropriate safeguards in the middle, and derogations at the bottom.³⁴ One of the appropriate safeguards as provided for in Article 46 will be implemented in the absence of an adequacy decision. In case both adequacy decisions,

³¹ Article 13.1.e, Article 14.1.f, Article 15.1.c, Article 15.2, and Article 28.3.a of GDPR.

³² Article 30.1.d, and Article 30.2.c of GDPR.

³³ Christopher Kuner, “Chapter V: Transfers of Personal Data to Third Countries or International Organizations”, *The EU General Data Protection Regulation (GDPR) – A Commentary*, ISBN: 978-0-19882-649-1, Pub. Oxford University Press, United Kingdom, 2020, p.763.

³⁴ The Federal Court of Canada, “Lawson v Accusearch Inc”, 05/02/2007, paragraph 9, p.764, available at: <https://www.canadianjusticereviewboard.ca/articles-caselaw/case-law/lawson-v.-accusearch-inc-and-the-privacy-commissioner-of-canada-2007-fc-125.pdf> (access date: 07/7/2022).

and appropriate safeguards are unavailable then one of the derogations in Article 49 will be applied.

Firstly, adequacy requires both that the content of data protection rules in third country, or international organizations (“**Foreign Country**”) meet the standards of EU law, and that such rules be effective in practice.³⁵ This does not mean Foreign Countries must copy and paste the GDPR into their domestic laws to achieve adequacy, but instead should “establish the essential requirements” of the regulation.³⁶ The EU has actively engaging with key partners with a view to reaching an adequacy finding and yielded important results such as the creation between the EU and Japan of the world’s largest area of free and safe data flows.

Secondly, “Appropriate safeguard” mechanisms under Art.46 includes model contractual clauses (“**SCCs**”) and binding corporate rules (“**BCRs**”). SCCs are approved provisions by the commission that must be incorporated into any commercial agreement for the international processing of personal data to cover the following matters, which are obligations of data exporter, obligations of the data importer, joint and several liabilities, user as a third-party beneficiary, choice of law, dispute resolution, and termination.³⁷ BCRs form a legally binding internal code of conduct operating within a multinational group, which applies to transfers of personal data from the group’s EEA entities to the group’s non-EEA entities.³⁸

Finally, derogations under Article 49 are exemptions from the general principle that personal data may only be transferred to Foreign Country if data protection rules in the

³⁵ Article 29 Data Protection Working Party, “Adequacy Referential (updated)”, 28/11/2017, p.4, available at: https://iapp.org/media/pdf/resource_center/wp29-Adequacy-referential.pdf (access date: 07/7/2022).

³⁶ The Working Party (“WP”) provides a list of nine core principles that Foreign Country must be included in their legal framework, which includes the concepts (basic data protection concepts must exist), grounds for

lawful and fair processing for legitimate purposes, purpose limitation, data quality, and proportionality, data retention, security and confidentiality, transparency, the right of access, rectification, erasure and objection, and restriction on onward transfers. WP also states four guarantees to limit interferences to fundamental rights including clear, precise and accessible rules for processing, necessity and proportionality with regards to legitimate objectives pursued, processing is subject to independent oversight, and effective remedies need to be available to individuals. See Lee Matheson, “What’s in the WP29 update on transfers to third countries?”, *IAPP website*, 13/12/2017, available at: <https://iapp.org/news/a/adequacy-tldr-whats-in-the-wp29-update-on-transfers-to-third-countries/> (access date: 07/7/2022).

³⁷ Choice of law requires the law of the data exporter shall govern the agreement, making all regulations such as GDPR directly applicable to them. See Sanjay Sharma and Pranav Menon, *Data Privacy and GDPR Handbook*, ISBN: 978-1- 11959-424-6, Pub. John Wiley & Sons, Inc., United States, 2020, p.167-168.

³⁸ Data Protection Commission, “Transfers of Personal Data to Third Countries or International Organizations”, *The Data Protection Commission website*, available at: <https://www.dataprotection.ie/en/organisations/international-transfers/transfers-personal-data-third-countries-or-international-organisations> (access date: 07/7/2022).

ForeignCountry meet the standards of EU law. A data exporter should first endeavour to frame transfers with one of the mechanisms guaranteeing adequate safeguards listed above, and only in their absence use the derogations provided in Article 49.1. These derogations or exceptionsallow transfers in specific situations, such as based on consent, for the performance or conclusion of a contract, for the exercise of legal claims, to protect the vital interests of the users where they cannot give consent, or for important reasons of public interest.³⁹

To sum up, GDPR mandates that an enterprise must comply with requirements for collection, and processing within the EU, justify the disclosure of the personal data to an international entity/individual, and ensure that the destination of the data is also in compliance with GDPR to transfer personal data to Foreign Country. The key aim of these rules relating to foreign transfers is to ensure that the level of protection afforded to data subjects under GDPR is not undermined. However, it is a challenge to satisfies the “establish the essential requirements” as not all the country follow the augmented requirements for protection, and processing as laid down under GDPR.

3. REMEDIES UNDER GDPR

GDPR provides three types of remedies to carry out enforcement for violating GDPR regulations regarding data processing and international data transferring, which includes injunctions, money damages, and specific performance. Injunctions are court orders commanding that a person or entity stop an activity they are engaged in, either temporarily (pending a final judgment from the court), or permanently.⁴⁰ Money damages includes compensation, and administrative fines. Violators can be fined up to €20 million, or 4% of their annual turnover of the previous financial year, whichever is higher (Article 58.5 of GDPR). Specific performance is an equitable remedy in law that is used to direct another to do a specific act. Specific performance usually exists in contract law, specifically in the sale of goods, and services. The remedy is often issued when money damages, or injunctions are unsuitable.⁴¹

In conclusion, GDPR remedies have led to many positive changes in company policies, especially the administrative fines. Since coming into force, a total of 839 fines have been issued. While only a mere 16 fines were issued in 2018, and only one was at least €100,000. GDPR remedies also improved company behaviors. Companies have been put off using people’s data in dubious ways, experts say, when they would not have thought twice about it pre-GDPR.⁴²

4. SOME SUGGESTIONS FOR IMPROVING THE LEGISLATION

³⁹ Rhys Smith and Jianhua Shao, “Privacy and E-commerce: A consumer-centric perspective”, *Electronic Commerce Research*, 2007, Vol. 7 (2), p.101-102

⁴⁰ Ibid. 16, p.279.

⁴¹ Serge Gutwirth et al., *Reinventing Data Protection?*, ISBN: 978-1-40209-497-2, Pub. Springer, France, 2009, p.283-284.

⁴² Ilse Heine, “3 Years Later: An Analysis of GDPR Enforcement”, *Center for strategic and International Studies*, 13/11/2021, available at: <https://www.csis.org/blogs/strategic-technologies-blog/3-years-later-analysis-gdpr-enforcement> (access date: 08/7/2022).

REGARDING DATA PROCESSING AND DATA TRANSMITTING IN E-COMMERCE OF VIETNAM

The present legislation has established a rather extensive, and comprehensive legal framework for sanctioning infractions of the law governing the processing of consumers' personal data in e-commerce. The Draft Decree governing personal data protection 2021 (**"Draft Decree"**) was recently adopted by the National Assembly. However, the foregoing fines do not appear to be sufficient deterrents, and there are several other shortcomings. As a result, in the spirit of learning from the EU's GDPR, the author makes the following recommendations.

4.1. Enhancing the data processing regulations

In general, present Vietnam's legislation require the Controller to asks for user's consent before processing his/her personal data. However, the laws do not explain clearly the methods to gain user's consent, and what can be considered as a valid consent. As an instance, the information protection policy contains the criteria under which the Controller may request the user's consent. Article 69.3 of Decree No. 52/2013/ND-CP on E-commerce (**"Decree 52"**) requires that the information protection policy be made public in a prominent location on the e-commerce website. However, what constitutes a "conspicuous posture" is not clearly defined, and determining it is entirely dependent on the feelings of the parties. According to the GDPR's Recital 32, for a consent to be valid, it should be given through "a clear affirmative act" and should be "unambiguous". Individuals should be aware at least of the identity of the Controller, and the purposes of the processing for which the personal data are intended. They also have right to withdraw consent easily, at any time, and on their own initiative. Therefore, the author suggests that the Government should establish guidance on what constitutes of a valid consent as the way GDPR did. For instance, the author recommends to Article 69.3 of Decree 52 as follows: *"Personal information protection policy shall be openly disclosed at the bottom corner of the website homepage"*. This makes it easier for consumers to access, and learn about personal information protection regulations, as well as removes barriers to finding a "conspicuous location" as a foundation for penalizing administrative infractions, if any exist.

4.2. Increasing penalties for administrative offences

One of the issues with administrative punishments for infractions is that they are still insufficient as a deterrence. In specific, individuals that illegally gather, or utilize customers' personal data outside of the stated goals and scope may face fines ranging from VND 20 million to VND 30 million (Art.65 of the Decree 98) is insufficient in comparison to the enormous earnings that violators might receive. The Draft Decree raises the penalties amount to a maximum of 5% of the total income of the data processor breaches in Vietnam for acts of breaking legislation on transferring personal data. However, this only applies if the violation does the same offense for the second or subsequent time. In the meantime, additional fines or corrective actions are not necessary in principle. The violator may not be subject to the

remedial measure of “forcing the return of the money obtained due to the commission of the violation”. However, if the amendments continue to increase the fine level, it is not appropriate for small-scale infractions with little earnings. Therefore, the author recommends applying a penalty of 5% of the total income of the data processor breaches in Vietnam for violations of the data processing provisions, and the transgender data transfer right from the first violation, as these are serious violations of the responsibility of Controllers. Besides, it is still necessary to keep the lowest fine level as prescribed in the Draft Decree for the subjects who commit acts to ensure deterrence, even for small-scale cases.

In conclusion, the Vietnamese government has shown concern for data processing and data transmitting. However, Vietnam lacks a specific regulation to address this issue on its own. Since current laws have several loopholes, the author proposes some recommendations that are deemed beneficial for Vietnam at this time. As required under EVFTA, it may thus contribute to ensuring that Vietnam’s legal system adheres to EU standards.

CONCLUSION

The GDPR proved to be flexible to support digital solutions in unforeseen circumstances such as the Covid-19 crisis. Businesses are developing a compliance culture, and increasingly use strong data protection as a competitive advantage. GDPR imposed strict requirements on data processing. An entity that wishes to process personal data for their day-to-day operations will have to claim one or more of the justifications, which includes Consent and Legal Sanction to avoid liability. Failure to follow these standards might result in a €20 million fine, or 4% of worldwide yearly revenue, necessitating strict adherence. However, there is still a loophole as public authorities, particularly their Controllers, are not subject to such a restriction. The GDPR also offers a modernized toolbox to facilitate the transfer of personal data from the EU to Foreign Country, while ensuring that the data continues to benefit from a high level of protection. The toolbox includes adequacy decisions, appropriate safeguards (SCCs, BCRs), and derogations, to harness the full potential of the GDPR rules on international transfers. As a result, EU and Japan of the world’s largest area of free and safe data flows. Based on EU’s GDPR regulations on data processing and data transmitting, the author makes several recommendations to strengthen Vietnamese law, including strengthening data processing laws, modernizing the legal framework on data processing and data transferring, and increasing fines for administrative offenses.

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BUILDING A LEGAL FRAMEWORK FOR MULTI-SECTOR REGULATORY SANDBOX IN VIETNAM

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SUMMARY

The fourth industrial revolution is taking place strongly around the world, with the pillars of artificial intelligence (AI), machine learning, blockchain technology, Internet of Things (IoT) ... Digital technology has formed and promoted the development of new business models such as automated Guided vehicles (AGV), medical technology (MedTech), financial technology (Fintech)

The emergence of new products and services also poses challenges for lawmakers when the law does not regulate or allow the operation of these new products and services. Traditional methods of lawmaking in the context of the complexity and rapid change of technology make it impossible to enact legislation for these models. At that time, the Regulatory Sandbox was considered as a solution to correct problems arising from new technology that has not been verified or anticipated by legal regulations. If well operated, the testing mechanism will contribute positively to the development of technology and promote innovation in the country.

Pilot mechanisms in Vietnam have initially taken a similar approach to a sandbox, to remove difficulties from legal regulations. However, this pilot mechanism is not universally applicable because only enterprises with approved schemes can participate in this mechanism and are under the close supervision of state agencies. This causes the testing mechanism to be limited in each field. Besides, the time to test and build documents takes a lot of time and effort, not suitable for fear of rapid changes in technology and new legal problems arising. Stemming from the above limitations, the authors will present an overview of the testing machine as well as the limitations and obstacles encountered in Vietnam, thereby proposing recommendations for building a complete legal framework to build a complete testing mechanism.

KEYWORDS: *Sandbox, regulatory sandbox.*

1. What is Sandbox?

The term "Sandbox"/"Regulatory Sandbox" is widely used in the digital economy, with the implication of creating experimental regulatory frameworks for new business models when the current regulatory framework does not have regulatory adjustments.

According to Ph.D. Chu Thi Hoa, Deputy Director of the Institute of Legal Sciences, Ministry of Justice, Sandbox is a testing space for businesses to operate, experience new products and services and also a space for management agencies to observe, learn and better understand what businesses are doing, thereby having plans for appropriate adjustment documents. Previously, both enterprises and management agencies did

not fully anticipate the impact of products and services on socio-economic life.⁴³

The Sandbox allows testing in a realistic environment, but has a defined scope and duration, along with appropriate safeguards to prevent any consequences of failure without affecting the national financial system too much. At the end of the testing period, if the startup and operation are successful, the enterprises will have to break out of the Sandbox legal framework and operate by following the current legal framework.

Regulatory Sandbox is considered a useful tool to promote innovation, by allowing regulatory agencies to observe new products and services in a limited real environment. Of course, regulatory Sandbox is not a tool for every problem arising from technology. Sandbox is only really needed when products and services need a new way of operating business models, there are legal obstacles that hinder the deployment and expansion of products, the growth capacity of the business

2. The need to build the regulatory sandbox

The Industrial Revolution 4.0 contributes to the creation of many new economic products, services, and models in an open space that has erased the gap between the real world and cyberspace. The need to realize innovative products and business models in life is met with a lot of difficulties due to the unwillingness of the current legal framework. Many information technology products and services implementing digital transformation in traditional fields face many difficulties in implementing related administrative procedures to implement business activities in practice. However, enterprises have not found appropriate and appropriate assistance and answers from state agencies, and there appears to be no state agency taking responsibility for handling that problem.

For some new information technology products and services, there are no specific legal provisions, adjusted by name, but can still apply the relevant legal provisions to apply without creating great risks to customers and the market. In this case, enterprises owning these products and services also have the desire to recognize the legality of the business model from the state agency to be assured of business, more favorable in the process of raising capital, and have a basis in the process of working with other state management agencies.

What the business needs, in this case, is a supporting focal point, providing official legal questions to the business. This will help businesses quickly deploy operations, be assured of business, and be favorable in raising capital.

From that actual need, the Sandbox is the ideal place for ideas to be freely developed in a controlled environment and limited time to monitor until they have grasped the models that work and devise appropriate behavioral measures.

^{1 43} Chu Thị Hoa (07/1/2020), "Sandbox: Cơ chế thử nghiệm áp dụng trong phạm vi hạn chế - Kinh nghiệm quốc tế và một số gợi ý cho Việt Nam",

<<http://lapphap.vn/Pages/tintuc/tinchitiet.aspx?tintucid=210382>>, (Accessed 7/03/2022).

3. Limitations of a regulatory sandbox in Vietnam

3.1 Not meeting the needs of the business

The number of new business models is increasing with the development of technology, leading to the increasing demand for testing. Meanwhile, the number of pilot mechanisms is very small, as from 2016 to 2021, there are only 2 pilot mechanisms issued and the scope of the pilot mechanism is also very narrow, applying only to a specific type of product and service (Pilot mechanism for technology booking application, a pilot mechanism for mobile money).⁴⁴

In 2022, the sandbox is considered the closest to the draft Decree on Fintech in the banking sector, but it is still in the process of working and it is not yet known when it will be officially issued. The scope of the mechanism is determined to be in the banking sector, however, in the opinion of many businesses, the scope of testing can limit the scope of the operation of the business. In order to meet the diverse financial needs of users, many businesses have developed a wide range of products and services in the interdisciplinary finance - banking sector such as insurance, securities, bonds, and fund certificates ... At that time, there is a risk that many new services are still in the field of financial technology but are not tested, or may have to be tested under a different mechanism. Such an approach wastes the time and effort of the business and creates the risk of overlapping, inconsistent mechanisms of management of experimental activities.

3.2 There is no clear mechanism for enactment

The idea of issuing a pilot mechanism largely comes from the needs of the business. However, the handling of that proposal by the enterprise, either translated into a pilot mechanism or rejection of that proposal, is not clearly regulated. So there are some concerns about fairness among business groups, especially among small businesses and startups. For example, there is competition between Uber, Grab, and traditional taxis in 2016.

3.3 The pilot mechanism does not really "exempt" the provisions of the law

The idea of building a sandbox is to allow businesses to be exempt from fulfilling certain obligations. However, according to the VCCI (Vietnam Chamber of Commerce and Industry), looking at the pilot mechanisms already in place, it seems that these mechanisms are trying to create additional space in addition to the existing regulations, instead of "breaking" these regulations.

These limitations have prevented the pilot mechanism from becoming a true sandbox, and therefore it is unlikely that replication meets the goal of supporting innovation. Therefore, the construction of a sandbox mechanism in the true sense is

⁴⁴ Thủy Diệu (12/4/2022), "Hiu hắt cơ chế Sandbox tại Việt Nam",

< <https://vneconomy.vn/hiu-hat-co-che-sandbox-tai-viet-nam.htm> >, (Accessed 7/03/2022).

essential.

3.4 There is no common standard for the promulgation of a regulatory sandbox legal

The sandbox discussion is depending on each case, each field, the approach as well as the perspective of each drafting agency. In addition, the fact that many documents were issued before the implementation of the testing mechanism has led to many years of Vietnam still not having a proper sandbox. The reason comes from the view of lawmakers is to always manage and control the business and accompany a lot of regulations on inspection, inspection, business conditions,... Meanwhile, new business models are without precedent, even beyond our imagination. If the current state management mindset is still applied to these models, then there are no conditions for new business models to be freely developed.

For the above reasons, the speed of document issuance has become slower, taking longer and hindering the development and operation of businesses applying new business models. Therefore, the development of a sandbox testing mechanism in which, regardless of the field, it is possible to register for testing, is necessary.

4. Proposal to build a multi-sector regulatory sandbox in Vietnam

4.1 Foreign experience in building regulatory sandbox

In June 2018, Japan enacted the Act on Special Measures for Productivity Improvement Enforced. Accordingly, the Government of Japan will provide an experimental legal space for all types of innovation and breakthrough technologies.⁴⁵ Although it is a standard testing space, there is still a separate regulatory sandbox for each field according to a sequence of registration, receipt, and processing according to the innovation and testing requirements of enterprises. Building a common legal framework is to save time waiting for unnecessary intermediary processes and businesses can soon test new technology products and services.

4.2 Proposing to build a complete regulatory sandbox in Vietnam

New products and services appear in many fields, from information technology to traditional industries such as education, health, transportation, and real estate ... It can be said that every area of life has the participation of technology. Is it necessary to establish a common testing mechanism for all areas?

Conceivably, this mechanism will allow any new business model, product, or service, regardless of sector, to register to participate in the trial. This mechanism will establish a clear order and procedures for the process of receiving and responding to the test proposal from the enterprise. At that time, the state management agency could

⁴⁵ Act No. 25 of 2018, Act on Special Measures for Productivity Improvement Japan, Articles 8 to 20,

<<https://www.japaneselawtranslation.go.jp/en/laws/view/3420/en>>, (Accessed 7/3/2022).

not fail to answer or take the reason that there was no legal basis to refuse the request to establish a test environment for the enterprise. Naturally, this document does not exclude the promulgation of its mechanisms for each field, since each field has its characteristics that must be designed in its Sandbox mechanism. However, in areas where there are no regulations, this will allow businesses to submit a project to apply for testing permission without taking a fairly large amount of time to establish a legal framework.

To clarify how the Regulatory Sandbox is multi-disciplinary, the author would like to contribute ideas as follows:

Firstly, the legal documents on Regulatory Sandbox include (i) Objectives of Sandbox, (ii) Conditions of enterprises/individuals to submit projects to apply Sandbox,

(iii) The relevant criteria for risk management and safeguards, (iv) The duration of testing (specifically in each field will be specified in the Decree and other valid legal documents). equivalent), (v) Administration and testing costs, (vi) Post-implementation adjustments to the Sandbox Goals.

Second, develop a clear procedure for receiving applications/proposals from businesses and feedback on whether to accept or not that trial proposal from the competent authorities. The decision to accept the proposal should be based on its characteristics. Innovative products, services or business models must be products or services that are not available before or products or services that apply new technologies; not included in the current legislation. These new technology application products and services have value and benefits for society. After a decision is made, businesses will be allowed to participate in the testing mechanism corresponding to each field they have registered, where each field will have a more specific regulatory regulation. .

Third, because the enterprise's participation in the regulatory sandbox will be many and multi-field, managers need to monitor its process: (i) Evaluation, monitoring, reporting, conclusions, (ii) Ensure security and safety for factors, limit and prevent external risks, (iii) Make decisions to continue, pause or remove when necessary.

Sandbox should be built and applied with the view that businesses can do what is not prohibited by law so as not to lose business opportunities for enterprises. At the same time, measures must be taken to prevent risks due to its novelty, thereby both achieving efficiency in economic development and maintaining the stability of the legal system.

Conclusion

Regulatory sandbox is a new management model of the State formed in the fourth industrial revolution. This governance model was first formed in the UK and has spread rapidly to the above countries and territories such as Japan, Singapore, the United States... Regulatory sandbox has been discussed a lot recently in Vietnam and may come into reality in the near future after the Government issues the first Decree

on Regulatory sandbox for FinTech built by the State Bank of Vietnam. We have the right to expect that the regulatory sandbox will continue to be developed further. Therefore, discussing and researching new and practical application methods is essential to improve the management efficiency of state agencies and adapt to the rapid changes in the industrial age. digital technology - digital society.

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PRIVACY RIGHT IN THE DEVELOPMENT OF THE DIGITAL ECONOMY IN VIETNAM

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SUMMARY:

Digital economy and digital society development is the trend for each country to integrate into the world. This is a new and necessary issue for a developing country like Vietnam, especially in the new period: the Era 4.0 and the Post-COVID, to develop sustainably. A recent digital economy report by Google indicates that Vietnam's digital economy had an estimated value of \$14 billion in 2020, posting a growth of 450 percent since 2015. It is forecasted to grow at approximately 30 percent between 2020 and 2025, as Vietnam actively implements its National Digital Transformation Program to 2025 with a vision to 2030. On the one hand, the rapid development of digitalization has led to the strong progress of the digital economy. On the other hand, the pandemic outbreak has boosted transactions and activities in cyberspace, and this continues after the pandemic, which encourages the strong economic growth and convenience for users. However, from the benefits that the digital economy brings, new legal problems also arise, to ensure sustainable development. In particular, the right to privacy for personal data. Because people have to provide their personal data to access the internet space, to use the services from suppliers. Therefore, a lot of problems can happen with personal data without the agreement and imagination of individuals. Actually, there are plenty of privacy issues in Vietnam's current law, which seem to stem from oriental culture and views and awareness of privacy rights in Vietnam. This essay will summarize and point out the importance of privacy protection in the development of the digital economy and propose some policies for this issue in Vietnam.

KEYWORDS:

digital economy, privacy rights, Vietnam, personal data, sustainable development.

1. OVERVIEW ABOUT PRIVACY RIGHT IN VIETNAMESE'S DEVELOPMENT OF THE DIGITAL ECONOMY

1.1. The cognitive of privacy and digital economy

Before being provided in legal documents, the privacy right had appeared in human's ideology for a long time. One of them is the 6th oath in "Hippocratic Oath"⁴⁶. Because respect for patient privacy and confidentiality is an ancient and a contemporary

⁴⁶ The Hippocratic Oath is an oath of ethics historically taken by physicians. It is one of the most widely known Greek medical texts. In its original form, it requires a new physician to swear, by a number of healing gods, to uphold specific ethical standards. The oldest partial fragments of the oath date to circa AD 275. The oldest extant version dates to roughly the 10th–11th century, held in the Vatican Library. Read more: "Codices urbinates graeci Bibliothecae Vaticanae: Folio 64(Urb.gr.64)" Vatican Library: DigiVatLib. 900–1100. p. folio:116 microfilm: 121. https://digi.vatlib.it/view/MSS_Urb.gr.64

professional responsibility of physicians⁴⁷. Besides, privacy right is shown indirectly in “Holy bible”⁴⁸, in the seal of confession⁴⁹.

Privacy right include *the right to privacy* and *the right to publicity*, which enables us to create barriers and manage boundaries to protect ourselves from unwarranted interference in our lives, which allows us to negotiate who we are and how we want to interact with the world around us⁵⁰. Privacy helps us establish boundaries to limit who has access to our bodies, places and things, as well as our communications and our information. Privacy is a fundamental right, essential to autonomy and the protection of human dignity, serving as the foundation upon which many other human rights are built⁵¹. That is the reason why there are more than 130 national constitutions regarding the protection of this right, in every region of the world⁵². On 10 December 1948, the United Nations General Assembly adopted the Universal Declaration of Human Rights (UDHR), originally written to guarantee individual rights of everyone everywhere; while *right to privacy* does not appear in the document, many interpret this through Article 12, which states: "No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honor and reputation. Everyone has the right to the protection of the law against such interference or attacks." Besides, International Covenant on Civil and Political Rights (ICCPR) 1966, Article 1 states: “No one shall be subjected to arbitrary or unlawful interference with his privacy, family, home or correspondence, nor to unlawful attacks on his honor or reputation. Everyone has the right to the protection of the law against such interference or attacks.” In Vietnam’s code, the privacy right is mentioned in *The 2013 Constitution of the Socialist Republic of Vietnam*, through

⁴⁷ John C Moskop, Catherine A Marco, Gregory Luke Larkin, Joel M Geiderman, Arthur R Derse, *From Hippocrates to HIPAA: privacy and confidentiality in emergency medicine--Part I: conceptual, moral, and legal foundations*, DOI: 10.1016/j.annemergmed.2004.08.008.

⁴⁸ Joseph Bayly, “Is the right to privacy biblical?”, <https://warhornmedia.com/2016/04/27/is-right-privacy-biblical/>

⁴⁹ Courtney Mares, “Seal of confession is an 'intrinsic requirement,' Vatican says”, <https://www.catholicnewsagency.com/news/41688/seal-of-confession-is-an-intrinsic-requirement-vatican-says>

⁵⁰ Harvard Law review, “The Right to privacy” <https://faculty.uml.edu/sgallagher/Brandeisprivacy.htm>

⁵¹ [privacy international.org](https://www.privacyinternational.org/explainer/56/what-privacy), “What is privacy?”, <https://www.privacyinternational.org/explainer/56/what-privacy>

⁵² Read more about the “Right to privacy” in the constitution.
https://www.constituteproject.org/constitutions?lang=en&status=in_force&status=is_draft

Article 21⁵³; in *Vietnam Civil Code 2015*, through Article 38⁵⁴.

The *digital economy* is an economy that is based on digital computing technologies but is often perceived as conducting business through markets based on the internet and the World Wide Web⁵⁵. It is also known as the Internet Economy, New Economy, or Web Economy. The digital economy results from billions of everyday online connections among people, businesses, devices, data, & processes. It is based on the interconnectedness of people, organizations, and machines that results from the Internet, mobile technology and the internet of things (IoT)⁵⁶. According to the Oxford Digital Economy Collaboration (OECD), “digital economy is defined as an economy based on digital technology, especially electronic transactions conducted through the internet. 3 main components in the digital economy include digital businesses, digital business infrastructure and e-commerce.”⁵⁷ At the Vietnam Private Economic Forum

⁵³ Article 21, *The 2013 Constitution of the Socialist Republic of Vietnam*,

“1. Everyone has the right to inviolability of private life, personal secrets and family secrets; and has the right to protect his or her honor and reputation.

The security of information about private life, personal secrets or family secrets shall be guaranteed by law.

1. Everyone has the right to privacy of correspondence, telephone conversations, telegrams and other forms of private communication.

No one may illegally break into, control or seize another’s correspondence, telephone conversations, telegrams or other forms of private communication.”

⁵⁴ Article 38, *Vietnam Civil Code 2015*: The right to private life and personal and family secrets “1. The private life and personal and family secrets are inviolable and shall be protected by law.

2. The collection, storage, use and publication of information relating to the private life and personal secrets of an individual must be consented by that person, and the collection, storage, use and publication of information relating to family secrets must be consented by all family members, unless otherwise prescribed by a law.

3. Letters, telephones, telegrams, electronic database and other forms of exchanging personal information of individuals shall be safely and confidentially guaranteed.

The opening, control and seizure of letters, telephones, telegrams, electronic database and other forms of exchanging personal information of individuals may be performed only in cases prescribed by a law.

Contractual parties may not disclose information on private life and personal and family secrets of each other that they have come to know during the making and performance of their contract, unless otherwise agreed upon.”

⁵⁵ Bukht, Rumana; Heeks, Richard (3 August 2017). "Defining, Conceptualizing and Measuring the Digital Economy". Rochester, NY. SSRN 3431732.

⁵⁶ Carlsson, Bo (1 September 2004). "The Digital Economy: what is new and what is not?". *Structural Change and Economic Dynamics*. Contains the special issue New and Old Economy: The Role of ICT in Structural Change and Economic Dynamics. 15 (3): 245–264. doi:10.1016/j.strueco.2004.02.001. ISSN 0954-349X.

⁵⁷ Martin Peitz, Joel Waldfogel, “The Oxford Handbook of the Digital Economy”, *Oxford University Press*,

<https://doi.org/10.1093/oxfordhb/9780195397840.001.0001>,

2019, the Digital economy is defined as all economic activities based on digital platforms and new business models created from the application of digital technology and digital data. In the period 2025-2045, Vietnam sets many goals to develop the digital economy, through a series of undertakings and policies to actively participate in the fourth industrial revolution (4.0) in the spirit of the Decision 52-NQ/TW dated September 27, 2019. According to a report from Google and Temasek (Singapore), Vietnam's digital economy reached about 3 billion USD in 2015. This number quickly tripled after only 3, reaching 9 billion USD in 2018. It is forecasted that by 2025, the scale of the digital economy in Vietnam will reach 30 billion USD to maintain its growth momentum.

1.2. The importance of privacy right in the new age: Post- pandemicaffection and digital technology development

On the one hand, thanks to the evolution of technology, the privacy right mostly show through protecting data in internet space, called *data privacy*⁵⁸. On the other hand, the quarantine and isolation period at home is strictly implemented in the face of the risk of rapid spread and dangerous level of the disease. That makes people limited in their ability to communicate, to connect with others, and even face complex psychological problems. Because of that they need an alternative solution to address their personal demand. In other words, they need a method that can help them to communicate with others; to release stress and psycho problems; to maintain their work; to perform their demands;... Indeed, frequency of using electronic devices has increased significantly in pandemic and post-pandemic⁵⁹ that have been creating more and more electronic transactions, which lead to the development of the digital economy⁶⁰⁶¹. By 2020, the global economy is in decline in every sector except for the digital economy. The core of the digital economy is the digital sector (IT/ICT). Recently, the digital economy has had a high growth rate and is widely applied to other economic fields, especially in the period of COVID-19⁶². On June 3, 2020, President Nguyen Xuan Phuc signed off on the national digital transformation programme until 2025 with a vision to 2030, which targets at increasing the digital economy's contribution to 20 percent of Vietnam's GDP over the course of the next five years. The digital economy is hoped

⁵⁸ *Data privacy*, is not only referred to as information privacy, which is an area of data protection that concerns the proper handling of sensitive data including, notably, personal data but also other confidential data, such as certain financial data and intellectual property data, to meet regulatory requirements as well as protecting the confidentiality and immutability of the data.

⁵⁹ Michael J. Wolf, How Covid-19 Has Transformed the Amount of Time We Spend Online, The Wall Street Journal,

<https://www.wsj.com/articles/how-covid-19-has-transformed-the-amount-of-time-we-spend-online-01596818846>

⁶⁰ BDO, "Covid- 19 is accelerating the rise of the digital economy"

⁶¹ Dr Fabian Stephany, *The Digital Economy Post COVID-19: Global Outlook and Local Contexts*, <https://www.oii.ox.ac.uk/news-events/videos/the-digital-economy-post-covid-19-global-outlook-and-local-context/s/>

⁶² Nguyen Thi Vu Ha, *The Development of the Digital Economy in Vietnam*, DOI: [10.25073/2588-1108/vnueab.4462](https://doi.org/10.25073/2588-1108/vnueab.4462)

to account for 20 percent of the country's GDP by 2025 and at least 10 percent of each sector. Vietnam also expects to be among the top 50 countries in the ICT Development Index and the Global Competitiveness Index, and one of the 35 leading countries in the Global Innovation Index (GII)⁶³.

While these activities demonstrate the tremendous potential of the digital transformation, the pandemic has also accentuated the gaps that remain. Although some digital divides have narrowed fast in recent years, others have not followed the same pace, leaving some behind in the COVID-induced digital acceleration. Moreover, the increased reliance on digital solutions has added new urgency to concerns around privacy and digital security⁶⁴. Precisely, the digital economy really helps us to connect more quickly and easier. As can be seen, the development of the digital economy and Post- pandemic scenario in the present time encourages online trading among individuals and organizations. However, it is clear that in this “convenient environment” the user's information can become valuable for the other, third- party use for their own negative purpose to get benefits, cyber bullying, online scam... In fact, a lot of cases related to taking benefits, harming the other from personal information of customers have been happening in Vietnam. For instance, the sale of ID/CCCD information of nearly 10,000 Vietnamese people by a hacker. The price of this data package was advertised at first at \$9,000 (about VND 207 million), then dropped to \$4,300 (about VND 99 million). The seller also said that he only accepts payments in two forms: Bitcoin (0.2 BTC) or Litecoin (2.8 LTC) or through an intermediary⁶⁵. Plus, the collection of personal data can become the chance for the stores, service providers to advertise their products according to the favorites, demand of customers, which is sometimes really disturbs the customers⁶⁶. Besides, the public-shaming pandemic cases which create pressure, insult the victim that happen easily seem to be the security of personal data⁶⁷. Especially, Ms. Nhung, 17th Covid's patient in Vietnam, received many curses and rude words from the society and online society⁶⁸. However, until the present time this information about her is still easily

⁶³ VNA, Digital economy – key driver for Vietnam's development, Vietnamplus.vn, <https://en.vietnamplus.vn/digital-economy-key-driver-for-vietnams-development/216394.vnp>

⁶⁴ OECD, *Digital Transformation in the Age of COVID-19*, <https://www.oecd.org/digital/digital-economy-outlook-covid.pdf>

⁶⁵ mic.gov.vn, “Tù vụ 10.000 thông tin cá nhân bị rao bán: Cần có trách nhiệm hơn với thông tin của chính mình”, *Cổng thông tin điện tử tỉnh Phú Thọ*,

<https://phutho.gov.vn/vi/tu-vu-10000-thong-tin-ca-nhan-bi-rao-ban-can-co-trach-nhiem-hon-voi-thong-tin-cua-chinh-minh>

⁶⁶ Max Freedman, “How Businesses Are Collecting Data (And What They're Doing With It)”, *Business New Daily*, <https://www.businessnewsdaily.com/10625-businesses-collecting-data.html>

⁶⁷ D. T. Max, The Public-Shaming Pandemic, *The New Yorker*, <https://www.newyorker.com/magazine/2020/09/28/the-public-shaming-pandemic>

⁶⁸ Manh Linh, “Bệnh nhân số 17, cô nợ đất nước một lời xin lỗi”, VTC News, <https://vtc.vn/benh-nhan-so-17-khong-duoc-la-ke-an-chao-da-bat-ar571228.html>

searched in Google. This is a problem related to the *right to be forgotten*⁶⁹.

2. EXPERIENCE AND REQUEST OF PRIVACY PROTECTION FRAMEWORK AND POLICIES

Personal data privacy laws have been passed in many countries, the most common element being the need to seek the permission of citizens before data about them can be collected. The purpose of the collection must be specified, usually with a commitment to destroy the data once it has been used – unless the use is ongoing, such as a credit card number for e-commerce, or a social security number for frequent claims. Data may still be used if seeking permission is not feasible but is judged to be in the best interests of the individual, such as medical data when a person is incapacitated. Malaysia has such a law and a Personal Data Privacy Commission to enforce it, but there is no such legislation in Thailand or in Vietnam⁷⁰.

2.1. International experience

First of all, if you process the personal data of EU citizens or residents, or you offer goods or services to such people, then The General Data Protection Regulation (GDPR)⁷¹ applies to you even if you're not in the EU⁷². Plus, the fines for violating the GDPR are very high. There are two tiers of penalties, which max out at €20 million or 4% of global revenue (whichever is higher), plus data subjects have the right to seek compensation for damages⁷³. In GDPR, there are many rights related to private rights. Firstly, *the right to be let alone*, appeared when Brandeis and Warren found a right to privacy in the "right to life." "The right to life," they wrote, "has come to mean the right to enjoy life - the right to be let alone". Brandeis and Warren left no doubt that they were responding to newspapers and that era's advance in technology – the movable camera that allowed photographers to take photos of people without permission. They wrote: "Instantaneous photographs and newspaper enterprise have invaded the sacred precincts of private and domestic life; and numerous mechanical devices threaten to make good the prediction that 'what is whispered in the closet shall be proclaimed from the house-tops'⁷⁴. Secondly, *the right to be forgotten* reflects the claim of an individual to have certain data deleted so that third persons can no longer

⁶⁹ The right to be forgotten (RTBF) the right to have private information about a person be removed from Internet searches and other directories under some circumstances. Read more: Vaas, Lisa (25 September 2019). "Google wins landmark case: Right to be forgotten only applies in EU". *Naked Security*. Retrieved 9 May 2021. ,

⁷⁰ Peter Lovelock, *Framing Policies for the Digital Economy*, <https://www.undp.org/publications/framing-policies-digital-economy>

⁷¹ The General Data Protection Regulation (GDPR) is the toughest privacy and security law in the world. Though it was drafted and passed by the European Union (EU), it imposes obligations onto organizations anywhere, so long as they target or collect data related to people in the EU. The regulation was put into effect on May 25, 2018. The GDPR will levy harsh fines against those who violate its privacy and security standards, with penalties reaching into the tens of millions of euros. Read more: <https://gdpr.eu/what-is-gdpr/>

⁷² GDPR.EU, "Does the GDPR apply to companies outside of the EU?", <https://gdpr.eu/companies-outside-of-europe/>

⁷³ GDPR.EU, "What are the GDPR Fines?", <https://gdpr.eu/fines/>

⁷⁴ Billofright225, "The right to be let alone", <http://www.billofrights225.com/author/billofrights225/>

trace them⁷⁵, which is also known as the right to erasure, GDPR gives individuals the right to ask organizations to delete their personal data. But organizations don't always have to do it. The right to be forgotten appears in Recitals 65 and 66 and in Article 17 of the GDPR. It states, "The data subject shall have the right to obtain from the controller the erasure of personal data concerning him or her without undue delay and the controller shall have the obligation to erase personal data without undue delay" if one of a number of conditions applies. "Undue delay" is considered to be about a month. You must also take reasonable steps to verify the person requesting erasure is actually the data subject⁷⁶.

The OECD's 2016 Revision Recommendations add issues such as:

- Protecting consumers' interests in the context of non-monetary transactions (i.e. transactions in which consumers use "free" goods and services in exchange for providing their own personal data));
- Provide complete and clear information to consumers about limitations they may face when buying, selling and using digital content products; as well as functionality and interoperability between different digital content products;
- Regulate the role of businesses in C2C transactions and ensure the truthfulness and accuracy of the reflections and endorsements given by NTDs;
- Ensure effective information delivery and keep transaction information/proof on mobile electronic devices;
- Further highlighting the importance of protecting consumers' privacy in B2Ce-commerce transactions and ensuring security threats are addressed;
- Calls on governments and stakeholders to work together to set a minimum safety standard for all online payments and protect consumers; and
- Ensure that unsafe or defective products are not circulated, bought, sold and provided to consumers in the e-commerce environment, and called on the business community to coordinate with government agencies to thoroughly solve the problem. to this problem.

2.2. Vietnam's legal recommendation

Protection of personal data and privacy of Consumer at present

Article 6 of the Law on Protection of Consumer Rights provides for the protection of information for consumers, whereby consumers are guaranteed their information safety and confidentiality when participating in transactions and using goods and services, except for at the request of a competent state agency. In the case of collecting, using and transferring information of consumers, organizations and individuals trading goods and/or services are responsible for: (a) Clearly and publicly informing consumers about the purpose before doing so. activities of collecting and using information of consumers; (b) Use the information in accordance with the purpose notified to the consumer and must be agreed to by the consumer; (c) Ensure safety, accuracy and completeness when collecting, using and transferring

⁷⁵ Weber, Rolf H. "The right to be forgotten." More than a Pandora's Box 2 (2011)

⁷⁶ Read more: <https://gdpr.eu/article-17-right-to-be-forgotten/>

information of consumers; (d) By themselves or taking measures for consumers to update and adjust information when detecting that such information is incorrect; and (dd) Only transfer information of consumers to third parties with the consent of consumers, unless otherwise provided for by law. However, this law does not provide any specific concept or definition of consumer information. Clause 13-14, Article 3, Decree No.

52/2013/ND-CP states: “Personal information is information that contributes to the identification of a specific individual, including name, age, and home address. , phone numbers, medical information, account numbers, information about personal payment transactions and other information that the individual wishes to keep confidential.

Personal information in this Decree does not include business contact information and information that individuals have self-published in the media.” “Collecting personal information is the activity of collecting and putting into a database including personal information of many consumers who are customers or potential customers of traders, organizations and individuals engaged in e-commerce activities. " Articles 68 to 73 of this Decree then further clarify the protection of personal information in e-commerce, such as the responsibility of consumers to protect personal information (Article 68), personal information protection policy personal information of consumers (Article 69), obtain permission from consumers when collecting information (Article 70), use personal information (Article 71), ensure safety and security of personal information (Article 72), and checking, updating and adjusting personal information (Article 73).

These are encouraging first steps in protecting personal data and privacy for consumers. However, it can be seen that the definition of personal information as well as personal information collection activities is quite narrow, not covering all issues that may arise in the context of the digital economy. The current legal framework also doesnot have specific provisions on acts of violating consumers' privacy, misappropriating personal data or abusing personal data to infringe upon consumers' legitimate rights and interests. as well as have not put in place appropriate sanctions. This is a big problem and according to the experience of many countries around the world (as will be analyzed in the next section), deserves to be resolved in a separate, independent andhighly effective legal document.

Law on Cybersecurity (No. 24/2018/QH14)

This law was issued by Vietnam’s National Assembly in June 2018. Article 26 stipulates that domestic and foreign enterprises who provide services on telecommunications networks or the internet, or other value-added services in cyberspace in Vietnam and who conduct activities of collecting, exploiting, analyzing and processing data must store such data physically within the borders of Vietnam in aperiod of time specified by the government. This data includes personal information, data about service users’ relationships, or data generated by service users. For foreign service providers, they must establish a branch or representative office in Vietnam.

However, this law has not been practically enforced as there has not been an official implementation guidance decree. Vietnam's Ministry of Public Security has been working on several guidance decree drafts since 2018. The latest draft became available for public comments during the Vietnam Business Forum in December 2020.

Draft Decree on Personal Data Protection

This draft decree was issued by the Vietnam Ministry of Public Security in February 2021. Article 21 of the decree stipulates that personal data of Vietnamese citizens can be transferred out of Vietnam if the following four requirements are met:

- 1) Data subject/owner consents to the transfer.
- 2) Original data is stored in Vietnam.
- 3) Data processor must prove that the recipient country or territory has equal or higher personal data protection standards than that in Vietnam.
- 4) Written approval of the transfer issued by Personal Data Protection Committee(PDPC) under Vietnam's Ministry of Public Security.

In particular, sensitive personal data must be registered with the PDPC prior to processing. Sensitive personal data includes financial data, physical and mental health data, biometric data, and criminal records. Accordingly, processors of sensitive personal data are required to submit a proper application to the PDPC for registration. It takes the PDPC 20 business days to process the application.

3. CONCLUSION

In summary, in order to promote the digital economy in Vietnam, the improvement of legal provisions on privacy, especially private data, needs to be deeply concerned. In the essay, I have pointed out the importance and urgency in the current context of the protection of personal data in Vietnam for economic development.

Besides, I also propose to improve the law based on reference from foreign laws on privacy rights. Thereby creating a fair competition in electronic transactions and ensuring the safety and privacy of users in the digital age, in Vietnam.

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DEVELOPING E-GOVERNMENT TO DRIVE DIGITAL GOVERNMENT IN VIETNAM: IMPORTANT TIP ON DIGITAL TRANSFORMATION AND FUTURE PARTY REFORM

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ABSTRACT

The technological revolution is changing the world very rapidly, with new technologies being applied in all different fields, bringing about transformative advances in the entire socio-economic environment. In the context of modern technology with a huge amount of data in the world, many countries including Vietnam have conducted assessments to understand the current situation of e-Government development, data management and readiness to develop e-government. Digital Government and Open Data developments shape digital strategies tailored to their countries in their own contexts. This article aims to analyze the benefits of e-Government in improving the efficiency of state management and the quality of public services. At the same time, on the basis of current legal provisions, propose plans to advise the Government of Vietnam, ministries and branches in the strategy towards digital government to continue contributing to promoting the development of digital government. of the country in the current international integration process.

KEYWORDS: *E-government, digital government, administrative reform*

1. INTRODUCE.

Since 2000, under the influence of digital technology and the Internet, especially 4.0 technology applications in recent years, it has created a strong revolution of "Digitalization" and "Digital transformation" for Vietnam. Male. In our country, the concept of digital government or e-government is still relatively new and has many different definitions. But perhaps the most common point of this concept is the widespread use of information technology and especially the Internet to improve service delivery by the government (and more broadly, the government apparatus). country) to citizens, businesses and other government agencies. In addition, this is also a comprehensive renewal of relations (especially the relationship between the government and citizens), renovating the process to help state agencies work more efficiently, effectively and transparently. , providing faster and better information and services to people, businesses and organizations, creating favorable conditions for people to practice democracy and participate in state management. In addition, e-Government also refers to the use of digital technologies to transform the activities of the state apparatus, in which the focus is on the executive branch system, contributing to improving the efficiency of the state apparatus. and public service. In short, e-government is a modern, innovative, for-the-people government that operates more effectively and efficiently, providing better services on the basis of information technology - digital application.

Digital government is a concept that often covers the contents of open government (2.0), smart government (3.0) and digital government (4.0). According to the Organization for Economic Co-operation and Development (OECD), digital government refers to the use of digital technology as an integrated part of governments' modernization strategies to create public value. Digital government develops an ecosystem that includes government agencies, NGOs, businesses, social organizations, citizens, and the interaction between these actors is realized and supported through a network of electronic database systems provided by the government. Therefore, it can be seen that Digital Government is a higher development step of e-Government. Digital government provides people with fair, inclusive, and sustainable services, anytime, anywhere. At the same time, promote transparency as well as tackle corruption, bureaucracy and monopolies in the public sector.

2. THE SITUATION OF APPLYING E-GOVERNMENT AND DIGITAL GOVERNMENT IN VIETNAM IN RECENT YEARS.

2.1. Positive

Since the 2000s, the Party and State have always paid attention to and attached importance to the development of information technology application in the activities of State agencies, identifying this as a driving force contributing to promoting the renovation process to create new capabilities. take shortcuts and take the lead to successfully realize industrialization and modernization. In 2014, the Politburo issued Resolution No. 36-NQ/TW on promoting the application and development of information technology to meet the requirements of sustainable development and international integration with the viewpoint of "Application and development of information technology". developing information technology in all fields, but with focus and focus. Prioritize the application of information technology in administrative management and public service provision, first of all in the fields related to businesses and people such as education, health care, transport, agriculture ... ". The resolution has identified specific goals by 2020 to "effectively implement the administrative reform program, closely associated with building e-government and providing high-level online public services and in many sectors". To concretize the Party's policy, in 2015, the Government issued the first resolution focusing on e-Government in order to "Promote the development of e-Government, improve the quality and performance of the agencies. The state, serving people and businesses better and better. Raising Vietnam's position on e-Government according to the United Nations ranking. Publicity and transparency of activities of State agencies in the network environment.

In response to the requirements of national development and administrative modernization, Vietnam has gradually built an e-government. With the drastic direction of the Government, ministries, branches and localities in recent years, building e-government in Vietnam has achieved important results. Information technology application in the activities of administrative agencies has been implemented synchronously from central to local levels, notably the modern one-stop system at district and commune levels, model of a public administration center;

system to authenticate electronic records of citizens, cadres, civil servants and public employees in performing administrative transactions. The network of information connection between agencies and units is increasingly expanding, forming a common database in many areas of management.

As of July 6, 2020, the National Public Service Portal has integrated, providing 750 online public services; has nearly 49 million hits; more than 187 thousand registered accounts; over 11 million records are synchronized status; over 168 thousand records were made; receiving and supporting over 16,000 calls from people and businesses via the Call Center 1800.1096; receiving and handling 6,870 complaints and suggestions from people and businesses. Currently, the National Public Service Portal has connected and integrated with 18/22 ministries and agencies and 63/63 provinces and cities directly under the Central Government. In addition, the Government Office develops, organizes and operates the Government Reporting Information System and the Information Center to serve the direction and administration of the Government and the Prime Minister. As of December 2019, over 220,000 digital certificates have been provided to 95 focal points (including the Party Central Committee's Office, 31 ministries, central branches and 63 localities) and 351 digital certificates for ministerial and level leaders. conscious. In which, 89/95 ministries, branches and localities have integrated digital signatures, 06/95 units have not yet integrated the Government's specialized digital signatures into the document management and administration system for use in processing. work management. According to data reported by the Ministry of Information and Communications, as of December 31, 2018, the Government Cipher Board has issued 140,297 digital certificates to 30 ministries, branches and 63 provinces and cities. In which, digital certificates issued to ministries and branches are 60,592, provinces are 79,705. The number of active certificates in ministries and branches is 56,247, provinces are 75,800.

Ministries and sectors have actively built national databases and achieved important results, contributing to the formation of a database for the direction and administration of the Government. create favorable conditions in the settlement of administrative procedures for people, organizations and enterprises, and improve the effectiveness and efficiency of the management of the state apparatus. Specifically, the national database on population; national land data; national data on business registration; national financial data; national insurance data (collects personal information of about 93 million people); national electronic civil status data; educational data; shared directory data of the Ministry of Health... A national data sharing and integration platform has been built, step by step connecting and sharing data among ministries, sectors and localities. By the end of June 2020, about 65.21% of ministries, sectors and localities have built a platform to integrate and share data at ministerial/provincial level.

Ministries, sectors and localities have focused on promoting investment, upgrading technical infrastructure, deploying and building many software and foundational databases to serve the construction and development of e-government as directed. of the Government, the Prime Minister. Implement the sending and receiving of

electronic documents between agencies in the state administrative system according to the Prime Minister's Decision No. 28/2018/QĐ-TTg dated July 12, 2018 on sending and receiving electronic documents. The Government Office officially opened and put into use the National Document Communication Axis, connecting to serve sending and receiving electronic documents between 95/95 state agencies from the central to local levels. and some other agencies in the political system with 2.2 million electronic documents sent and received (from March 12, 2019 to July 6, 2020).

From 2016 to March 2020, according to reports of ministries, branches and localities, the number of agencies and units implementing the use of document management software or the connection between document management systems and management of ministries and provinces with the National Document Communication Axis, there are 1,668 agencies and units in ministries and branches; the number of agencies implementing document management software application in ministries and branches is 5,551 agencies and units. For the provinces: a total of 44,233 agencies and units implement the use of document management software or the connection between the document management and administration systems of the province and the National Document Interoperability Axis. The information system for meeting and handling government affairs (e-cabinet system) was officially put into use, contributing to innovating the working method of the Government on the basis of strong application of technology. information, towards a paperless government, saving time and costs, and improving the effectiveness and efficiency of management and administration of the Government, the Prime Minister and members of the Government.

The Government Office has launched the National Reporting Information System; Information Center, directing and operating of the Government and the Prime Minister. A number of ministries, branches and localities have also built an integrated operating center, sharing databases, such as: Ministry of Planning and Investment, Ministry of Natural Resources and Environment, Phu Tho province, Kon Tum province , Tra Vinh province...

According to the assessment, if in 2016, Vietnam ranked 89th in the world - an increase of 10 places compared to 2014; ranked sixth in ASEAN, behind Singapore, Malaysia, Thailand, Philippines and Brunei, by 2020, the National Public Service Portal has more than 2.6 thousand integrated public services, provided out of a total of 6.7 thousand administrative procedures (reaching the rate of 39%, exceeding the target of 9%) with more than 99 million visits; The government has established a National Committee to accelerate the construction of e-government and national databases. Up to now, about 47,000 online public services have been performed at level 3 and level 4 at ministries, branches and localities. Putting into operation the national document interlinking axis, the information system serving meetings and handling of government affairs, the national reporting information system and the information center serving the direction and administration of the government. government.

Currently, 100% of ministries, branches and localities have electronic portals; agencies and units directly under the departments, branches, districts, have electronic information pages; Updated information on the portal/website is more and more diversified and abundant, the number of news and articles is updated regularly. According to the assessment of the United Nations, in 2020, Vietnam ranked 86/193 countries and territories, maintaining a continuous increase since 2014 (99/193), being classified in the group of developing countries with electric government. mortality rate is high and higher than the world average.

2.2. Restrict

However, in practice over the past time, many shortcomings have also been revealed in the implementation of e-Government, digital government, in national digital transformation, such as: Technical infrastructure has not been optimized and specialized operations have been carried out. industry, has not yet been able to flexibly meet new requirements arising; the connection and sharing of data between state agencies is still limited; low rate of online public services generating dossiers and low rate of online processing dossiers; the operation of state agencies still has many manual stages, based on traditional paper; the national ranking on e-Government has improved but is only at the average level in the region; digital transformation has not had many breakthrough results. Databases at administrative agencies to extract and share information still face many problems. The coordination between vertical agencies and local administrative agencies in the application of information technology is not effective and comprehensive. Information technology infrastructure at the commune level has not been paid due attention, and the level of information technology application of commune-level cadres and civil servants is still not high.

One of the important "bottlenecks" to focus on removing to develop e-government, digital government, and promote digital transformation is the issue of data sharing, so people still have to declare and provide data data many times, especially when performing administrative procedures. In addition, the work of ensuring information safety, network security, the development of human resources for digital transformation, and funding for information technology application activities, building an e-Government towards the Government. digital coverage, digital transformation has not been really interested. In addition, in the process of e-government in Vietnam, there are still barriers, such as stagnation, fear of innovation among some cadres and civil servants; qualifications and skills in using information technology and telecommunications equipment of cadres, civil servants and public employees are not equal.

3. SOLUTION.

Looking at the achievements of countries around the world, it can be said that implementing e-Government is an inevitable trend, improving transparency in government operations, repelling corruption, contributing to economic development. economy, improve competitiveness, labor productivity and is the way to create

prosperity for the nation. To have a strong breakthrough, Vietnam needs to study, learn from the world's experience and develop specific and direct implementation steps with the highest efficiency. This will be a specific orientation to implement the tasks of building an e-Government towards a digital economy and a digital society in the context of the industrial revolution 4.0 that is taking place strongly globally, and to realize it. In order to achieve the above goal, it is necessary to perform well a number of key issues as follows:

Firstly, speed up the construction and completion of a full and comprehensive legal environment for the implementation and facilitate the development of e-government towards digital government in the new period.

According to the experience of developed countries about e-Government, the institutional foundation of e-Government must go first, while we still lack many regulations and policies. Therefore, it is necessary to study, propose and amend the Law on Electronic Transactions and the Law on Archives to have regulations on electronic storage, creating legal conditions for the implementation of complete digital transformation in operations and processes. work of state agencies and organizations. At the same time, it is necessary to soon promulgate the Law on e-Government and study and develop the Law on Digital Government. Promulgating Government Decrees to replace Decree No. 43/2011/ND-CP dated June 13, 2011 on provision of online public information and services on websites to have appropriate regulations. more convenient, convenient, and enhance the interaction between people and businesses. Promulgating the Government's Decree replacing Decree No. 64/2007/ND-CP dated April 10, 2007 stipulating the application of information technology in the activities of state agencies to match the development trend. of the digital government as well as the digital transformation orientation of our country. In addition, it is necessary to ensure a regulatory environment that allows experimentation, acceptance of newness and acceptance of change. Forming a pilot space for digital services and building a legal framework to allow testing of digital services that are not yet regulated by law. Digital service pilot space is a digital space that allows all innovative digital products and services that are not yet regulated by legal documents to be piloted, provided that they are closely monitored by law. technology in terms of scope, scale and operating model. When reaching a certain scale, the organization evaluates to build the necessary legal corridor.

Second, complete the national database of fundamental nature.

Develop and operate a stable, secure and smooth dedicated network infrastructure, connecting 04 administrative levels from central to commune level on the basis of specialized data transmission networks of Party, State, and network agencies. large areas of ministries, branches, localities, broadband Internet to serve the Digital Government.

Building a unified Government Cloud Computing Platform (CGC) on the basis of planning and connecting clouds of state agencies at ministries, branches and localities (AGC) to create an environment for storing, sharing resources, developing shared

services for the digital government on a nationwide scale to be flexible, efficient and fast; effectively connect and exploit enterprise cloud systems (EGC) to provide cloud computing infrastructure for the Digital Government.

Developing national digital data creates a foundation for digital government implementation, ensuring the provision of digital data for online public services, smooth data sharing among state agencies, and provision of data sets. open data of high quality and value, open data in accordance with the law to develop digital government, digital economy and digital society.

Building a National Data Portal to act as the focal point for providing open data of state agencies in the online environment in order to be transparent, increase data sharing, promote creativity, develop the digital economy and digital society. ensure the safety of information of organizations and individuals according to the provisions of law. In addition, on the existing platform, develop and flex more online meeting form, form a working environment, work in a digital environment based on Government cloud computing, Virtual assistant platform, ensuring ensure inheritance of information systems that have been built in ministries, branches and localities.

Third, apply information assurance measures to maintain national network safety and security.

Building a network security appraisal system, checking network security, assessing network security conditions, monitoring network security, responding to and overcoming network security incidents for important information systems on the Internet. national security in accordance with the Law on Cybersecurity. To organize the inspection and examination of the work of ensuring network security and protecting state secrets at agencies, network operators and enterprises providing digital government services.

Strengthening capacity and raising awareness about e-government to cadres and civil servants to understand the importance and necessity in building e-government by organizing training courses for leading cadres, cadres, civil servants and public employees in state agencies from the central to local levels, solving the current urgent need for resources to develop e-government and digital government, promoting number conversion.

Promote the training and fostering of experts with experience in implementing e-government in Vietnam, creating a core force, spreading knowledge and skills for digital government development in ministries and sectors. Digital Government experts must first grasp new technology trends, lessons learned, legal regulations, models, and technical regulations in implementing Digital Government. Building a network of experts on Digital Government to share knowledge and coordinate to solve big problems.

Fourth, promote the role of the leader, improve enforcement efficiency and accountability.

Showing determination to build an e-Government, the Prime Minister directed the establishment of the National Committee on E-Government on the basis of consolidating the National Committee on Information Technology Application chaired by the Prime Minister. government is the Chairman of the Committee. The Committee has members who are ministers of ministries directly related to the tasks in e-Government building to connect across ministries, branches and localities in performing tasks. At the same time, the Committee has the participation of representatives of the private sector to help promote the effectiveness of public-private cooperation in the implementation of this task. E-Government implementation tasks will be assessed in association with the individual responsibilities of the heads of each ministry, branch, and locality and measured through a set of criteria for evaluating the effectiveness and quality of construction results. Building e-Government to ensure accuracy and fairness.

4. CONCLUSION.

Digital transformation is a long and challenging process, but it will help the Government increasingly improve the quality of work, of its employees, improve public services, help reduce congestion and serve the needs of the people. people more efficiently. Therefore, building e-Government towards digital government and digital economy is a major policy that needs to be promoted in the coming time. In order to achieve the set goals, it is necessary to participate with high determination of the whole political system to create a new mode of administration, a new way of doing things to make an important contribution to promoting development, widely apply information technology for socio-economic development and national defense; make the most of the benefits brought by digital technology, ensuring rapid and sustainable development of the country.

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DEEFAKE DETECTION USING EFFICIENTNET: WORKING TOWARDS DENSE SAMPLING AND FRAMES SELECTION

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ABSTRACT:

Deepfake is a controversial technology that allows the automatic generation of video content, through generative adversarial networks. The emergence of Deepfake technology is problematic and sophisticated which makes it more difficult to be detected. In our paper, we contribute a deep-learning method to resolve that problem. We use MTCNN face detector to extract facial images, apply data augmentation and EfficientNet for real-fake classification. With the raw label prediction, we apply frames selection to tackle the fault cases and receive the final label. We utilize training and evaluation datasets from FaceForensics++, with the aforementioned approach applied, and achieve an accuracy of 62.5%.

I. INTRODUCTION

In 2022, image counterfeiting has swept the online community and social media applications [1]. On apps like Snapchat, Instagram, Facebook, Reddit, and others [2], using deep learning [3] techniques to learn specific picture features and transpose them onto another image or video has become a craze. This notion is referred to as "deepfake", with "deep" referring to the utilization of deep learning neural networks

[4] and "fake" refers to the meaning of being misleading to the original input.

Deepfake [5] has frequently been used on human faces to misrepresent persons by replacing their face with the face of a different person. Faces are of particular interest to current manipulation methods for a variety of reasons. Firstly, human face reconstruction and tracking is a well-studied field in computer vision by leading experts in this field. Secondly, faces are the most common identifying feature while facial communication is always the best way to build trust and persuasion in modern society.

Image fraud has been penetrated into the life of modern people, with applications including movie productions, photography, video-games and virtual reality. However, the same technology may be used for nefarious reasons, such as blackmailing individuals with phony porn movies or establishing fake-news campaigns to sway public opinion. For example, a deepfake video of former President Barack Obama giving a lecture on the issue was uploaded by BuzzFeed (an online media site). Despite the video's resemblance to President Barack Obama, it was a deepfake in Fig. 1. This deepfake, as complex as it was, was made feasible by a piece of open-source software called FakeApp. The app's debut sparked fears of impersonation, the propagation of false information on social media, and identity theft. The academic community has taken a keen interest in these deepfakes.

Deepfakes have generated worries about the safety and security of innocent persons throughout their brief life.

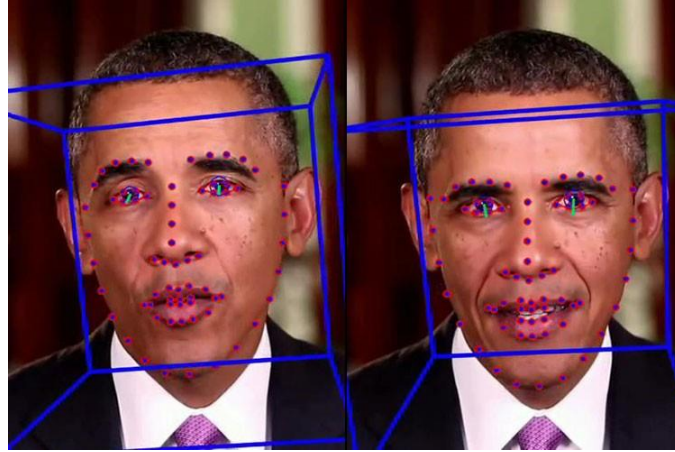


Figure 1.1. AI detect deepfakes Obama [6]

Motivated by a desire to tackle these existing problems, we contribute a fast and light-weight deep-learning method using EfficientNet [7] for classification tasks to automatically detect deepfake videos. We utilise training and evaluation datasets from FaceForensics++ [8] which are the availability of large- scale datasets of DeepFake [5] videos and achieve an accuracy of 62.5%.

In this paper, we conduct a dense sampling method to crop out facial regions from all videos by MTCNN [9] network. From the raw image of a list of frames in the video, we try to augment the data and pass through them a deep learning network, in specific, a fine-tune EfficientNet [7] model. After feeding the data into the model, we receive a list of binary predicted labels on each frame. We eliminate the fraud labels and analyze the consecutive fake labels whether it exceeds the threshold in order to conclude the realness of the whole video.

The outline of our paper is organized as follows: Section II discusses the works related to our project. Next, an explicit and detailed description of the method we choose is given in Section III. After that, Section IV presents our evaluation paradigm and experimental result.

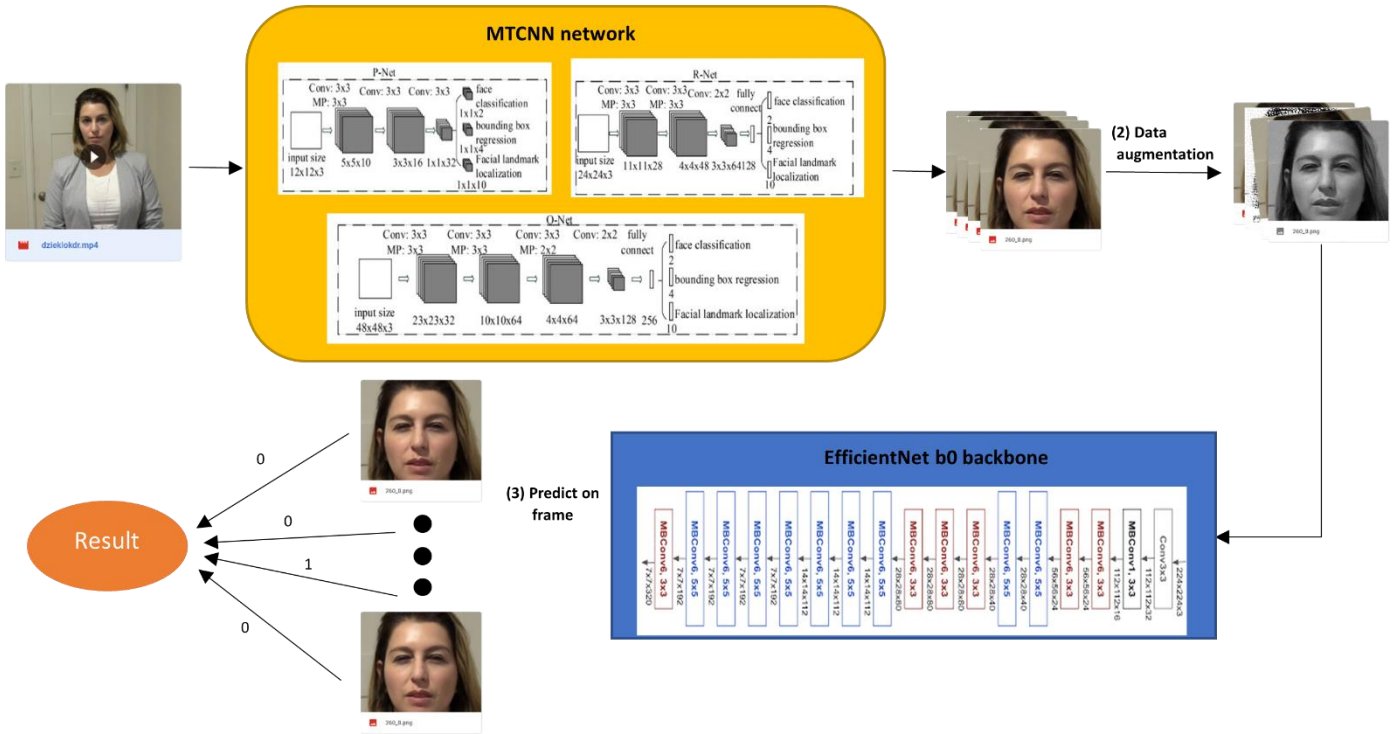


Figure 1.2. Method diagram.

II. RELATED WORK

Deepfakes rely on a type of neural network called an autoen-coder. These consist of an encoder, which reduces an image to a lower dimensional latent space, and a decoder, which reconstructs the image from the latent representation [10]. A popular upgrade to this architecture attaches a generative adversarial network to the decoder. A GAN [11] trains a generator, in this case the decoder, and a discriminator in an adversarial relationship. This causes the generator to create images that mimic reality extremely well as any defects would be caught by the discriminator. When training completes, the generator is used to synthesize images with realistic appearance. Liu et al. [12] proposed an unsupervised image-to-image translation framework based on coupled GANs, with the goal of learning the joint representation of images across domains. This algorithm is the basis for the DeepFake algorithm.

DeepFake video is created by taking an input video of a specific person ('target') and generating a new video with the target's face replaced with that of another person ('source'), based on a GAN model that has been trained to translate between the target and source faces. This process is based on a GAN [11] the model trained to translate between the faces of the target and the source. Zhou *et al.* Cycle-GAN proposed cycle consistent loss to push the performance of GAN [13]. Bansal *et al.* stepped further and proposed Recycle-GAN, which used conditional generative adversarial networks to incorporate temporal and spatial cues [14]. StarGAN [15] used a single generator and discriminator to learn the mapping across various

domains.

For detecting manipulated videos, several countermeasures have been implemented. Treating a video as a series of image frames and working on the images as input is a common approach. Fridrich and Kodovsky [16] proposed a noise-based approach that is considered one of the best handcrafted detectors. Its upgraded version [17], which used a convolutional neural network (CNN), established the utility of automatic feature extraction for detection. Fine-tuning [18] and transfer learning [19] are two deep learning approaches to detection that take advantage of high-performing pre-trained models.

Additionally, GAN Generated Image/Video Detection methods can be used to identify traditional forgeries such as Zhou *et al.* proposed two-stream CNN for face tampering detection [20]. NoisePrint [21] employed the CNN model to track down device fingerprints for forgery detection. Li *et al.* observed that DeepFake faces have a lack of realistic eye blinking because most images of training obtained from the internet do not include photographs of the subject with their eyes closed. The lack of eye blinking is detected with a CNN/RNN model [22]. However, this detection can be avoided by including images with closed eyes in the training. Afchar *et al.* trained a convolutional neural networks namely MesoNet to directly classify real faces and fake faces generated by DeepFake and Face2face [23]. The work of David *et al.* [4] extended from the work of Darius *et al.* [24] to the temporal domain by incorporating RNN on CNN. While this holistic approach shows potential performance, it does have a disadvantage. It requires both real and fake images as training data and uses AI-based synthesis algorithms to generate the fake images.

III. METHOD

In this section, we describe our approach towards deepfake detection in Fig. 1.2.

The method comprises four main steps: (1) MTCNN network is used to detect landmarks of the speaker in the video. Those points are selected to locate the facial area and crop it into a facial image (every 0.5s in the video). (2) Facial images are randomly transformed into gray-scale, blur, rotated, etc. images to create augmented data for efficient training.

(3) Using EfficientNet b0 backbone as a binary classifier to detect deepfake images. (4) Compare the predicted label on each frame to draw final conclusion on the video real label.

A. Face detection

The overall face detection approach is inherited from a three-stage cascaded CNN framework – MTCNN pipeline [9]. Given a video, we crop a single frame every 0.5 seconds and fit it consecutively through three following stages in an MTCNN network as illustrated in Fig. 1.2.

Stage 1: Frame is fed to a fully convolutional network, called Proposal Network (P-Net), to obtain candidate facial bounding box and their regression vectors. The network also employ a non-maximum suppression (NMS) to consolidate the

overlapped windows into one whole.

Stage 2: Frame continues to be refined to another CNN – Refine Network (R-Net), which further eliminates false cases, combining with extra bounding-box regression and NMS.

Stage 3: This stage is similar to the previous one, but face regions are identified with more supervision and precision. Output network (O-Net) will return five facial landmark positions. Eventually, candidates' faces are precisely detected and extracted from the given video and resized into a fixed (224x224) scale.

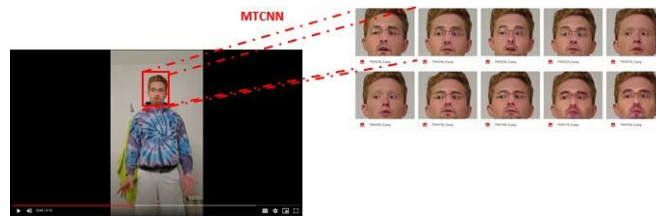


Figure 3.1. MTCNN process.

B. Data augmentation

Original RGB facial images are transformed into different augmented data image: gray-scale, blur, gaussian-noise, rotated, etc. This augmentation step will effectively generate more data to robustify the training process and increase the prediction accuracy.

C. Deepfake EfficientNet-b0 classifier

EfficientNet is a convolutional neural network architecture and scaling method that uniformly scales all dimensions of depth/width/resolution using a compound coefficient [25]. In general, EfficientNet models achieve both higher accuracy and better efficiency over existing CNNs, reducing parameter size and FLOPs by an order of magnitude [25].

The reason that we choose EfficientNet is that Deepfake task requires a large scale of training data. EfficientNet with the idea of compound scaling which scales neural networks to accommodate more computational resources that you might have/gain, easily outperform other architectures that have a similar computational cost. We also perform a training evaluation of ResNet18 [26] described in Section IV.

In this paper, we use EfficientNet-b0 as the main backbone for the classification task. Applying the transfer learning method, we append a fully connected layer with an output feature equal to two – 0 for fake and 1 for real and use cross-entropy loss

with a learning rate = 0.0001. We have trained 30000 images for 6 epochs over 12 hours. The platform we used for training is Google Colab, with its default configuration: a Nvidia K80 GPU, 8GB of RAM and 25GB of disk space.

D. Comparing labels within a frame

After predicting all the images' labels, we combine them into a sequence of binary (0 or 1) array a , in which the i^{th} bit in the array stands for the predicted label of the i^{th} image in the video. If the length of a consecutive 1 bit exceeds a value of k , we propose that the video is deepfake generated; otherwise that is an original video.

However, when an image label is predicted, there might be rare cases that the model mispredicts the truth label of the frame which leads to a single "fake" label in between two sequences of "real" labels and vice versa. Therefore, we propose two solutions to tackle this problem.

1) *Eliminating the single "1" label:* Since there are some fault predicted label 1 in between an array of 0s, we decide to create a new array x in which if the i^{th} bit is 1 the value in the i^{th} is equal to the sum of $i - 1^{th}$ and $i + 1^{th}$ bits.

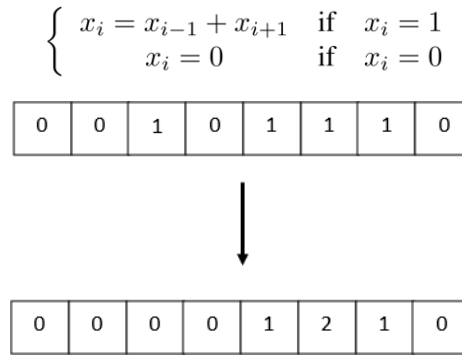


Figure 3.2 Frame selection 1.

2) *Eliminating the single "0" label:* If there exists a single "0" label bounded by two long sequences of "1". The single label "0" changes into "1".

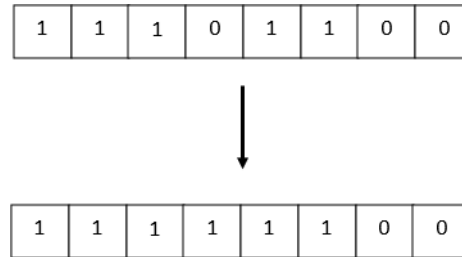


Figure 3.3. Frame selection 2.

IV. EXPERIMENTS

A. Dataset

The dataset we use is a forensic dataset from FaceForensic++. We download 4000

videos (2000 original videos and 2000 deepfake videos). The dataset is challenging where there are some failed cases in face detection; however, we try to upscale the local feature in those cases so that we can extract facial landmarks from them.

B. Training and validation

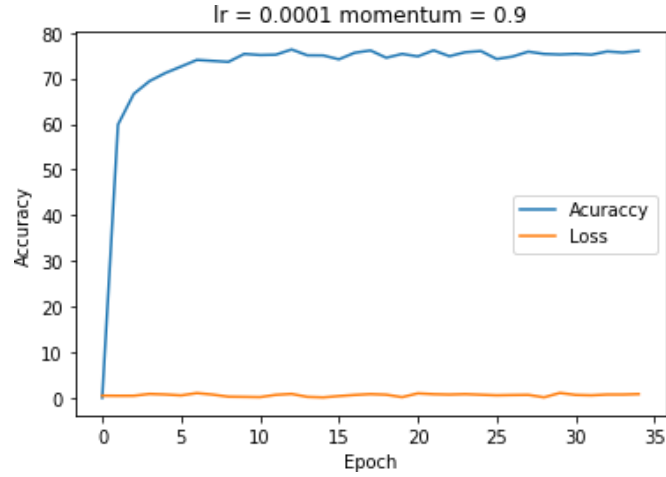


Figure 4.1. EfficientNet accuracy score within 35 epochs

1) *Comparing ResNet and EfficientNet:* We evaluate the overall detection performance using cross-entropy loss at the frame level for all keyframes. To increase robustness to numerical imprecision, the accuracy scores are rounded to five digits after the decimal point, *i.e.*, with a precision of 105. The training process takes more than 6 hours to be finished. We utilize SGD optimizer with momentum to be 0.9, learning rate to be 10^{-4} and gamma to be 0.1 during the process. As such, we could not practically re-train these models on all datasets we considered. We use the default parameters provided with each compared detection method. Eventually, we get a 76% and 70% accuracy in training validation with EfficientNet and ResNet respectively in Fig. 4.1, Fig.4.2.

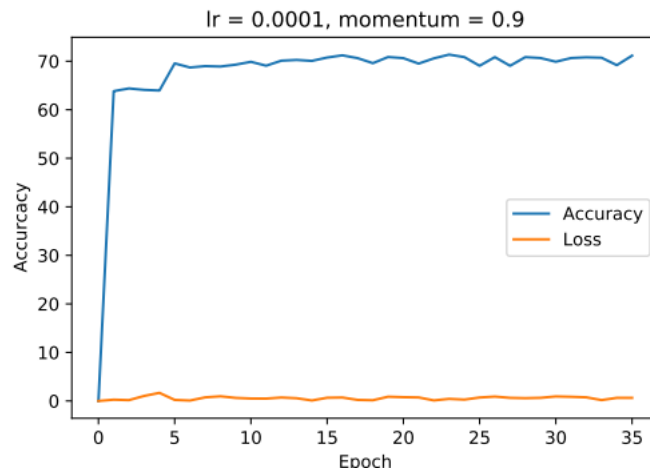


Figure 4.2. Resnet accuracy score within 35 epochs

2) *Threshold selection:* We apply the model on the test set and receive the final labels on the frame of the test videos. We conduct many trials for different k .

$$k = \text{video\_length} * \text{threshold}$$

After experimenting with different thresholds ranging from 0.1 to 1.0, we come up with the result that the threshold equal to

0.3 giving the highest accuracy *TABLE 4.1*.

Threshold	Accuracy
0.20	0.6121
0.25	0.6181
0.29	0.6242
...	...
0.30	0.6252
...	...
0.31	0.6212
0.35	0.6222
0.40	0.6192
0.45	0.6050
0.50	0.5959

Table 4.1. Accuracy With Different Threshold

B. Cross-entropy loss function

$$L_{\text{cross-entropy}}(\hat{y}, y) = - \sum_i y_i \log(\hat{y}_i)$$

Cross-entropy loss, or log loss, measures the performance of a classification model whose output is a probability value between 0 and 1. Cross-entropy loss increases as the predicted probability diverges from the actual label.

The reason that we use cross-entropy error instead of classification error or mean-squared error is that the choice of ACE or MSE affects the computation of the gradient during back-propagation. Therefore, the weight changes do not get smaller

and smaller and so training is not likely to stall out.

c. Confusion matrix

We get our confusion matrix presented in *Fig. 4.3* with 342 cases of true negative, 277 cases of true positive, 226 cases of type I error, 145 cases of type II error, archive an accuracy of 62.5%, precision of 55.1% and recall of 65.6%.

$$\text{precision} = \frac{TP}{TP+FP}$$

$$\text{recall} = \frac{TP}{TP+FN}$$

$$\text{accuracy} = \frac{TP+TN}{TP+TN+NP+NN}$$

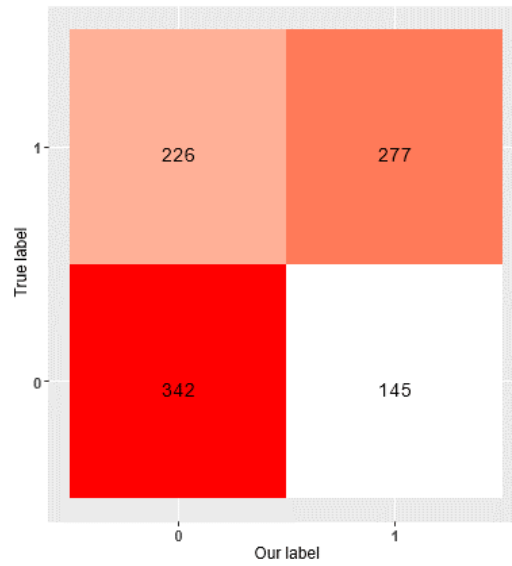


Figure 4.3. Confusion matrix

E. Conclusion

In conclusion, we conduct a method to detect Deepfake videos by frame prediction. Every frame gives a facial image of the speaker in the videos by applying MTCNN network. After that, the frame sequence is fed into the EfficientNet model and gives out the raw prediction. Given that, we transform the prediction array into a more reliable array and compare it with the experimental threshold to finally draw the conclusion to the video characteristic.

v. FUTURE WORK

Deepfake had become popular due to the massive availability of images and videos in social content. This is particularly important nowadays because the tools for making deepfakes are becoming more accessible, and social media sites will easily allow people to distribute and share such fake content. Recently, various deep learning-based methods have been proposed to address this issue and successfully detect fake images and videos. In this paper, we first discuss the current applications and tools that have been widely used to create fake images and videos. Then, We proposed a detailed description of our deepfake methods in terms of architecture, tool

and performance. We also highlighted the publicly accessible datasets used by the science community, categorizing them by dataset sort, source, and method. Finally, we have also discussed the current challenges and provided insights into future research on deepfake detection using deep learning.

Although deep learning has shown a remarkable performance in deepfakes detection, the quality of deepfake has been increasing. Hence, the current deep learning methods need to improve as well to successfully identify fake videos and images. In addition, for the current deep learning methods, there is not a clear method to know the number of layers needed and which architecture is appropriate for deepfake detection. Another area of investigation is the incorporation of identification of deepfake detection methods in social media platform in order to improve their effectiveness in coping with the pervasive effects of deepfakes and reduce its impacts.

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IDENTIFICATION OF LEAF DISEASES ON APPLE TREES USING THE EFFICIENTNETB7 MODEL

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ABSTRACT—In the field of agriculture, leaf diseases caused by fungi and insects seriously affect crop yield, followed by notable decreases in the quantity and quality of agricultural products. Among them, Rust and Scab are two of the most popular diseases on leaves, which are often seen in apple and Citrus such as orange, lemon, grapefruit. . . Hopefully, these diseases can be controlled due to early prediction. In this research, authors focus on identifying the feature of four kinds of states in apple leaf: healthy, rust, scab and multiple diseases. EfficientNetB7 Model is used to identify the four common apple leaf diseases. Our dataset contains 3500 images which are categorized into two classes: labeled and not labeled - to be used for stimulation experiments. During the progress of this research, the results indicate that EfficientNetB7 Model be feasible for identifying leaf diseases of almost apple trees. The experimental results attained from validation data without data augmentation methods achieves an overall accuracy of 85%, compared to that with data augmentation methods reaches a more satisfactory result, 92%. Therefore, the proposed deep learning model is demonstrated to be practicable and effective.

INDEX TERMS: *component, formatting, style, styling, insert*

I. INTRODUCTION

For centuries, Vietnam's economy has depended heavily on agriculture. In 2019, agriculture contributed approximately 13.96% of the country's total GDP [10]. In the two years when Vietnam faced the Covid-19 epidemic, most business fields experienced a decline. However, agriculture saw positive growth, becoming the mainstay of the country's economy throughout difficult times [11]. As a result, agriculture will have been the engine of economic growth in 2022. Hence, the issue of how to increase productivity and quality of agricultural products have always been of interest to Vietnamese scientists.

For instance, rust and scab on apple trees have become the primary cause of low productivity in apple trees. Rust, or cedar rust on apple leaves, causes yellow, orange, and dark-brown color spots on the surface of leaves. Meanwhile, scab disease produces scab-like lesions that can cause the leaf to deform and torn. These diseases interfere with the photosynthesis of leaves, doing severe harm to a tree's

development. Diseased tree can not absorb water or mineral as well. Even worse, diseases can spread quickly from leaves to other parts such as buds and fruits, which leads to tree's early withering. Therefore, early-stage detection of these diseases in such situations is extremely urgent. Not only does it help farmers reduce the cost for treatments on leaves but it also minimizes the risk of yield loss.

Different ways to identify illnesses on apple leaves had been developed in the past to avert big losses. Microbiology and immunology techniques have been implemented and resulted in correct recognition of the causative agents. However, they are required large amount of money and energy to carry out. In addition, in order to put these solutions into practice, farmers must have profound knowledge about plants and arable land. Hence, we need a new technique - digital technique - using image and data augmentation to identify diseases in plants, so that the following research can be performed.

This study is a sub-problem of processing image and classifying components according to given labeled images. Obviously, part of the data has been labeled and the rest unlabeled is used to evaluate the results of the proposed models. The issue of identifying diseases in agricultural crops or classifying cultivars in agriculture plays an important role in the application of technology. The goal of this approach is to help farmers pinpoint the issues they really care about. If this research method provides good results, it can be applied in various ways to provide the suitable treatment for diseased trees. In this study, with a relatively small data set, a simple model, EfficientNetB7, in addition to EfficientNetB4 and Xception, will be used here. Besides, the data is preprocessed before proceeding to build the model. There are many different processing methods depending on the specific analysis for the selected data set. For instance, adjusting the image to focus on the object determines the result of the most attached label. The main result is model usage on collected and unlabeled datasets. After being processed and labeled by the model, testing and evaluating accuracy is the most important issue in this study. If the results are not good, the model cannot be deployed and applied in practice. On the contrary, we hope to build an application to give accurate results in reality and give appropriate treatment methods. Provided that the user needs to provide a data set of diseased leaves, so that it can be performed on many different plants.

The main contributions of this paper are stated as follows:

- 1) An improved convolutional neural network for recognition and classification of apple leaf disease is proposed. In this research, we propose three models: the EfficientNetB7, EfficientNetB4 and Xception model.
- 2) Experiments are performed to examine, contrast and hence draw conclusions about the effectiveness as well as accuracy of the proposed systems. The result is expected to reveal which network model is the most effective solution for detecting leaf diseases. The leaf dataset attained from **Kaggle** is categorized into four types related to the healthiness of leaves, which is used for simulations.

II. RELATED WORKS

Plant pathology is a huge problem concerning a great number of scientists in the world due to the fact that it not only affects the quantity but also the productivity of farming. Additionally, identification of plant disease requires accuracy and rapidity, which is still a big challenge today.

So far, researchers have made various efforts to control these diseases. Traditional machine learning algorithms have been widely used, and researchers have conducted experiments to apply them in detecting plant disease, hoping to get better results. A four step scheme was proposed by Selvaraj et al. [1]: first a system is generated for the input which transfers a RGB image, green pixels are covered and taken over by using different threshold values preceded by segmentation. All useful segmentations, texture are calculated and important features are sent to SVM classifier. Pujari et al. [2] proposed Support Vector Machine and Artificial Neural Network based on the identification of fungile disease in grain plant. The areas looked related with diseases are classified by using K- means segmentation. Colors and structure of these are used for the input of classification system. Using **K-means clustering** technique, Vishnu et al. [3] determined the important features of the regions which are affected by diseases. Finally, the derived features are trained by the Neural Network Model. Qin et al. [4] proposed a new approach to find out the lesion image segmentation and image recognition of alfalfa leaf disease. The method ReiefF firstly to be used to detect 129 features and then method SVM was trained to find out the most important characteristics. This method achieved a positive score: 97,74%.

A approach is suggested by Lu et al. [5] in rice diseases based on deep convolution neural networks. Dataset of 500 images includes healthy and disease leaves, his team used CNN models to find 10 types of popular disease in rice leaf. The obtained result is extremely high with accuracy is estimated 95,48%. In 2018, Bin et al. [6] proposed a new model based on deep convolutional neural networks and did experiments on apple leaves. The achieved accuracy is about 97,6%, higher than that of AlexNet, GoogleNet, ResNet-20, VGGNet-16. In [7], Sladojevic et al. suggested a new method to detect disease by using deep convolutional networks. CNN-based model was trained to determine diseased leaves among the surroundings and 13 types of disease were detected. The obtained efficiency was high and the average accuracy was approximately 96,3%. All of the above studies are proved that Convolution Neural Networks have been widely used in the field of plant pathology. Based on those foundations, we are making efforts to improve our models and enhance the accuracy of disease identification on apple leaves.

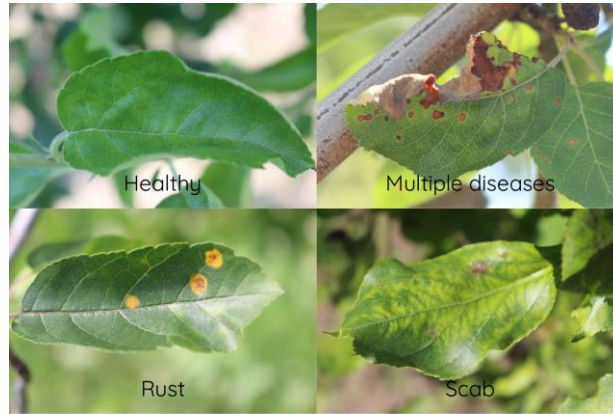
III. METHODS

A. Dataset

The dataset is supplied from **Kaggle** [12], including two following parts:

Firstly, trained dataset has 1821 *labeled images*, which is used to build deep learning models. 1821 is a rather limited number of images to do data pre-processing. Therefore, it is necessary that we use data augmentation to increase the

number of images. The larger number of images, the more accurate of these models. Each image has only one label in the four following types: healthy, multiple_diseases, rust or scab. Figure 1 shows healthy and unhealthy sample of images in the dataset collection used in this article.



The labeling for each image is demonstrated as a table and saved in `.csv` file, which looks like:

image_id	healthy	multiple_diseases	rust	scab
Train_0	0	0	0	1
Train_1	0	1	0	0
Train_2	1	0	0	0
Train_3	0	0	1	0
Train_4	1	0	0	0
Train_5	1	0	0	0
Train_6	0	1	0	0
Train_7	0	0	0	1
Train_8	0	0	0	1
Train_9	1	0	0	0
Train_10	0	0	1	0
Train_11	0	0	0	1
Train_12	0	0	0	1
Train_13	1	0	0	0
Train_14	0	0	1	0

Conspicuously, the value in the above table is either 0 or 1. The first row is listing four types of label and the first column is an ordered list of images in the train data. Also, all values in the table is equal to 0 or 1. The value 1 at row x , column y stands for labeling image x with y . Due to the fact that every image has only one label, all rows have one value 1 and three value 0.

Secondly, test dataset contains *unlabeled images*: these images are unlabeled and used to evaluate the efficiency of models. The number of unlabeled images is the same as labeled ones, which is 1821.

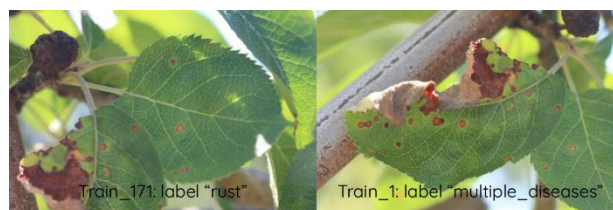
From the trained data, we perform some fundamental statistic steps and we have got:

	Healthy	Multiple diseases	Rust	Scab	Total

Number of images	515	91	623	592	1821
Percentage	28.3%	5%	34.2%	32.5%	100%

It can be seen that the number of images shown healthy, rust và scab apple leaves are quite good and nearly equal to each other. However, multiple-disease-leave images are few (it accounts for nearly 5% of labeled images). Therefore, we will perform data augmentation methods to increase this category. However, it is necessary that we ensure the precision of these labeled images about apple leaf disease. Unexpectedly, we found some mistakes in the supplied dataset, which are described thoroughly in the following paragraphs.

Firstly, there are some images that are captured the same leaf although they are taken at different camera angles. However, these images are labeled differently. For instance, the image "train_171" and "train_1" are labeled as "rust" and "multiple_diseases" respectively, although they might photograph the same leaf. By a quick check, it can be seen that the leaf taken in these two photos is multiple diseases.



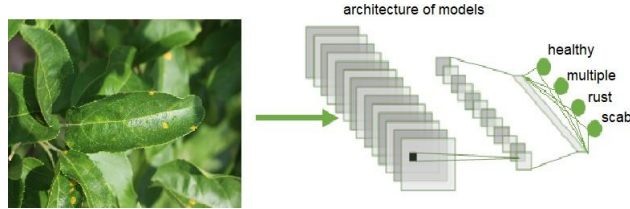
Secondly, there are some images that are captured nearly the same leaf, also the same camera angle, but are labeled differently. For instance, the image "train_379" and "train_1173" are labeled as "scab" and "multiple_diseases" correspondingly, although they are almost similar to each other. By a quick check, it can be seen that the leaf taken in these two photos is scab.



Therefore, we need to build a method to increase the number of images and balance four types of disease in apple leaves. From the images in the first dataset, authors apply Synthetic Minority Oversampling Technique (SMOTE) to double the quantity and balance four ratios of each classification to the dataset. In addition, image processing methods was applied to rotate image, crop image, zoom in, zoom out, flip image horizontally and vertically, change image's brightness and transparency, etc.

B. Our methods

The figure below illustrates the way to process the problem in this article. We use the Neural Architecture Search (NAS) to design a new baseline network and scale it up to obtain a family of deep learning models. Indeed, compound scaling method will be applied to resize the dimensions of our network. Hence, it is important to find the scaling coefficients for each of the dimensions to be scaled-up. Appropriate coefficients can lead to better performance.



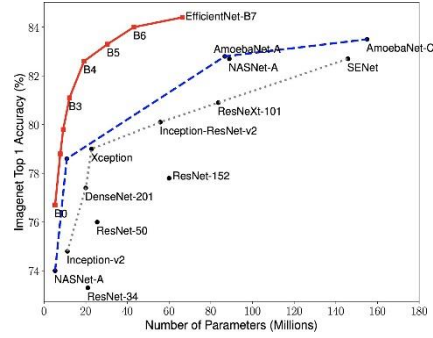
In this research, we propose three types of CNN model to identify leaf disease.

EfficientNetB7 model will be implemented on four classification of leaf disease. The following figure shows the structure of EfficientNet models.



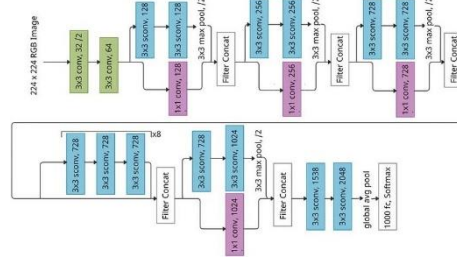
EfficientNetB7 are designed with a strategy to optimize the scaling coefficients. Under a fixed resource constraint, the model uses applied grid search strategy to find the relationship between the different scaling dimensions of the baseline network. Therefore, the appropriate scaling coefficients for each of the dimensions are found simply and straightforwardly, resulting in improving the model's accuracy and efficiency. Two figures below presents comparisons of EfficientNet's performance with other powerful transfer learning models when worked on the same dataset. It can be said that EfficientNet- B7, which is the latest version of EfficientNet, has the highest accuracy among all with less number of parameters [13].

Models	Top-1 Accuracy	Top-2 Accuracy	Top-3 Accuracy
EfficientNet B0	83.02%	93.80%	97.39%
EfficientNet B1	83.69%	93.90%	97.34%
EfficientNet B2	83.95%	93.75%	97.39%
EfficientNet B3	83.90%	94.63%	97.65%
EfficientNet B4	87.91%	95.67%	97.81%
EfficientNet B5	87.62%	94.59%	97.55%
EfficientNet B6	85.36%	94.01%	96.97%
EfficientNet B7	85.52%	94.84%	98.12%



In addition, **EfficientNetB4 model** will also be proposed. An old generation of EfficientNetB7 was chosen to check the efficiency of EfficientNetB7: whether it is better or worse.

Lastly, **Xception model** will be used in this article. The figure below shows the same speed between Xception and EfficientNetB4 when worked on the same dataset, so that the authors will do experiments to test if the accuracy of each mentioned model are still the same.



After determining the three types of CNN model, we proceed to build each of them based on basic methods. Afterward, we conduct adjustments of processing to optimize the models. In this paper, we perform two following ways:

Firstly, we can present some digital image processing technology. For instance, we rotate photos horizontally as well as vertically, and change image's brightness. Another method is to morph the image (zoom in/out, crop left/right) in combination with changing image's brightness.

Secondly, we are trying to adjust the model's structure. Please note that the structures of three chosen models (Efficient-NetB7, EfficientNetB4 and Xception) based on complicated process are still maintained. We only affect and adjust the later layers of each model. Besides, instead of just using two layers *GlobalAveragePooling2D* and *Dense*, in this process, we are adding additional layers such as: *MaxPooling2D*, *Flatten*, *BatchNormalization*, *Dropout* and *Dense*.

Finally, choosing the right hardware configuration for the problem is still an important step. In this paper, authors use available resources provided on **Kaggle** and train the models by GPU. Furthermore, **wandb** is such a great website for graphing. Indeed, we are going to illustrate the obtained results in each model through

wandb, which will help us have a more intuitive view about our results.

IV. EXPERIMENTS

C. Data handling

The original data folder utilized for the training process is split into two sub-folders to build as well as to test the proposed models. When building a model, the SMOTE method is used to increase the image count as in addition to guaranteeing that the quantity of images of each category is equal to one another. The images are analyzed via three-dimensional matrixes, the latter's databases are then normalized so that each section has a value in the range of [0, 1]. The figure below shows how we perform data handling step by step.

```
train_image=[]
for name in dataset['image_id']:
    path= '../input/plant-pathology-2020-fgvc7/images/'+name+'.jpg'
    img=cv2.imread(path)
    img=cv2.resize(img,(img_size,img_size),interpolation=cv2.INTER_AREA)
    train_image.append(image)

fig, ax = plt.subplots(1, 4, figsize=(15, 15))
for i in range(4):
    ax[i].set_axis_off()
    ax[i].imshow(train_image[i])

from keras.preprocessing.image import img_to_array

x_train = np.ndarray(shape=(len(train_image), img_size, img_size, 3),dtype = np.float32)
i=0
for image in train_image:
    x_train[i]=img_to_array(image)
    x_train[i]=train_image[i]
    i=i+1

# 255 la thang mau
x_train=x_train/255
```

The following figure presents the process of data augmentation with random adjustments. We perform multiple image transformation such as: rotation, shear, shifting, scaling, flipping, filling and changing image's brightness. The function ***ImageDataGenerator*** in **keras** module will be used here.

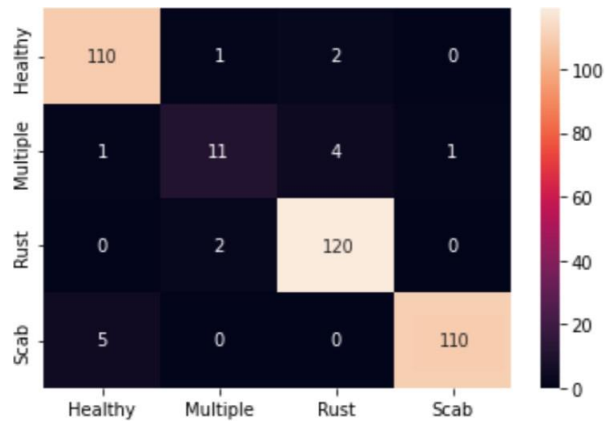
```
datagen = ImageDataGenerator(rotation_range=45,
                              shear_range=.25,
                              zoom_range=.25,
                              width_shift_range=.25,
                              height_shift_range=.25,
                              rescale=1/255,
                              brightness_range=[.5,1.5],
                              horizontal_flip=True,
                              vertical_flip=True,
                              fill_mode='nearest')
```

The figure below shows our obtained results after implementing data augmentation.

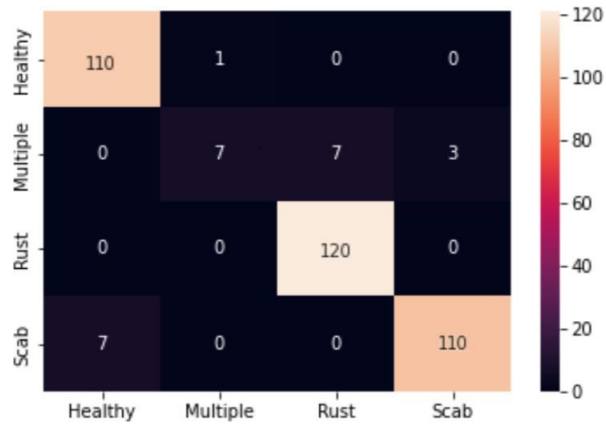


D. Stimulation results

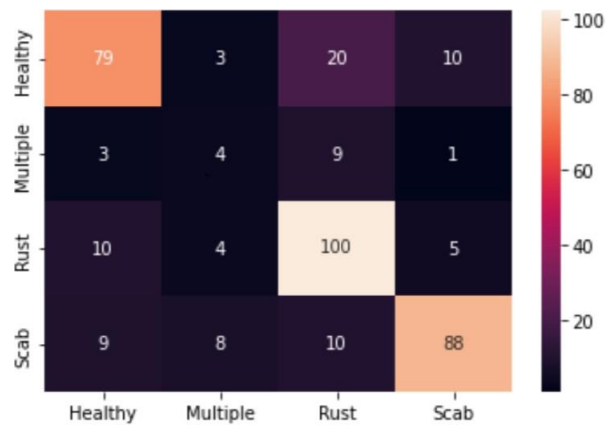
The figure below demonstrates the result when using Effi-cientNetB7 Model.



The figure below demonstrates the result when using Effi-cientNetB4 Model.

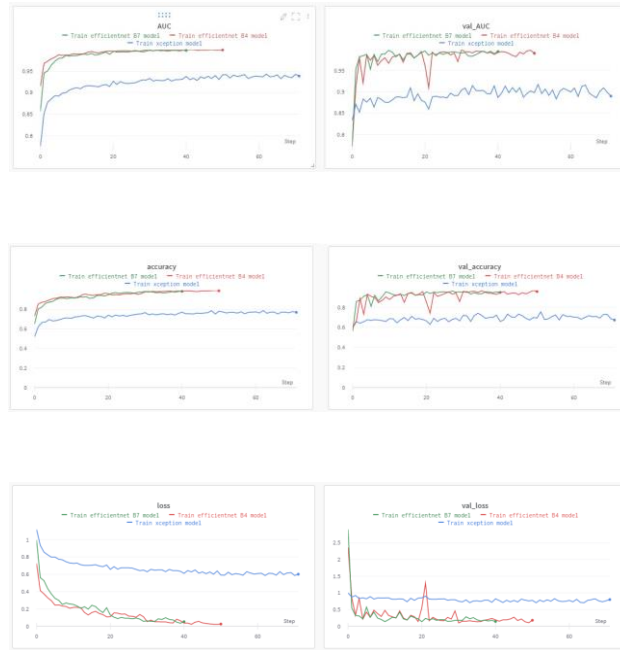


The figure below demonstrates the result when using Xcep-tion Model.

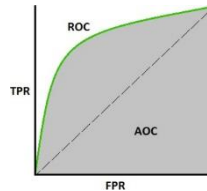


E. Analysis the results

The following figures illustrate our training process [14] and shows comparison between the three mentioned models.



The AUC - ROC curve is used to evaluate the efficiency of the model. This is the method to tell how much the model is capable of distinguishing between classes. ROC is a graphical plot that illustrates the diagnostic ability of a binary classifier system, and AUC represents the degree or measure of separability. Both the former and the latter track the level at which the model can differentiate/categorize the classes. With a high-proficiency AUC, the model can theoretically fluidly distinguish between classes when it is applied for diseased leaves and thriving ones.



These are our final result when submitting:

EfficientNetB7: 0.96137

EfficientNetB4: 0.95236

Xception: 0.80902

Therefore, EfficientNet model have higher performance than others. Among them, EfficientNetB7 achieves the highest accuracy.

F. Optimizing process with the best model

With the best gained result after experimenting, Efficient-NetB7 is the most effective model. In addition, to increase the result, we will perform some extra experiments.

- Make changes to the images augmentation forms: As described above, it will be done in two ways, the common point is that they both use image color changes and the difference here is to change the image layout and keep the image layout.

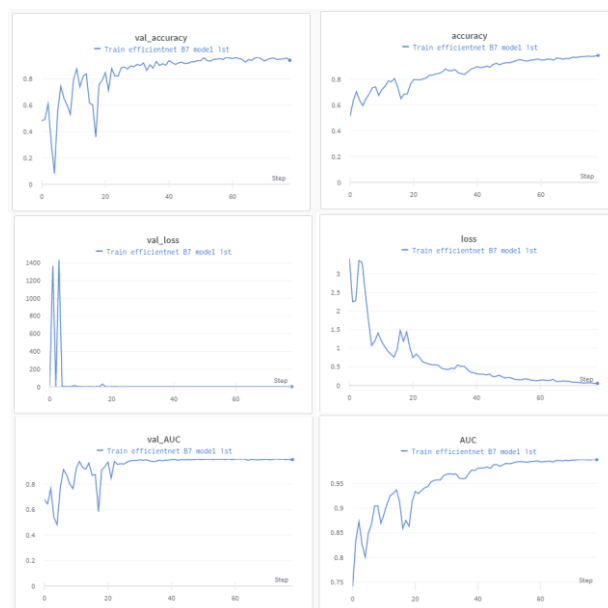
- Method 1: Make changes by rotating the image. This will still preserve the layout of the image.

```
datagen = ImageDataGenerator(
    brightness_range=[.5,1.5],
    horizontal_flip=True,
    vertical_flip=True)
```

Example of image processing:



Result: Looking at the graphs during the run, it can be seen that the model gives very good results. However, when using the model in evaluating the test data set, the result is only 0.475. Prove that the model is overfitting. And the reason for this problem may be that the processing by rotating the image and changing the brightness cannot produce a very different image, which can lead to a lot of duplicate data so the model was not able to give out a good result.



- Method 2: Make changes by changing the aspect ratio. This will change the layout of the image randomly according to the requested selections.


```

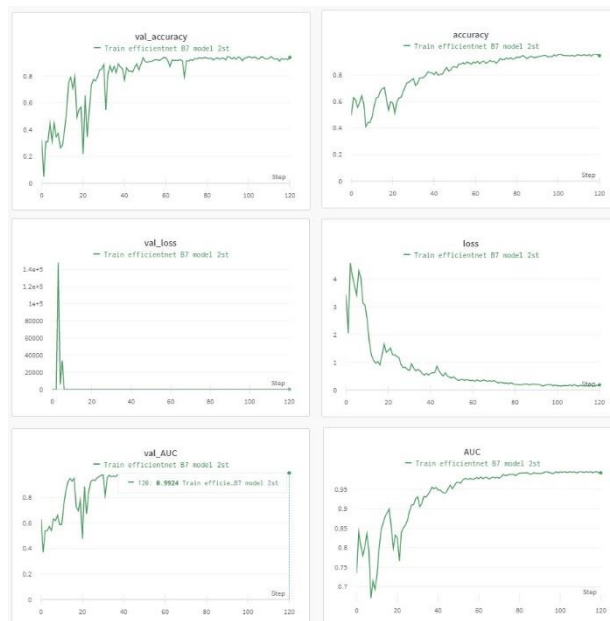
datagen = ImageDataGenerator(rotation_range=45,
                             shear_range=.25,
                             zoom_range=.25,
                             width_shift_range=.25,
                             height_shift_range=.25,
                             rescale=1/255,
                             brightness_range=[.5,1.5])

```

Example of image processing:



Result: Looking at the graphs during the run, it can be seen that the model gives very good results. And when using the model in evaluating the test dataset, the results are still very good(0.9523), but the results are still not greater than the times performed on the original model. It has been shown that scaling parameters are more beneficial than image capture, and that image capture will only yield good results when further aided by changing the aspect ratio.



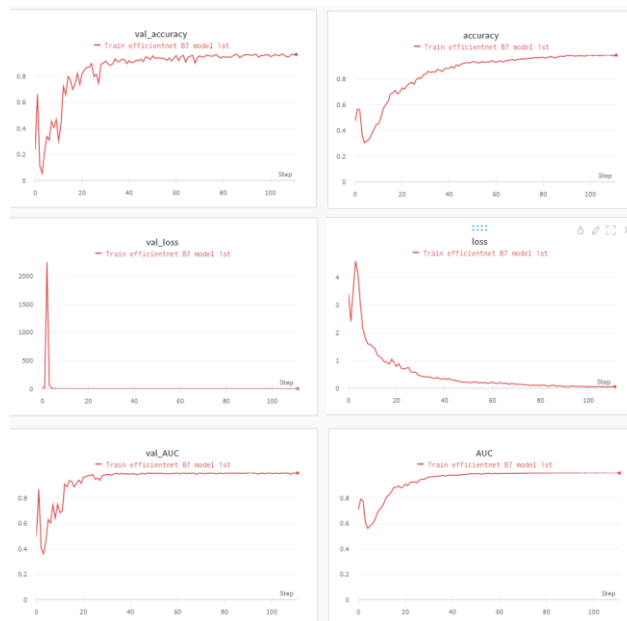
Make changes to model handling classes: As suggested above, this section will proceed to change the processing layers after having processed the image using the EfficientNet B7 model architecture. Now the model will be built with the following architecture:

```

model_efficientnet_b7 = tf.keras.Sequential([
    efn.EfficientNetB7(
        input_shape=(img_size, img_size, 3),
        weights='imagenet',
        include_top=False
    ),
    keras.layers.MaxPooling2D(pool_size=(2,2)),
    keras.layers.Flatten(),
    keras.layers.BatchNormalization(),
    keras.layers.Dropout(0.3),
    keras.layers.Dense(4, activation='softmax')
])

```

Result: Looking at the graphs during the run, it can be seen that the model gives very good results. And when using the model in evaluating the test data set, the result is very good (0.975), which is the best result currently. It is demonstrated that changing the processing classes has yielded better results for the current learning model.



IV. CONCLUSIONS

About building models: After testing on models, the results are achieved at a high level. However, in order to be able to implement the disease identification problem in practice, our team thinks that only the model using EfficientNet B7 architecture can be applied, because this model achieves high results. Show that when used in practice if needed on larger and more complex data sets, just add data processing steps to give good results.

About improving experimental results: this treatment brings good results for this problem. Through this testing, it is shown that if you want to improve the model, you can add more processing steps to the model or change the data approach with data

change methods.

Model development directions: with the results obtained after testing, our team finds that the model can be used in practice to assist farmers in dealing with leaf disease problems. Our team aims to use the model with additional data collected from diseases on different types of leaves so that we can check how accurate the experiment is and from there there will be improvements. follow-up in this research model.

v. DISCUSSION

Overall, EfficientNetB7 Model provides early diagnosis and accurate identification of apple leaf diseases. Besides, it is a feasible and effective solution for farmers, which can be put into practice and implemented on various devices, without requiring high costs. In addition, the model can be improved and other problems can be handled to better support identifying of plant leaf diseases.

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ESSENTIAL OF DIGITALIZATION IN WAREHOUSE GENERAL ANALYSIS ON GIAO HANG NHANH WAREHOUSE

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I. INTRODUCTION

The Council of Supply Chain Management Professionals (CSCMP) defines logistics as the process of planning and implementing the efficient transportation and storage of goods from the point of origin to the point of consumption. The purpose of logistics is to meet client demands in a timely and cost-effective manner. The exchange of commodities and trade in domestic and international regions is an essential part of any economy. As a result, logistics has become an important aspect of countries' socio-economic activity all over the world. The logistics system ensures that exchange, commerce, transportation, and storage are all carried out properly, additionally, resource coordination for timely supply and utilization of raw materials can increase an enterprise's strength. Furthermore, if products are not created and delivered in a timely manner, customer satisfaction levels may fall, also, negatively affecting operations, profitability, and the company's survival.

Logistics contributes significantly to GDP (Gross Domestic Product) and has a massive effect on currency devaluation, bank interest rates, labor productivity, gasoline costs, and other elements of the economy. According to statistics from logistics research organizations, logistics costs account for above ten per cent of GDP in developed countries such as Japan and the United States; around 15 and 20 per cent in developing countries; and almost 25% of GDP in Vietnam. Logistics costs make for a substantial portion of the economy's expenditure; it influences and is influenced by other economic activities. Logistics development will reduce costs, ensure time and quality for other economic operations, and increase productivity. Transportation-related services, cargo handling services, warehousing services, and other auxiliary logistics services are some of the numerous categories of logistics services. Because of the growth of cross-border e-commerce and the increased demand for integrated supply chains, warehousing services have undergone major modifications combined with automation in 2019. As a result, demand for next-generation warehouses for the last delivery is higher than ever, and this is the fastest-growing category in the global warehousing market.

A warehouse is a building that stores products for stocking, packing, and shipping preparation. Warehouses are considered as the central locations that operate both inbound and outbound logistic process. Maintaining a warehouse is crucial for any business that sells physical goods or receives products from a wholesale marketplace. Depending on a company's needs or preferences, multiple service providers may handle separate warehouse-related tasks. There are diverse types of warehouses for different businesses, but every warehouse provides secure storage for products.

II. BRIEF INFORMATION

1. Overview of Vietnam Logistic market

In recent years, international trade has been constantly growing owing to the trend of globalization and economic integration between countries, creating many opportunities for import-export businesses. In particular, logistics services, especially with the warehouse service, are the significant components directly contributed to the success of the international trade. In developed countries, businesses increasingly tend to outsource human and material resources in emerging markets such as Southeast Asia to save costs effectively in production. Vietnam is considered one of the most attractive emerging markets with abundant natural resources, cheap raw material costs and lower wages for foreign investors. In addition, the geographical position of Vietnam is also an important link between Southeast Asia and Southeast Asia and is an important sea link with the world. A developing number of companies are moving to fabricate from China to Vietnam, which may be great news for logistics operators as demand for warehousing and street transportation administrations rises in couple with fabricating development. The current surge in e-commerce in Vietnam should give opportunities, especially for businesses fascinated by last-mile delivery and value-added distribution services.

Logistics is one of the fastest expanding sectors of Vietnam's economy, whose growth may outpace GDP (Vietnam Briefing, 2020). According to the General Statistics Office of Vietnam, Vietnam's GDP increased by 7.02 percent in 2019, with exports rising by 8.1 percent to US\$263.45 billion (about \$810 per person in the US) and imports rising by 7% to US\$253.51 billion. Since joining the World Trade Organization (WTO) in 2007, a growing number of foreign investment capital has flowed into Vietnam to establish and develop trans-border manufacturing and assembly operations, resulting in a greater demand for logistics services to complete the global supply chain. The Vietnamese government aims to achieve an annual logistics growth rate close to 20 percent by 2025 (Vietnam Briefing, 2020). With a low proportion of 7.40 percent, Vietnam's logistics industry has a fierce and dynamic future. According to data reported by CRIF D&B Vietnam in 2019, the logistics industry in Vietnam has a positive and continuous growth trend, with sales revenue increasing by 6.8% from 305,825 million VND in 2017 to VND 325,294 million in 2018 and to VND 332,634 million in 2019. The gross profit margin also increased from 12.23 percent in 2017 to 12.46 % in 2018, and to the highest level of 12.68 % in 2019.

In Vietnam, the logistics market is dominated by SMEs that provide low-value-added services. More than 90% of the country's 3000+ logistics companies have registered capital of less than \$430,000 USD. The remaining 5% have capital more than US\$860,000, while the rest have capital in the range of these figures. Domestic logistics firms compete fiercely with one another as well as with foreign players. Foreign players control three-fourths of Vietnam's logistics market, accounting for

three-fourths of its revenue. In Vietnam, over 30 companies provide international logistics services, including well-known names like DHL, FedEx, and Maersk.

In 2021, Vietnam's socioeconomic is heavily affected by the 4th Covid-19 epidemic, with extended periods of social distancing as well as production and communication interruption. In this context, service logistics is both directly affected and must demonstrate the endurance to maintain the operation of domestic supply chains as well as export goods. According to Ministry of Industry and Trade, the logistics market in Vietnam is evaluated by the business community (DN) and international organizations as a potential market for strong development, especially after the pandemic. The Covid-19 epidemic is under control and production and business activities recover and grow again.

2. Brief information about Giao Hang Nhanh

According to the Vietnam Logistics Association (VLA), there are approximately 1,300 firms are operating in the broad field of logistics, state-owned companies accounted for 20%, over half of the total are limited liability companies and 10% are private enterprises. Giao Hang Nhanh (GHN) is one of Vietnam's most well-known logistics companies, which was established in 2012.

In 2015, GHN offered service to 63 provinces around Vietnam and it also launched the AhaMove service, providing express delivery service around 30 minutes to 4 hours within Ho Chi Minh City and Hanoi. After one year, GHN launched their post office system nationwide, for instance, by 2019 the total number of GHN post offices had officially exceeded 500. With the improvement and enhancement of service quality to promptly meet the diverse requirements of customers, in 2017, GHN launched transportation services for businesses such as GHN Logistics and warehouse services. The company owns more than 1000 trucks, a special delivery network and more than 100,000 square meters of warehouses across provinces and cities in Vietnam, helping businesses to operate more efficiently. As a result, they can save a huge amount of costs and infrastructure. In addition, 2018 was an outstanding processing milestone for GHN's operating system as GHN achieved the ability to process 500,000 orders per day.

With the slogan “Whether you own a large e-commerce site or are simply an ordinary seller - GHN is always ready to provide professional services for you.” They always dedicate themselves to provide the best delivering services. The passion for quality has helped GHN achieve incredible achievements over the past 8 years:

- 10,000,000 orders are successfully delivered every month
- More than 100,000 online shops and businesses have trusted
- Strategic partner of Tiki, Shopee, Lazada, Sendo, etc.

- Delivery network covering 100% of 63 provinces
- Reach processing speed of 500,000 orders/day

III. STRENGTHS AND WEAKNESS OF GIAO HANG NHANH WAREHOUSE

1. Strengths

For every business and their production activities, warehouse is one of the most essential parts of the supply chain. It is not only help businesses solve their concerns about storage space, preservation, delivery, and packaging of goods but also optimize companies whole supply chain system and help to create time utility as goods are only distributed when they are needed.

Giao Hang Nhanh, nowadays, is considered as the leader in the small package delivery industry. They are proud to be the first 100% automated sorting system in a fulfillment warehouse in Vietnam, with elevated level of package pickup, sorting, and delivery efficiency. This is achieved by applying barcode scanning technology which each parcel has their own barcode and each barcode is made by a database that have all information about its destination and expected delivery time. Using automated sorting system helps the company to reduce the cost of hiring employees, they were able to cut down to about 3/4 of the number of employees, save 2-3 hours to the same day orders and increase the success rate by 25-30%, compared to before about 60%.

Besides that, Giao Hang Nhanh also pride themselves in managing the entire system by using API integration portal. This helps both the company and its customers to easily check the status of goods, monitor the material handling process, follow the delivery journey. From this system, Giao Hang Nhanh can easily retrieve transaction history to manage the number of import, export and inventory units and increase order fulfillment speed and accuracy. Therefore, enhance management and control of any issue during the delivery process and allows them to maximize asset utilization and network efficiency with many people working on something at the same time. Especially, technologies that the company uses to apply to the system are developed directly by the company. They continuously allow employees to experience each step to find the problems and this approach helps the company to have the right system and the company can also change or develop the technology if needed in the future.

About warehouse location, we passionately believe that the location of the warehouse is extremely important. It is said that a warehouse is 30 minutes away from the airport is much better than the one that is 2 hours away. As a result, Giao Hang Nhanh has put a lot of effort and invested in having the best location for their warehouse like near the airport, train stations or industrial areas. It is also selected to be located on the main roads so that customers can access easily. Because to the company, investing in where the warehouses will be is not only about the convenient of the customers

and the company's operation process, but it also helps to increase the brand awareness and reduce the carbon footprint. Till 2019, Giao Hang Nhanh has successfully owned 1000 warehouse in Vietnam with total area is about 100.000m² so they can be ready to satisfy needs of customers at any time including in peak seasons

2. Weakness

Logistics is a major issue in an e-commerce market. If we work in the order fulfillment or materials handling industries, we should know that automation is unavoidable. Over the last few decades, new warehouse automation technologies, systems, and tactics have exploded, to promise the competitive, less wasteful and eventually lucrative operations procedures, for example, particularly the Giao Hang Nhanh's automated sortation. When the company expands and evolves, operational adjustments can provide a wonderful opportunity to increase profitability and efficiency, and customers' desire for faster delivery can really set a company apart. GHN is preparing to scale up to take the lead in Vietnam's logistics market. There are various drawbacks to automated handling, like with any system, that should be addressed before making the switch. However, these drawbacks are a small price to pay given the numerous benefits of automation.

The most significant disadvantage of an automated sortation system is the high initial and ongoing expenditures. This indicates that the equipment's selling price is high, which is a barrier that inhibits many businesses from obtaining it. It also necessitates frequent maintenance to keep them in functioning order. As a result, maintenance must be performed with caution.

The operation is complicated, yet, needing GHN to have critical understanding of the equipment as well as competence. Employees should use accumulation conveyors, pick the optimum speeds, release modes, and alignment throughout the entire system while conveying fragile or light-weight products. To ensure accuracy and safety when installing, programming, or changing the settings of the system, some expertise must be performed. Furthermore, deploying automated sortation systems in places with high security and privacy needs might be dangerous if they are exploited

Machine breakdowns or malfunctions are always the top disadvantages of the Giao Hang Nhanh Warehouse system, resulting in bottleneck of delivering packages. If the problem is serious and we cannot fix it, Giao Hang Nhanh must employ a technician and purchase the components, which will lead to the waste of capital and human resources.

IV. PRACTICAL SOLUTION

1. Training the human resources

Since human resource is the valuable components of any business, Giao Hang Nhanh must consider on educating and controlling the quality of the human resources. In response with the 4.0 technological era, Giao Hang Nhanh has 10 Sorting warehouses and 2 Auto- sorting warehouses with several types of modern machines and facilities. Hence, to adapt with these evaluations, Giao Hang Nhanh must effectively train the employee's profession to satisfy the demand of the significant development of the logistic industry. In fact, there is no answer as to how much training duration should be spent on new employees but depend on the variability and complexity of the job. Knowing the specifics of the job is important, however, regularly updating and evaluating the executives is the essential part for high- quality human resources management, especially for the warehouse service- key component of the Giao Hang Nhanh success.

In addition, it is important for warehouse operators to know what is expected of them. Warehouse employees, by themselves, will discover how to successfully complete their works or even behave appropriately with the company's corporate culture. However, we passionately believe that Giao Hang Nhanh must provide some quantitative measures to let employees understand what is anticipated from them, for example, the rate of productivity through controlling the output rate, the defective rate of inventory classification, etc. Besides, these standards should be targetable, verifiable and measurable which is based on the status of the whole business.

2. Upgrade the scales of warehouse and apply Automatic Material Handling technology

In general, Giao Hang Nhanh has 12 sorting warehouses (including 2 automatic classification warehouses) and 500 distribution centers. With the extreme demand of Vietnamese people, especially from a post - Covid 19 pandemic period, while people are get used to using the E-commerce services, Giao Hang Nhanh must face off with the difficult problems in handling inventory. Since its distribution centers are nationwide with 63 provinces, Giao Hang Nhanh should upgrade their warehouse's capacity to maintain the effectiveness and the timeliness of their shipping service. For example, they can improve the quality of roller conveyor or apply the Automated Storage & Retrieval System (AS/RS) in arranging the products.

In addition, they should regularly synchronize the technology and application that is used for material handling. For instance, instead of using a traditional method for checking and arranging products from other companies, Giao Hang Nhanh can establish an entire system using artificial intelligence technology for tracking and automatically suggest the appropriate ways for handling materials.

3. Setting the suitable standards and work tracking

Every activity and procedure for transferring a product from the time it arrives at the warehouse until it departs must follow a set of rules. This procedure is designed to

promote job efficiency while also meeting the needs of each stage, each employee, and, most importantly, the transportation process. We cannot quantify results without a process, even when staff are at their most productive or comfortable.

We can verify that all staff are working to the same standards by using automated procedures. Most significantly, we may compare each employee's performance to the process segment's criteria. When issues occur - such as rising operating expenses or a need for a speedy audit - a brief review of the current process may frequently quickly reveal bottlenecks in the workflow. If the issue is one of performance, management may engage with staff to immediately address deviations and restore workflow.

Remember that our staff are at the center of your warehouse operation before examining and modifying it. Workflows rely on people to execute activities, enhance them, and increase the efficiency of your warehouse. If we want to improve the efficiency of your process, include our staff. Create a feedback loop and ask our staff to tell you how they think each activity may be made better. Although some measurements are necessary, even seemingly minor improvements to packaging and material handling processes can result in significant waste reduction and revenue loss for GHN.

We should implement the standards for overcoming problems such as:

- + Monitor the rate of damaged products and promptly handle them.
- + Limit travel time between warehouses or during storage to ensure work efficiency for each stage and the whole cycle.
- => Develop a process for receiving, checking documents as well as documents and documents required to import, export, and circulate goods.
- + Maintain a good relationship with suppliers to cooperate in the import and export process of products and materials => receive favorable price incentives or improved product quality.
- + Monitor and periodically take inventory of actual inventory to accurately compare with inventory on the system.

Apply the following forms of inventory:

- Actual inventory
- On-site inspection: when the actual inventory at the end of the year will encounter many problems or the amount of goods in the warehouse is too large, you can perform regular spot checks during the year.

-Cycle check

If the physical inventory is done every year, then the cyclical method of counting can be done weekly, monthly, or even quarterly.

- + Understanding the amount of inventory is also a way for managers to control the amount of goods in / out.
- + Monitor the amount of goods and inventory every day, ensuring that the goods and materials are at the minimum stock level.
- + Evaluate and adjust minimum inventory levels based on fluctuations of each type of goods.
- + Periodically check the quality of the operation chain and the product quality for perishable or fragile goods.
- + Set environmental regulations, limit employees' activities that affect goods and machinery.

Ensure safety, especially regulations on fire protection and warehouse safety for workers and products.

Always make sure to periodically check the warehouse infrastructure to avoid quality problems such as moisture, termites, and damage that affect product quality and the reputation of the GHN system.

V. CONCLUSION

In the current context of extensive regionalization and globalization, the demand for freight transport is higher than ever, this is also an opportunity for Logistics to develop. Countries and businesses around the world, thanks to an effective logistics system, can easily access input sources easily and choose a reasonable production location to bring their products everywhere in the world at the lowest cost. Besides the trend of globalization, the development of technology that leads to the strong development of e-commerce is also an opportunity for Logistics. With the increasing trend of e-commerce, sales units will need units to help transport goods to their customers. However, coordination in Vietnam has not yet developed despite its enormous potential and opportunities. In the context that the logistics industry in Vietnam has not been developed in general, GHN has emerged as a leading company in the field of Logistics in Vietnam with service quality on par with US, Korean and Chinese standards. Researching on GHN, it can be drawn that the crucial factor for the success of GHN comes from the foresight of the managers at GHN. Managers recognize exactly what are the key issues and do not hesitate to invest heavily and innovate to help GHN become increasingly perfect. GHN's determination to make a

difference is reflected in the 100% automatic goods classification system, which completely changed the landscape of the logistics market in Vietnam and turned GHN into a leading company in the field. Logistics sector.

EYE-SCANNING MOBILE APPLICATION FOR INITIAL MEDICAL ASSESSMENT

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SUMMARY:

Our objective is to develop an effective, convenient and economical method of health screening to properly diagnose and treat diseases before development into the chronic stage since some symptoms are often overlooked or assumed to be unrelated. Our course of action is to develop a smartphone application that uses the camera to scan the users' eyes for early warning signs of diseases and inform them of potential health risks since there are various illnesses with eye-related symptoms. Hence, we aim to create an application that uses a smartphone camera to scan users' eyes for signs of common diseases. By detecting early warning signs of illness and informing users, our application actively helps avoiding chronic developments with timely notifications. This alleviates the burden on healthcare systems as more resources can be reallocated from health scanning and diagnosis to treatment and therapy. Clinical conditions such as endocrine diseases (diabetes, hypothyroidism), infection, cataracts, etc. are characterized by ocular symptoms and thus can be recognized by AI pattern-learning model. We built the application with Python for the Back-end processing, Javascript for Front-end interface, Convolutional Neural Network (CNN) and deep learning techniques for disorder classification. The deep learning algorithm has high sensitivity and specificity for detecting common eye diseases, which helps enhancing the accuracy of diagnosis and further our goal to make the application commonplace among the population. This application includes 5 phases: (1) Loading eye disease images dataset. (2) Image classification model python - data preprocessing. (3) Building a Convolutional Neural Network (CNN) image classification python model from scratch. (4) Applying Transfer learning techniques to achieve a high-speed process. (5) Evaluating the performance of the photo classification model. AI-assisted medical diagnostic systems are primarily applied in the field of the aforementioned medical imaging. The diagnosis of the disease that relies on natural observation mainly depends on the doctor's personal experience. One example is skin lesion; the current AI algorithm can differentiate malignant melanoma from benign lesions on digital skin photographs. Technology will be used increasingly in daily life, which includes implications in the healthcare industry. We want to create a positive impact on healthcare by creating useful medical apps for initial medical assessment, so people can detect and treat diseases early.

KEYWORDS: *Convolutional Neural Network, AI, eye diseases, Python, deep learning.*

1. PROPOSAL AND RESEARCH OBJECTIVES:

1.1. Proposals:

According to our research, the incidence of chronic diseases such as hyperthyroidism, infection, stroke, etc. has been increasing steadily. Although these illnesses could be predicted in the early stage through some minor symptoms, which are usually ignored and expected to dissipate over time. It is worth mentioning that vision loss due to eye disease may be avoidable through early diagnosis and appropriate therapy. Certain diseases can be identified from ocular conditions before manifestation elsewhere, such as hyperthyroidism from bulging eyes and high blood pressure from unusual bends, kinks or bleeding of blood vessels at the back of the eye. Observing the ocular surface, primarily the cornea, pupil, and conjunctiva is the foundation of eye disease diagnosis. However, this highly depends on the grader's clinical background and may have variants on the same patient. Automated classifying of medical images could be used to handle these issues by reducing the physicians' workload, increasing efficiency, and improving patient prognosis through early detection and treatment. Recent advances in deep learning algorithms, in particular convolutional neural networks (CNN), have made it possible to learn the most predictive disease features directly from medical images when given a large dataset of labeled examples. Deep learning for medical image classification is a crucial technique of computer-aided diagnosis systems today, and is currently being researched by various institutions from around the world. Qure.ai, a company that provides cost-effective, timely, and expert diagnoses everywhere, uses deep learning algorithms to recognize and localize abnormalities on X-rays, MRIs, and CT scans, which has been proven practical and effective for COVID-19. These algorithms are being used for the early detection and diagnosis of the infection, as well as for developing drugs and vaccines to reduce the load on healthcare workers and fast-track the process. This study aims to develop an effective deep learning algorithm for multiple eye disease identification by processing ocular surface images. Our AI model was trained based on images covering the whole ocular surface image, and this allows our algorithm to detect the pupil area, corneal, and conjunctiva. The algorithm's diagnostic performance will then be evaluated. To avoid overfitting issues with deep learning algorithms, our database will be divided into training, validation and testing.

In conclusion, our main motivations for this proposal are the readiness of technology, the frequent usage of smartphones, and the benefits to the healthcare system through faster and more accurate diagnosis should it be applied and expanded upon.

1.2. Research Objectives:

The project consists of six main stages:

- (1) Building a database of eye disease images using Kaggle
- (2) Image classification model - data preprocessing, which includes loading validation and test data, preprocessing and batch generation.

(3) Building a Convolutional Neural Network (CNN) image classification Model in Python. A Convolutional Neural Network is the basic building block of any model working on image data. There are several lists that we use to get a good performance: Train for more epochs, change the batch size or tweak the neural network. Checking out all of these options takes time and may or may not be successful. In order to be more time-efficient, transfer learning is used instead of trials and errors.

(4) Transfer learning. Transfer learning uses neural networks which are pre-trained from billions of images for different tasks. They can operate more effectively at learning these abstract features than an untrained, newly-built neural network.

(5) Assessing the performance of the image classification model.

(6) Creating a user interface to combine with the model.

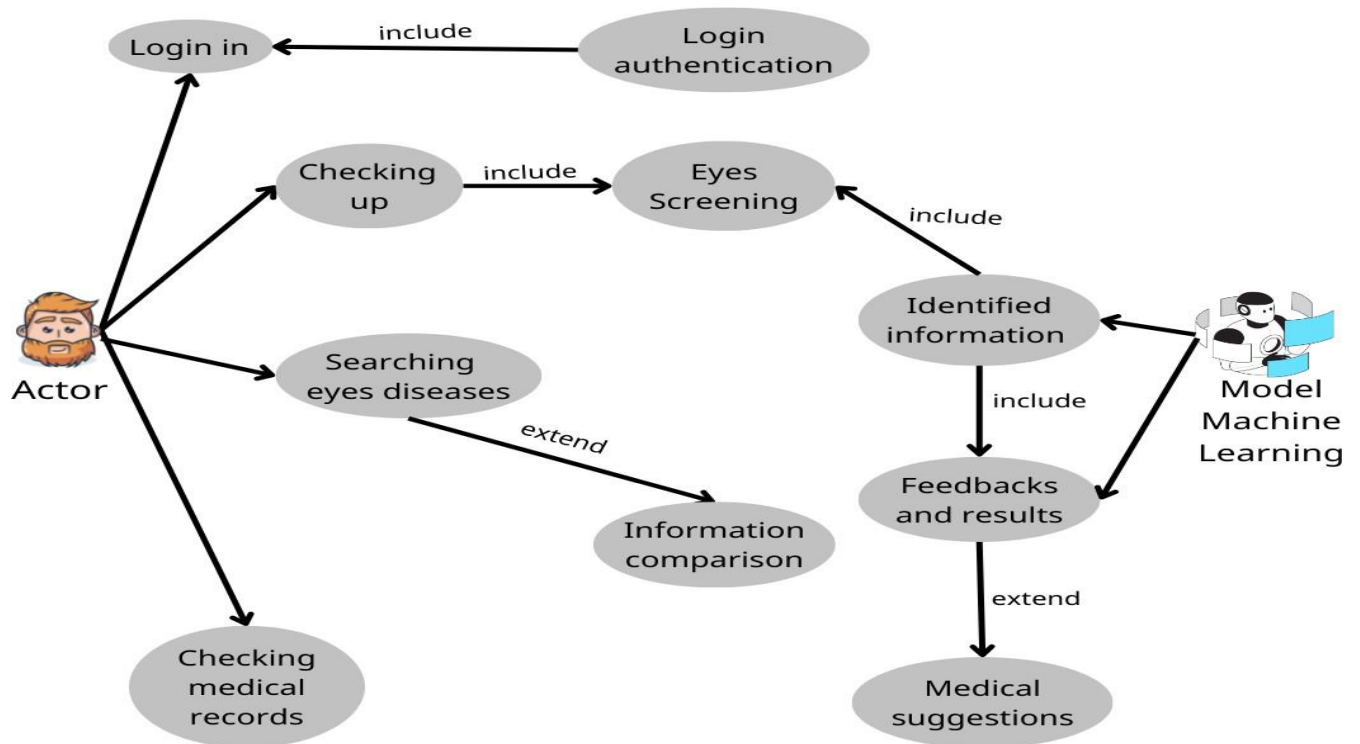


Figure 1.1. Eye-Scanning Mobile Application's User-Flow

2. RESEARCH METHODOLOGY:

2.1 Tools/Technology Used

In the current study, the majority of our dataset comes from Kaggle. Several classifications of algorithms will be used in the medical domain, reliability and high confidence.

Images are first processed by OpenCV before being used for classification modelling with Keras and Tensorflow. OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. TensorFlow is an open-sourced end-to-end platform, a library for multiple machine learning tasks, while Keras is a high-level neural network library that runs on top of TensorFlow. Both provide high-level APIs used for easily building and training models. The AI model itself is then trained using sample scripts in Python and R. Our dataset is divided into three directories for training, validation and testing. There are two folders - one including eye disease images and the other containing standard eye disease images for each directory. The training data is then loaded into a data frame with two columns: one for picture labels and the other for image paths. Then, we load the test and validation data, perform some preprocessing, and create batches. To turn photos into a form the model can understand and improve the efficiency of the algorithm, preprocessing is necessary. The model uses the network to process the first batch, after which a loss is determined, and the gradients go backward to change the network's parameters. Until we achieve our desired loss and training ceases, this process is repeated. We write a function to generate images in batches from the train set. Next, we built a Convolutional Neural Network Image Classification Python Model from Scratch. From left to right, then top to bottom, the filter is systematically applied to each overlapped section or filter-sized patch of the input data. Prior layers' convolutions train to recognize abstract elements like edges, textures, etc. They develop the ability to recognize more specific things, such as eyeballs, in the last layer.

As we move up the network, the layers learn more specialized patterns for the task they are being trained for. The initial levels learn extremely general features. Pre-trained models are more capable of learning these abstract properties than a neural network created from scratch because they have been trained on a large number of images. Fine-tuning is a step up from basic transfer learning, where a new classification layer is added to the network so that the final layer's weight can be freed up for more learning capacity. All layers in transfer learning are frozen, with the exception of the classification layer. The initial layers are left frozen, while the bottom layers are retrained to fine-tune the model. We will utilize the pre-trained VGG16 and add our classification layer (Dense) at the bottom before freezing the network up until the second-to-last convolutional block

and retraining. VGG16 is a convolutional neural network model. It improves by replacing large kernel-sized filters (11 and 5 in the first and second convolutional layer, respectively) with multiple 3×3 kernel-sized filters. VGG16 was trained for weeks and was using NVIDIA Titan Black GPUs. After completing and evaluating the performance, we design the user interface (front-end) using Angular. Angular is highly usable and comes with a range of features that allow developers to achieve a high speed to market. It also helps improve the app's performance by reducing the initial-loaded application size.

Next to the assessment, visual data is gathered and categorized into four types:

- The number of Normal people is predicted as Normal. These cases are called TrueNegatives.
- The number of people with diseases but diagnosed as Normal is called FalseNegatives.
- The number of normal people diagnosed with the disease by the model is called False Positives.
- The number of people with the disease who are also diagnosed with the disease by the model is True Positives.

In order to minimize false negatives. We retrain this model on the same data from Kaggle with slightly different result values more detailed to its previous results. This method implicates taking a model and training it on a dataset until it optimally reaches a global minimum.

The quality of images screening by smartphones should be mentioned. Effectiveness, convenience, and economy is the objective. Any smartphone with a competent camera can be used, although people should try to get their hands on a more recent model with a 12-megapixel camera or above. Some kinds of smartphones meet this criterion but are not expensive, like Samsung Galaxy S8, Google Pixel 2, or newer. Moreover, we also put a guideline on getting quality images on the application, such as finding a room with good light, setting up a backdrop, and finding someone to help. Besides, Data Augmentation is an excellent technique to resolve low-resolution images, such as blurred and pixelated. Data augmentation is a process of artificially increasing the amount of data by generating new data points from existing data. Therefore, it improves model prediction accuracy.

Due to limited resources, our algorithm has been trained to determine only the ocular surface diseases listed in the datasets. Therefore, eye diseases with asymptomatic ocular surface are not included as results of diagnosis. Additionally, our current dataset is only at 80 percent of the desired size in order to accurately determine the diagnosis, thus part of our future work on this project includes expanding the current dataset for more accurate results.

3. CONCLUSION:

If AI can significantly improve with higher diagnostic accuracy, this shall greatly benefit patients suffering from eye diseases, saving medical resources and reducing societal burden. There is still a large population of individuals now suffering from disorders that could be predicted in the early stage through eyes and receive timely treatment. There are two approaches to improve diagnostic accuracy: One is to improve the physical training system and strengthen the professional education and training for physicians; the other is to develop a practicable one. The system uses artificial intelligence to aid in diagnostics. Our recent research shows that creating an AI system that uses clinical photos to increase the diagnosis precision for eye illnesses is technically feasible. To improve our AI diagnostic system to raise the diagnostic accuracy, a multi-modal learning model or a more suitable sequential learning model may necessarily be devised for future work.

We created a deep learning method with good sensitivity and specificity for identifying common eye illnesses based on an extensive collection of images of the ocular surface. These findings can be verified in the future from researches conducted on outpatient clinics. Further study is required to address the variability in pictures captured by various imaging technologies and enhance our algorithm for usage in clinical settings with various demographics. We anticipate that the routine application of our approach in a clinical context will lead to further advancements in diagnoses. Last but not least, it should be mentioned that deep learning algorithms gain from every new piece of Information being examined. As a result, we anticipate that consistent application of our approach in a clinical setting will lead to ongoing advancements in diagnoses. The real- world use of such an AI system to support doctors in clinical practice necessitates more rigorous clinical evaluations.

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<https://www.kaggle.com/datasets/naureenmohammad/mmu-iris-dataset>

ARTIFICIAL INTELLIGENT IN MARKETING: TOPIC MODELING

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SUMMARY:

The purpose of this study is to give a systematic review of artificial intelligence in marketing (AIM) in papers on the same topic and to connect authors and journals in order to gain a comprehensive understanding of the current state of knowledge. The author extracted 596 publications from the Web of Science and analyzed them using the Dirichlet method, natural language processing, and machine learning. According to the results, there is a lot of research on AIM, covering nine topics: (1) AI Marketing, (2) AI in Marketing Services, (3) Marketing Data Mining, (4) CEO and CMO Influence on Marketing Strategy, (5) Digital Marketing Research, and (6) Sales Robots, (7) AI-assisted recruitment, (8) AI-assisted purchasing, and (9) marketing technology. Also, customers, technology, study, research, systems, models, and business are some of the words that describe analytic techniques in the field. Research facilitates systematic examination of AIM issues and the development of related topics.

KEYWORDS:

Artificial intelligence in marketing (AIM), natural language processing (NLP), machine learning (ML), latent dirichlet attribution (LDA), big data, digital

1. PROPOSAL AND RESEARCH OBJECTIVES:

1.1. Proposal

Many businesses can benefit from the fast growth of artificial intelligence (AI) when they use it for marketing, especially during the COVID-19 pandemic. AI also makes it possible for universities to do a lot of interesting and fascinating research. People think that AI will be the most disruptive technology in the future. AI is also very important in business, manufacturing, and our everyday lives.

According to research by PwC, AI could add \$15.7 trillion to the global economy by 2030, which is 14% of the global GDP. This amount will come from increased productivity (\$6.6 trillion) and other things (\$9.1 trillion) (Rao et al., 2017). Because of this, China and the US are in a global race for AI. This has led many countries around the world, like China, South Korea, Japan, Finland, etc., to look for ways to build and develop AI in their own countries. Vietnam is a country as well. In customer-centered marketing that is more global, focusing on their needs helps the organization grow (Vetterli et al., 2016), so that it can meet customers' wants and needs while still being relevant to the current situation.

About two-thirds of marketers say AI is a good business. This is because algorithms are getting better and better at copying human functions, perceptions, and intelligence expressions in marketing (Huang and Rust, 2018; Rangaswamy et al., 2021; Russell and Norvig, 2016; Sterne, 2017). When AI does a lot of repetitive tasks, it saves money, opens up new service options, and lets people be more creative, innovative,

and resourceful when doing tasks. This is why customers will benefit a lot from these applications (Haenlein and Kaplan, 2019; Smart Insights, 2018). Chatbots (Nguyen and Sidorova, 2018); AI applications that learn about customer habits and whether they like or dislike products and services (Chatterjee et al., 2019); and AI user interface (AIUI) that helps with customer relationship management (CRM).

So far, there hasn't been a clear plan for how AI technologies have been used in marketing or how they will be used in the future. This is despite the fact that AI is a large field (Haenlein and Kaplan, 2019; Paschen et al., 2019). To do this, the author must analyze and review the relevant studies, combining the synthesis of goal use and the direction of future academic research. Researchers, journal publishers, or editors need to do research analysis to look at any existing knowledge base and find gaps in the knowledge, effectiveness, and productivity of the research (Lowry et al., 2004). For a clear picture of the knowledge base, the author looks at the most popular AI research topics on the market and writes down key topics, important publications, and those that have an effect on authors and journals (Huang and Rust, 2018; Russell and Norvig, 2016).

1.2. Research objectives and research questions

The purpose of this study is to explore the main topics of research related to AIM, highlighting key topics, influential publications, and networks between authors and journals to provide a clear view of existing knowledge.

To meet this goal, this study must answer the following questions: (1) What are the main topics in AIM?, (2) How do these issues affect AIM? (3) Which role does theme modeling play in the use of AIM?

2. RESEARCH METHODOLOGY:

2.1. Tools/Technology Used: Python programming language and Latent Dirichlet allocation Model

A Latent Dirichlet allocation (LDA) is used to figure out what the main points of the aim are. This method shows how many words are found together and gives information about the topic that keeps coming up (Booth et al., 2016; Nikolenko et al., 2017; Zhao et al., 2019). It lets us look back at the things that most interest us, figure out what the underlying trends are, and find the best information for each subject (Jacobi et al., 2016; Nikolenko et al., 2017).

More about our Latent Dirichlet allocation: Latent Dirichlet allocation (LDA) is a general probability model of a repository of materials. The basic idea is that the materials are expressed as random mixtures according to potential topics, in which each topic is arranged in a way that is distributed across words (Blei et al., 2003). The set of articles D is the assumption that contains T topics expressed through W different words. Each article $d \in D$ has a length N_d modeled as discrete distribution (d) on a set of topics $(z_j = t) = (d)_t$, where z is a discrete variable that defines the topic for each case from $j \in d$. Each topic in turn corresponds to a polynomial distribution on the words, $p(w | z_j = t) = \phi(t)_w$. Dirichlet baits can α be assigned to the distribution

of subject vectors θ , $\theta \sim \text{Dir}(\alpha)$, similar to β for the distribution of words in the subject, $\phi \sim \text{Dir}(\beta)$.

3. CONCLUSION

3.1. General conclusion

In this study, the author looks at publications in the Web of Science database to find out how scientific research on the use of AIM has changed from 1991 to September 2021. The subject model is used in this study to do a new, systematic, and thorough review of AIM research. Unlike traditional evaluation methods, the author uses a new method based on algorithms. This confirms that the subject model can be used to analyze business research (Vanhala et al., 2020). The results are based on 569 articles that give an overview of the information that is already out there that is relevant to research on AIM. This study shows how the field has changed over time by looking at important publications and the authors' how certain topics have changed over time. Using the topic model and text analysis technology, the author has also found nine interesting consumer research topics that fit into two large groups: Artificial Intelligence Marketing, AI Support in Recruitment, and Technology in Marketing. All organizations that use AI in service marketing, data mining, the effect of CEOs and CMOs on marketing strategies, technical marketing research, or the use of robots in sales and purchases are all part of the research. When this topic model is shown, the author can look at possible topics that aren't obvious at first glance to find out what kinds of things articles have in common.

This analysis helps researchers who want to contribute to this area of AIM research by clarifying the existing core document base, the direction of development of the field of study over time, which journals should be referenced, which authors stand out the most, and which topics are relevant in different fields. For example, when the author looks at published journals, the author sees that the most well-known and potentially most influential journals in the research community, such as the Journal of Industrial Marketing Management, the Journal of Marketing, the Journal of Marketing Research, and the Journal of the Academy of Marketing Sciences, have published the most articles on the subject.

3.2. Summary of findings and theoretical implications

The study's results show that most articles are about AI marketing (topic 1) and AI in service marketing (topic 9). In the current situation and trends, these two topics make sense. Artificial intelligence marketing is a type of direct marketing that uses AI concepts and models, like machine learning, along with database marketing techniques. Direct marketing has changed a lot in the past few years. Instead of using phones, cards, and letters, as it did in the past,... Direct marketing in the present day includes email, mobile SMS, or push messages, and marketing on social media sites. But in the end, it doesn't change the main goal of effective direct marketing to customers, which is to promote products or services using information about demographics, transactions, and other things (Rekha et al., 2016). Also, putting AI to use in service research has a lot of potential. According to Huang and Rust (2018),

AI is a powerful tool that businesses can use to take over jobs that humans used to do and change the way they do business. It is expected to change how businesses market and how customers act (Davenport et al., 2020). Self-service technologies (SSTs) can use AI to give customers who choose to use them a better experience. Huang and Rust (2018) did a lot of research on the tasks and uses of AI. In their work, they say that AI can affect not only how well customer service works but also how discipline works by doing things like helping with tax returns.

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DIGITAL TRANSFORMATION OF HIGHER EDUCATION: COMPETING ON ANALYTICS

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ABSTRACT

Digital transformation of higher education is about more than just technology. The goal is to adopt new ways of working in order to continue delivering user-focused services in the face of changing technology, competition, audience needs and behaviour. Digital (core) services, digitally skilled educators and students, decisions that consider available evidence are some of the characteristics of a digitally transformed higher education. In conditions of great uncertainty and competition higher education have to move from wondering what the future might hold to predicting the future - making proactive decisions and taking action based on that information. Evidence-based, quantitative and predictive decision making is a quite reliable way of gaining competitive advantage. With the widespread availability of data in many businesses, leading business organizations have recognized and significantly leverage the power of analytics in the most important decisions affecting their business. This is a path that higher education institutions should follow in order to turn their data into meaningful value. Conventional and unconventional (unstructured), internal and external data should be used to discover hidden patterns underlying performance in different areas, track admissions, optimize enrolment, manage grants, enhance academic advising etc. To gain insights from vast amounts of accumulated data and, what is even more challenging, translate these insights into powerful business decisions higher education institutions have to catch up with big data and data analytics tools and techniques as fundamental enablers of evidence-based, data-driven predictive decisions. Pointing out that digital transformation of higher education institutions is critical to their future success we are focusing on data aspects of this transformation, bearing in mind that data itself is an asset while the real challenge is turning that data into value. This paper points to the need for a more comprehensive adoption of big data and analytics solutions in higher education: key imperatives of adoption are listed, some activities that seem suitable for analytics pilot projects are considered, and expected business advantages are described. Finally, we emphasize that, due to increasing number of open source platforms and tools, the adoption of data analytics in higher education is becoming less and less a matter of money, and much more a matter of recognizing the value of generating useful insights and spawning innovations and a matter of preparedness of higher education institutions for such an undertaking.

KEYWORDS: *Digital transformation, Higher education, Analytics, Data-driven decisions*

1 INTRODUCTION

With increasing competition for students and funding, higher education institutions need to harness the power of data to streamline operations and enhance the student

experience. At the same time, integration with legacy banner systems can result in deployment costs that strain tight budgets. Furthermore, threats to higher institutions, both online and on campus, demonstrate an urgent need for security and intelligence about students and staff more than ever before. In order to be able to respond to an increasing number of challenges higher education institutions will have to integrate digital technologies into their business to a much greater extent than before. This will result in fundamental changes to how business operate and how they deliver value to their “customers”. There are many aspects of digitization of higher education institutions: in this paper the attention is focused on the role of business analytics in acquiring a competitive advantage in higher education. With the widespread availability of data in many businesses, we have reached a point where leading organizations significantly leverage the power of analytics in the most important decisions affecting their business. Whether it relates to customer, service delivery, product development, asset utilization or other operational area, data is being used to discover hidden patterns underlying performance in specific areas, and influence decisions that yield maximum impact for the business.

Although many authors and consultants have defined it slightly differently, analytics can be viewed as the process of developing recommendations for actions or actionable decisions based upon insights generated from historical data [1]. Business analytics, descriptive, predictive, or prescriptive, can bring a variety of benefits to higher education institutions and enable data-driven fact based decisionmaking: to know what is happening (descriptive analytics), what is likely to happen in the future (predictive analytics) and to examine trends, causes and likely forecasts and use that information to make decisions (prescriptive analytics). Over the years, the use of the analytics and its related fields has grown tremendously and now there are wide varieties of industry participants that use analytics. After a period in which attention was mainly focused on financial sector organizations, business analytics solution providers are increasingly turning to other specific areas like higher education. It is not hard to assume that specific business processes and activities of higher education institutions require specific analytical solutions: some of them are described in this paper. The paper consists of four sections. Following the introduction, the second chapter presents the phenomenon of digital transformation in higher education, with an overview of areas undergoing change through digital transformation, as well as different perspectives. After that, the third section contains a description of the purposes and possibilities of different types of analytics; Section four presents some business areas of higher education institutions that appear suitable for the implementation of analytics-related pilot projects. The final section contains concluding remarks.

2 DIGITAL TRANSFORMATION OF HIGHER EDUCATION

Digital transformation has rapidly become a top priority for many organizations operating in different areas of business, with permanent acceleration being the primary characteristic of this change process. None of the business sectors, nether the primary, secondary or tertiary, are immune to the process of digital transformation. In many

cases, digitalization causes them to change significantly, or even entirely cease to exist. Higher education is also among the sectors influenced by digitalization, faced with different challenges caused by rapid and diverse changes in the environment. According to Mehaffy, these changes can be divided into seven areas: the players, the college business models, the course models, data and learning analytics, the cost, measuring success and threats to the credential [2]. All of these areas are primarily caused by technological changes, or, to be exact, utilization of digital technologies. The phenomenon of digital transformation is widely studied in numerous academic domains, and the crude overview of the field is a result of such research. Different authors have defined digital transformation in different, often ambiguous ways. A query into academic and professional literature using keywords “digital transformation” results in thousands of papers exploring the concept of digital transformation from different perspectives. The most common perspectives include: an individual, an institution/organization, a network, an industry or an entire ecosystem, society or economy, as well as the digital era [3]. According to most authors, the digital transformation of business has six dimensions, that is, transformation blocks it is comprised of: • Established and accepted organizational digital strategy and the approach to application of innovation; • Organized agile, promptly and substantially adaptable collaborative processes in modern business models; • Complete automation of business processes; • Detailed analysis and research of customers’ decision making; • Information technology supporting all organizational business processes; and • Usable and relevant data and use of data analytics as a basis for decision making in line with the organization’s goals and strategy. Numerous authors are in agreement that digital transformation is, before all, organizational change, realized by means of digital technologies and business models with the aim to improve organization’s operational performance. Categories of organizational business transformations encompass: business models, organizational structure, people/staff, business processes, technologies utilized for gathering and managing information, range of products or services, models of engaging with customers and suppliers [4]. Digital transformation of higher education institutions is a process of their technological and organizational changes, primarily caused by the development of digital technologies [5]. Some authors even highlight that true digital transformation of these institutions can be achieved only if the significance of the digital culture is comprehended and accepted by all of their organizational units, and adopted as a part of their own culture. However, authors most commonly view digital transformation as one of the complex modes of business transformation, enabled by digital technologies. Digital transformation ascertains the strategic role of novel digital technologies, as well as possibilities for successful digital innovation in the digital era. Through the process of digital transformation, organizations converge multiple new digital technologies, with the intent to achieve superior performance and sustained competitive advantage. In such way, they transform different dimensions of business, such as the business model, the customer experience and operations, and simultaneously impacting people and networks [3]. The principal aim of the digital transformation process in higher education is to redefine educational services and redevelop higher institutions’

operational processes. There are three possible approaches to accomplishing this goal. The first involves service-first transformation, focused on changing and redefining services prior to making key improvements and changes to operations, i.e. activities within processes. The second is the operation-first transformation, aimed at identifying new and amending present digital processes, activities and operations, as the basis for redefining higher education services. The third, service-operation combination, involves integrated transformation through systematic interrelation of both previous approaches [6]. With the focus of this paper being on the second of the aforementioned approaches to digital transformation of higher education, the authors identified four hierarchical levels of the university business process model: mega processes, major processes, sub-processes, activities and tasks. The highest level processes identified by the higher education institutions are following mega processes: the learning and teaching process, the research process, the enabling process, and the planning and governance process [7]. Mega and major processes that represent a basis for redefining educational, research, and administrative services of higher education institutions are given in Table 1.

Table 1. Overview of mega and major processes in higher education institutions [7]

Learning and teaching process	Research process
• study programme accreditation	• research planning
• teaching process preparation and realisation	• research preparation
• teaching process outcomes monitoring	• research conduct
• teaching process assessment	• research outcomes monitoring
• student and teacher mobility realisation	• research evaluation
Enabling processes	Planning and governance processes
• student administration services	• organization management services
• library services	• change and business process management
• staff provision and development services	• plan development
• finance and accounting services	• budget and funds planning
• marketing, sale and distribution services	• performance assessment
• procurement services	

3. BIG DATA AND ANALYTICS

Yet for many organizations neither the volume of data nor where to store them is a problem. These issues are unlikely to make or break businesses. Instead, a key factor that determines whether organizations sink or swim in today's rapidly evolving business environment is their ability to harness the potential and power of data by gleaning useful insights for decision-making and innovation.

Traditionally, business intelligence has been focused mostly on reporting. In this approach to business intelligence, highly-formatted reports are created by a few people (usually specialized report developers) and distributed to an entire department or organization. More recently, things have changed: the current trend in analytics is to provide the people who have questions about their data with the tools to get their own

answers. This new approach, often referred as self-service analytics, is about letting business people become analysts themselves. “It’s not just about generating reports, but about letting people get in the flow of analysis, explore their data, and ask their own questions. This has completely changed the way many companies approach business intelligence” [8].

Table 2. Analytics platforms capabilities

Collect Hybrid Data Management	Organize Unified Governance & Integration	Analyze Data Science & Business Analytics
		
• Collect all types of data, structured and unstructured; • Include all open sources of data; • Leverage a simple platform with a common application layer; • Write once and deploy anywhere;	• Satisfy all matters of finding, cataloging and masking data; • Integrate fluid data sets; • Deliver built-in compliance; • Leverage advanced machine learning capabilities;	• Deliver descriptive, prescriptive and predictive insight across all types of data; • Empower the teams and their unique use cases; • Enable advanced analytics and data science methods;

Relying on the value of data, analytics platforms deliver the capabilities needed by decision makers (Table 2). Data were traditionally considered as an organizational property created in digital truckloads through an organization's operations. But as in the case of any other type of property, the owner may, under certain conditions, give the right to others to use that property. Data is growing at a faster rate than ever before, which is particularly pronounced in the case of publicly available data. In the near future there will be an avalanche of applications and services derived from open data, driven in large part by the government’s initiative to open up a wider range of public data. This is likely to be followed by the private sector, where there will be a gradual opening up of data, although at a slower pace. Organizations will also increasingly recognize open source techniques and open platforms as means for amassing relevant data, generating useful insights and spawning innovations. Although numerical data have long been the staple feed of analytics and the basis on which business leaders make informed decisions, we are witnessing the increasing prominence and proliferation of unconventional, or unstructured, data. Technology enhancements have enabled application of analytic techniques to gain insights from large amounts of hybrid (structured and unstructured) data. This forms the basis of Big Data analytics as an integrated form of data analytics and web analytics for big data [9]. It’s more than obvious that big data is becoming the next frontier of competitive advantage. Big data is generating a powerful buzz, but many organizations still do not fully recognize or have difficulties in harnessing its potential. In many organizations big data alone

has not been developed into anything near its expected value, primarily because there is a disconnection between the vast volume of data and the managers who make and implement business decisions. Analytics can bridge this gap by applying algorithms, generating and presenting recommendations for optimal, practical and achievable business decisions in a user-friendly format. Forward thinking organizations are already proactively deploying advanced analytics on data to generate useful insights that can help leaders make better fact-based decisions with the ultimate aim of driving strategy and improving performance. On top of that, organizations are also beginning to spot innovation opportunities and niches by unleashing not just the diagnostic and predictive, but also the creative power of advanced analytics on big data to meet latent market needs with new, or improved, products and services. However, organizations that have historically invested heavily in technology and technological solutions for the purpose of managing and analysing data must not lose sight of six other key

imperatives: data and analytics must take on a strategy-level orientation; analytics capabilities must be pushed deeper into all areas of the organization; the CEO must drive the adoption of analytics across the organization; the organization's structure, processes and culture must be properly aligned to a data driven strategy; investment in analytics capabilities must also involve acquiring and developing the right talent and institutional skills to harness the potential of data. In addition to that organizations must shift their paradigm to a more open, collaborative way of working, particularly with external stakeholders.

4 ANALYTICS IN HIGHER EDUCATION

In order to illustrate the feasibility and scope of analytics adoption in higher education institutions, this paper examines three areas suitable for the implementation of pilot projects: admission tracking, enrollment optimization and academic advising.

4.1 Admissions tracking

Higher education institutions of every type and size always strive to recruit and retain great students. To answer questions surrounding where and how to conduct outreach or which students to admit and offer scholarships to, it is essential to have a deep understanding of the types of students applying – as well as which ones will actually enrol and succeed. Analytics can provide a model for higher education institutions leaders to improve organizational efficiency and decision-making as they pertain to admissions and enrolment. Data is the key to successful planning and recruitment, and analytics solutions can let universities answer a variety of questions, whether it be how prospective students and parents are interacting with web channels, or if demographics are changing in meaningful ways. Analytics solutions usually offer very extensive analytical libraries. From basic summarization, to optimization, to even forecasting and predictions, users can embed statistical metrics into an analytical workflow very easily. Important types of rich data collected on web visitors, applicants, and matriculates can help schools understand what different people are looking for and shape both their marketing strategy and curriculum accordingly. Armed with hundreds of native functions out of the box, admissions staff are able to perform data mining and

create highly advanced statistical algorithms with minimal support from IT. This will help improve the effectiveness of each admission recruiting cycle, and help ensure that educational offerings meet institutional, students', and employer needs.

4.2 Enrollment optimization

University administration and staff are often charged with the construction and maintenance of course sections for thousands of students each semester and must schedule the classrooms for the inventory of approved courses. Alongside that workload, they must monitor course enrollment levels over time and determine which courses should be repeated or dropped to meet student interests and needs. Universities constantly look ahead to plan for tomorrow's educational needs based on current student behavior and activity. Appropriate analytics solution could provide speed and accuracy when university administrators drill into data about student course preferences. Analytics applications could help colleges measure the health of their academic programs so they can align them with overall university goals. By dragging and dropping course codes or course names administrators in distinct departments could compare student enrollment by semester. Filters could be used to refine analysis by department to understand course popularity by subject and faculty member to figure out classroom allocation. Professors and administrators can collaborate and recognize which majors and minors are popular among students. With these insights, they can help solidify short- and long-term education strategy. Universities can develop more specialized programs and tracks as a reflection of data on student interests.

4.3 Academic advising

In 2016, USA college graduates left school with an average of \$37,172 in student loan debt [10]. Furthermore, only about 40% of 2007–08 first-time bachelor's degree candidates completed their degree within 4 years of their initial enrollment [11]. Factors driving this include excess credits due to transfers or changes in major. In this environment, improved academic advising is crucial to improve student outcomes. However, self-reported ratios from colleges and universities nationwide show that, on average, there are about 300 students for each full-time adviser in a four-year public institution

Universities are constantly gathering data on their students. The next step is to turn this data into actionable information that can be used to help learners. Academic advising analytics help track and improve outcomes, from matriculation to post-graduation: complex data collected by learning management and student information systems can be translated into real-time, student-level recommendations. These insights help inform advisors' decisions as they consider intervening on behalf of students, whether it's to minimize excess credit hour accumulation, flag critical alternate-year courses for registration, or just generally reduce the time it takes a student to graduate.

5. CONCLUSIONS

Leading enterprises use business analytics to accelerate business performance. They manage data as a differentiating asset, with a focus on both horizontal and vertical integration of Enterprise Resource Planning systems, operational data stores, data

warehouses, reporting systems, analytic engines and more. These organizations evaluate business intelligence as a corporate competency – with discipline around people, process, and technology - and they embed analytics as a strategic tools for smart business decisions. Tomorrow's competitive advantage of higher education institutions will be driven by the ability to identify, consume, produce, and govern the complex information inside and outside university walls. However, creating this new intelligent business model can be a significant change journey. An effective information/data driven approach should apply historical, current, and predictive analytics to give higher education institutions a 360-degree view of their data. This view enables a focus on business outcomes and measurable value. Although there is a lot of talk about big data, the big truth is that big data is only as useful as its rate of analysis. Otherwise, businesses won't gain access to the real-time suggestions and statistics necessary to make informed decisions with better outcomes. With fast data, information becomes more plentiful, more actionable and more beneficial to an organization. Our intention was to point out the need and significance of more prominent adoption of analytics in higher education institutions as a differentiating component of their business model. As organizations roll out initiatives to enhance the value of their business, the use of data (internal and external) and analytics will go a long way in enhancing the value of decisions. Data governance analytics, student analytics (including student sentiment which stems from external data), staff and other specific analytics can play a key role in gaining competitive advantage and ensuring a safer future for higher education institutions. Growing offer of open source platforms and tools makes the adoption of business analytics in higher education much less a matter of money, and much more a matter of recognizing the value of generating useful insights and spawning innovations and a matter of preparedness of higher education institutions for such an undertaking.

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DIGITAL TRANSFORMATION IN VIETNAM BANKING

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I/ INTRODUCTION

In Industry 4.0 combined with the effects of Covid-19, digital transformation is no longer an inevitable trend, but rather one of the Vietnam government's key objectives. In the last two years, it changed all aspects of Vietnam's economy. In particular, digital transformation in banking has made significant progress.

The Covid-19 pandemic outbreak increased people's demand for non-cash payments for online shopping, transferring money, etc. In addition, along with the shift of population structure, customer behavior is also gradually changing: Millennials and Gen Z - two generations of 'digital natives' - have become the primary customer group with increasing service expectations. On the other hand, plenty of Fintechs have emerged as formidable competitors to banks. In that context, the Vietnamese banks have to carry out digital transformation from partial to comprehensive, as highlighted in the Government's Non-Payment Development Scheme for the period 2021-2025.

This report will conduct an analysis of digital transformation in banks under the influence of Industry 4.0, Covid-19 pandemic and initiatives of the Vietnamese government. Banking industry is undergoing a digital transformation that involves not only implementing the latest in technology—Big Data, Artificial Intelligence (AI), Blockchain, etc.—into the service management process, but also changing every aspect of cooperation strategy, organizational structure, and other areas.

KEYWORDS: *digital transformation, digital banking technology, digital bank*

II/ BODY PART

1. Digital Transformation in Banking:

Digital transformation is the restructuring of thinking in the coordination between data, processes and people to create new values (Microsoft, 2017). It not only requires businesses to apply cutting-edge technology to their operations (Big Data Analytics, AI, Cloud Computing, etc) but the entire workforce must change to become more technologically proficient. Thus, digital transformation reduces cost operations while enhancing the customer experience.

Digital Banking is part of digital transformation in the bank. It can assist customers in conducting their transactions online via the internet, avoiding visiting banks and reducing the amount of paperwork required. Transactions can be carried out wherever and whenever.

The Covid-19 pandemic and population reorganization have altered customer demands and accelerated the trend toward cashless transactions, providing

opportunities for banks to initiate digital transformation. Although the COVID-19 pandemic had a negative impact on many economic sectors in the first half of 2020, non-cash payment transactions through banks still grew significantly, by 48.3% in quantity and 13.3% in volume compared to the same time in 2019 (Vietnam News Agency, 2022). 99% of Vietnamese banks have invested in digital transformation. In which, 39% have approved a digital transformation strategy and 42% are developing a digital transformation strategy for themselves. Following the global trend, numerous banks have invested funds to build a data warehouse, a centralized and standardized digital infrastructure, and a multi-industry ecosystem.

2. SITUATION OF DIGITAL TRANSFORMATION IN VIETNAM BANKING:

2.1 Data governance:

Data is the key energy source of digitalization. Recognizing their advantages in capturing the large volume of data, banks have given data governance a high priority: 100% have built Data warehouses, 27% have built data lakes (State Bank, 2019). Some banks have started to set up specialized data governance departments or already have technology solutions to implement effective data governance.

However, in reality, banks in Vietnam still do not effectively govern data. The issue here is that data infrastructure is frequently confused with technology infrastructure. Data governance is not only the responsibility of the IT department but also takes place at the systemic level, involving a wide range of personnels and departments, including data specialists, human resources, etc. Inefficient governance is also because banks cannot distinguish between data requiring higher security, necessary data and irrelevant data. This results in no priority for each data type. In addition, although banks have started to build their data warehouses, they are frequently run by separate units for separate purposes. This is wasting resources.

Therefore, to benefit from the advantage, banks need to keep developing effective data governance personnels and processes as well as constantly expanding their cooperation relationships with Fintech, Bigtech.

2.2. Core-banking:

Core-banking is a software system that connects the business subsystems of the banking system, allowing the bank to expand its network of Online Banking, Mobile Banking,... By doing so, the system helps both the process of digital transformation and the advancement of global integration.

Unlike many businesses, Core banking is a must-have application for every bank. In Vietnam, core-banking implementation got underway in 2000. Up to now, 100% of banks in Vietnam have used core-banking and many banks have upgraded their Core banking system to meet development requirements. 83.33% of banks claimed to be digitizing their core business processes (Vietnam Report, 2020).

Core-banking investment must be made continuously rather than all at once. In reality, the transformation of core banks occurring in Vietnamese banks is thought to be slow,

receiving little attention, and not producing efficiency commensurate with it.

2.3. Popular technologies for digital banking:

Cloud Computing:

Managing big data is very difficult so bringing large amounts of data to the Cloud is an option adopted by most banks. Cloud computing features data maintenance, storage, management, processing, analysis, and security by exploiting Internet-based servers (An Nhiên, 2021). Thanks to this technology, banks can easily: analyze and operate Big Data, store website data through Cloud Server, and easily share data through platforms such as Google Drive, etc. From there, it assists businesses in process simplification, cost optimization, and customer experience enhancement. Along with that, employees can be granted access to the same remote data, making it easier for businesses to adapt when working remotely during the pandemic. Cloud computing positively impacts the green IT revolution by reducing carbon footprint and energy consumption: more than a billion tons of CO₂ emissions from 2021.

In 2021, Vietnam witnessed a number of strategic partnerships between the top three Cloud providers: Google, Amazon Web Services (AWS), Microsoft and Vietnamese banks: VIB and Microsoft Vietnam, MSB and AWS, PVcomBank and CMC Telecom (AWS Senior Partner in Vietnam),... Banks should consider cooperating with trusted partners which provide technology services in line with each bank's orientation, in order to create competition and develop together. .

The Vietnamese government has taken many actions to stimulate banks to use cloud computing. In 12/2019, the State Bank issued the Strategy for Information Technology Development of the Banking Industry to 2025 with a Vision to 2030. In which, the goal of striving for 2025 is 60% of Vietnamese banks using cloud computing and 100% by 2030. The State Bank also released Circular No. 09/2020/TT-NHNN on 10/2020, which permits Banks to migrate data to the Cloud.

Artificial intelligence (AI):

Artificial intelligence has become a powerful force to help renew services for customers. It can perform some tasks as humans. When customers come to transact or call the switch board, it will automatically identify and predict customer needs, thereby saving customers time. Thus, AI can help reduce the workload for employees, the burden on personnel, management costs and improve work efficiency.

Chatbot is considered the most visible form of AI in the Bank's operations. Chatbot can support customers 24/7 that no single staff can do. Instead of visiting a Bank branch, it provides customers with the convenience of resolving issues via an online messaging platform. A good illustration is Chatbot T'Aio, a virtual assistant used by TPBank. In addition to Chatbot, the Bank also offers other AI-application solutions, including the SAHA assistant robot, VietinBank's AI-combined recognition camera, OCR Viet Capital Bank's AI facematching and optical character recognition platform. AI-powered mobile banking apps from banks can gather user data and analyze behavior to improve the user experience. Additionally, AI can keep track of data from

recent and past transactions, examine typical customer behavior to spot anomalies, and thus prevent fraudulent transactions (MBBank, 2021).

Government also released Decision No.127/QĐ-TTg: National strategy for research, development, and application of AI until 2030. Currently, 44.4% of Vietnam banks anticipate that AI will increase sales growth by more than 50%. As a result, the process of applying AI to the banking industry has produced many positive outcomes.

Blockchain:

Blockchain is a technology that uses interconnected blocks to store and transmit data and can be used to address security challenges and ensure that there isn't any fraud or tampering.

Blockchain just appeared in Vietnam recently, with letters of credit (L/C) being the first application in 2019. As of 02/2021, five Vietnamese banks have started the trial: BIDV, HDBank, Vietinbank, MBBank, and Vietcombank. With the help of the Blockchain system, all parties can monitor the transaction throughout the execution process, which ensures consistency and transparency.

Despite the benefits of blockchain, there hasn't been much interest in applying it to banking processes in general or L/C transactions in particular. Only 5 banks have agreed to the trial in the past 2 years. L/C transactions are carried out without a clear legal corridor and the participation of competent parties such as customs, inspection, etc. Therefore, this process still has many risks and takes a long time to complete.

eKYC (Electronics Know Your Customer)

eKYC is a form of identification of customers right on the bank's application. Following that, customers can access the service in under 5 minutes without first going to a bank counter to open an account

Previously, the State Bank did not permit eKYC. Customers who want to open an account must visit the bank in person to provide identification. Since 07/2020, the State Bank has permitted 10 joint stock commercial banks to test the use of eKYC for customer identification because of Covid-19 pandemic. From 04/12/2020, in order to assist banks in offering digital banking services, the State Bank of Vietnam issued an online account identification service with 100% eKYC application. Specifically, Decree 87/2019/ND-CP, Decree 16 on Anti-Terrorism, allows commercial banks to decide to meet/not meet customers when establishing a relationship for the first time. Circular No. 16/2020/TT-NHNN on opening and using accounts has added regulations on eKYC. However, many other banking services have not yet been allowed to eKYC, for example: Circular 01/2021/TT-NHNN about the issuance of promissory notes, bills, certificates of deposit, and domestic bonds must still be done "directly". And as of right now, participation by foreigners in Vietnam's eKYC program is still outlawed. The State Bank needs to take this into account if it wants to encourage international cooperation in the banking and finance industry.

eKYC has been implemented by numerous banks, including MBBank, VPBank, TPBank, HDBank, Viet Capital Bank, etc. After a few months of testing, in 08/2020,

there were 30% more monthly users with iMoney accounts registered on the HDBank app and more than 16,000 new accounts have been registered at VPBank, exceeding the forecast by more than 50%. More than 1.8 million payment accounts were opened online using the eKYC between 03/2021 and 12/2021 (The State Bank of Vietnam, 2021)

However, banks should not only not rely on technology, but also need a human element in order to limit risks associated with a sophisticated level of counterfeiting.

Biometrics:

Banks use biometric customer identification such as fingerprints, faces, etc. to simplify procedures: opening cards, receiving and withdrawing money. They only take 3s to identify and 30s to process transactions (TPB Livebank, MBB smart bank)

VietQR:

VietQR is extremely convenient. Accordingly, customers can easily create aQR code and use it for every transaction, shortening time and simplifying payment operations. There have been 27 banks participating in the implementation of VietQR applied to money transactions. Besides, NAPAS has successfully cooperated to deploy VietQR payment with Thailand: Thai customers can pay in Vietnam and vice versa.

Although many banks use VietQR code across the country, but it is their own code, there is still no connection with each other. People still cannot easily use QR for all services. This is what banks need to pay attention to when they want to develop their markets and products-services.

API (Application Program Interface) - Open Banking:

Open banking, which is created using open source API technology, is the practice of banks and non-banking financial institutions (Bigtech, Fintech) giving third parties the right to access consumer banking, transactions, and other financial data in order to create financial applications and services that are matched to their customers (MBBank, 2021). Open Banking enables the bank to reach a larger segment of its customer base, including those who do not currently have a bank account or have not used financial services. Some of the services can be:

- Tracking every transaction with instant notifications
- Reminding for upcoming payments
- Transferring money between banks quickly and conveniently
- ...

Closed API	Open API

The systems connect data transmission between banks and partners	- Create a large and stable customer ecosystem, connecting with many different organizations, businesses and individuals. - Open API can be integrated into the ERP management system to reduce product development time, focusing on core features to reduce operating costs and risks.

Most of Vietnam's banks have led the way in opening APIs to connect with payment services, e-commerce platforms, and utility service providers (electricity, water, aviation...) For example: OCB has more than 30 open APIs, VietinBank has more than 127 open APIs with more than 73 partners.

On 16/03/2017, the Governor of the State Bank of Vietnam established a Steering Committee on Fintech under Decision No.328/QĐ-NHNN. Accordingly, building the connection and sharing data through Open API is one of the key tasks of the Committee. In 06/2018, the IT Department of the State Bank conducted an Open API survey in the field of finance and banking. In 10/2018, the IT Department signed an agreement with the Korea IT Promotion Agency and the Korea Institute of Finance and Telecommunications - Clearing on Open API interface in banking. But currently, in Vietnam, the legal framework for Open API is not clearly defined. Therefore, Banks need to consider how to deal with input risks and other unpredictable issues. The most important thing with Open API is that third parties have access to Bank data, so there must be a safe and unified mechanism to share data (more detailed later).

2.4. Cyber-Security Priority:

The issue of cyber security is also the top priority for banks in digitalization. According to the Head of Cybersecurity Consulting Service EY Vietnam: "A survey of 100 banks showed that 98 banks have security holes". To personalize the customer experience, digital processes have become more simple but they also introduce numerous security holes. Thieves use this way to get around the entire appraisal system. The case VN84App, about which Bkav issued in 06/2020, is typically a program that has gathered OTP messages for financial transactions totaling up to billions of VND and infected thousands of smartphones in Vietnam. In 2020, banks lost VND 100 billion from 4,000 cyber security attacks (Ministry of Public Security, 2020). To deal with this problem, banks have implemented the following actions:

- a. Collaborating with specialized parties:
 - 20/02/2021, Sacombank and IBM collaborated on SOC technology
 - 12/2021, Vietcombank and Department of Cybersecurity and High-tech Crime Prevention - Ministry of Public Security signed a cooperation agreement.
- b. Continuously upgrading technology infrastructure and services:
 - Vietcombank, OCB, Sacombank, TPBank upgraded security features for Visa and MasterCard cards to 3D Secure 2.0 version with EMV standard.

- Sacombank applies tokenized security and IBM's Trusteer security technology.
- Most banks use security management systems according to ISO 27001 and PCIDSS standards.
- According to regulations, all domestic magnetic cards in circulation must comply with VCCS standards. Banks must apply appropriate network safety and security solutions (TRAML Client; STRClient, etc)

11,300 billion VND is the amount that Agribank, Vietinbank, Vietcombank, BIDV must pay annually for SMS authentication method. Although the results have not been recorded yet, we can see the efforts of banks in ensuring information security in parallel with digital transformation, towards a safe and sustainable digital economy.

2.5. Human resource management and training:

Digital transformation helps reduce staff size, improve productivity, and save operating costs. This is one of the reasons why many banks still make profits during the 2 years of Covid-19. In 2021, banks reduced a large number of employees: OCB (1,500 employees), VPB (1,000 employees). This helps the bank improve the operational efficiency of each employee. In 06/2021, VPBank's consolidated cost-to-income ratio (CIR) took the lead among banks (23.4%). Other banks also owning CIR below 30% include BIDV (25.63%), Techcombank (28.41%), etc.

In addition, banks are gradually changing their organizational structure. From 06/2020 to 04/2021, banks have a large recruitment demand for qualified, experienced technology and legal personnel. In contrast, the sales and sales support department suffered major cuts. At MBBank, the engineers are more than 1,200 people, accounting for 10% of the bank's staff; this number is expected to reach 25% by 2024.

Regarding training, the practice cyber defense exercise launched by Security Monitoring Center (NCSC) and IEC Group on 16/12/2020, in Hanoi included more than 100 officers in charge of cyber security from 30 typical banks. VIB has organized hundreds of training sessions for its technology engineers. Vietcombank is constantly upgrading the Training Center into a School of Training and Human Resource Development and widely applying an e-learning system.

Human resources are the core factor to successfully transform from a traditional banking to a digital one. This is one of the things that banks need to pay attention to accelerate digitization in a sustainable way.

2.6. Collaboration with Fintechs:

Fintech has acquired technological services and infrastructure that banks have not yet fully perfected: convenient payment options using e-wallets like Momo, ZaloPay, VNPay, etc and a full variety of services that customers want: booking online, ordering food, shopping online. However, raising capital for credit activities is a major issue for all Fintechs. Fintech transactions must be based on the association with bank accounts. Banks and Fintech collaboration strategy involves both cooperation and

competition (coopetition) for stronger development and expansion. On the one hand, fintechs will assist banks in extending their reach for products-services and connecting with digital ecosystems in other sectors: enterprises offering goods and services (Bamboo Airways, Gojek, etc), E-commerce (Tiki, Shopee, etc) and communication (Viettel, VNPT, etc). On the other hand, Fintechs also emerge as a major rival to banks in many areas, primarily payment and money transfer. Therefore, if banks don't want to lose their competitive advantages, they must be innovators in developing smart and practical products-services.

Up to 72% of fintechs collaborate with banks (State Bank of Vietnam, 2019). Most banks currently have partnerships with MoMo and VnPay to create e-wallets. Other notable collaborations include: Techcombank - Fintech Fastacash debuted the F@st Mobile, while VIB - Fintech Weezi introduced the MyVIB Keyboard. VietinBank - Fintech Opportunity Network (ON) offers a business connection platform with more than 15,000 businesses in 113 countries.

Collaborations between banks and Fintechs still face numerous challenges, so their potential has not yet been fully realized. Fintechs in Vietnam are still constrained without permission from the authorities to offer traditional banking services, primarily due to the absence of current legal regulations. Government issued Resolution No. 100/NQ-CP on 06/09/2021, approving a Decree on a controlled trial mechanism for Fintech activities in the financial-banking industry. But there are no specific legal restrictions on the peer-to-peer (P2P) lending model, international money transfers, sharing user data through Open APIs, etc. In addition, Circular No.09/2020/TT-NHNN regulating the safety of banking information systems does not apply to Fintech companies. Therefore, the government still needs to issue clearer regulations regarding a number of other legal provisions, such as Decree on non-cash payments, the use of banking databases, etc.

III/ CONCLUSION

The Covid-19 pandemic outbreak served as a catalyst for the banking industry's digital transformation, which has produced many noteworthy successes over the past two years. We can see the efforts of banks not only in applying cutting-edge technologies to their operations, but also in gradually changing their organizational structure and applying a series of strategies. Although banks are just beginning to digitize, the digital transformation of Vietnamese banks is seen as having enormous potential. As a nation that follows the global trend of digital transformation, Vietnam will benefit greatly from lessons learned from the past. Additionally, the full potential of customers in remote areas has also not been fully realized, nor have technological advancements been fully put to use.

Digital transformation in the banking industry is not only the efforts of the bank but also requires the support of the government and the State Bank in promulgating and adjusting regulations, making the legal framework more stringent. In addition, Vietnamese students must not only concentrate on enhancing their professional abilities but also broaden their technological knowledge in order to adapt to the

growth of the digital economy.

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SOLUTIONS FOR APPLICATION OF TECHNOLOGY FOR LEARNING EDUCATION POLICY OF CURRENT STUDENTS

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SUMMARY:

Today, the fourth industrial revolution is taking place around the world with the core of which is technological advancement. In Vietnam, it is recognized that the large and directly affected technology user force is the student generation. To consolidate and equip students with knowledge in the process of national integration and development. Improve political thinking based on technology. By the available documents and through the process of accessing and investigating information, it is possible to see the reality of participation, the degree of influence of technology applied to political theory education for students is very large. From there, evaluate some roles of technology application in the education of political theory. Proposing solutions to effectively apply and exploit aspects of technology in developing students' political theory today.

KEYWORDS:

political theory education, applied solutions, political theory, current students, technology application

1. INTRODUCTION

Modern technology is the legacy of previous industrial revolutions. At the same time, it is a direct product of the fourth industrial revolution. This is considered a revolution that determines the development of countries today, so countries are interested in and exploiting technology in all aspects.

Coming to our country, technology has had a great impact on many different fields from economy, politics, society... It facilitates development, also brings many challenges in the integration process. Faced with the superior achievements of technology, there are also potential risks of information and software with false ideas. To be able to integrate well internationally and develop the country in the right direction. We need to equip political reasoning minds, especially the students. The generation that will be most involved and influenced by technology. It is also the generation that will lead and follow the previous generations. Equipping students with political theory knowledge through the application of technology will limit the conspiracy strategies of hostile forces taking advantage of technology, and equip students with critical thinking abilities. See the role of technology through its applications to political life. Proposing solutions to continue applying technology to political theory education in the future is a matter of practical relevance and needs to be exploited. In order to maintain and develop the political education model using technology and to encourage and improve the quality of theoretical learning and the activeness of students.

2. RESEARCH RESULTS:

2.1 Assessment of the current state of technology application to students' political theory education:

Current status of technology application in political theory education in the classroom:

Currently, many teachers have applied technology to the classroom teaching process. In which, the software is used such as: Office 365 suite (Microsoft Team, SharePoint ...), Skyde (teaching project), Blended Learning... to help the teaching effect to be of good quality. During the lesson, students are allowed to use technology to look up, find answers, learn new knowledge, great thinkers, etc., related to the main theory module.

Although many places have applied technology to teach, there are still cases of little or no use of technology as a support tool. Some lecturers still teach in the traditional way, with very limited exposure to technology when imparting political theory knowledge to students. Partly because the ability to use information technology has not met, partly because it has not been innovated and has access to technology.

Current status of technology application in political theory education on social networks:

On the platform of social networks, the internet: Many online competitions on the internet were launched and coordinated with many colleges and universities to increase student participation. Students will participate and answer questions about Marxist-Leninist thought, Ho Chi Minh's thought, ways of responding and countering hostile forces. For example: the contest "Youth learns and follows Ho Chi Minh's thought, morality and style"; contest "the way of truth"...

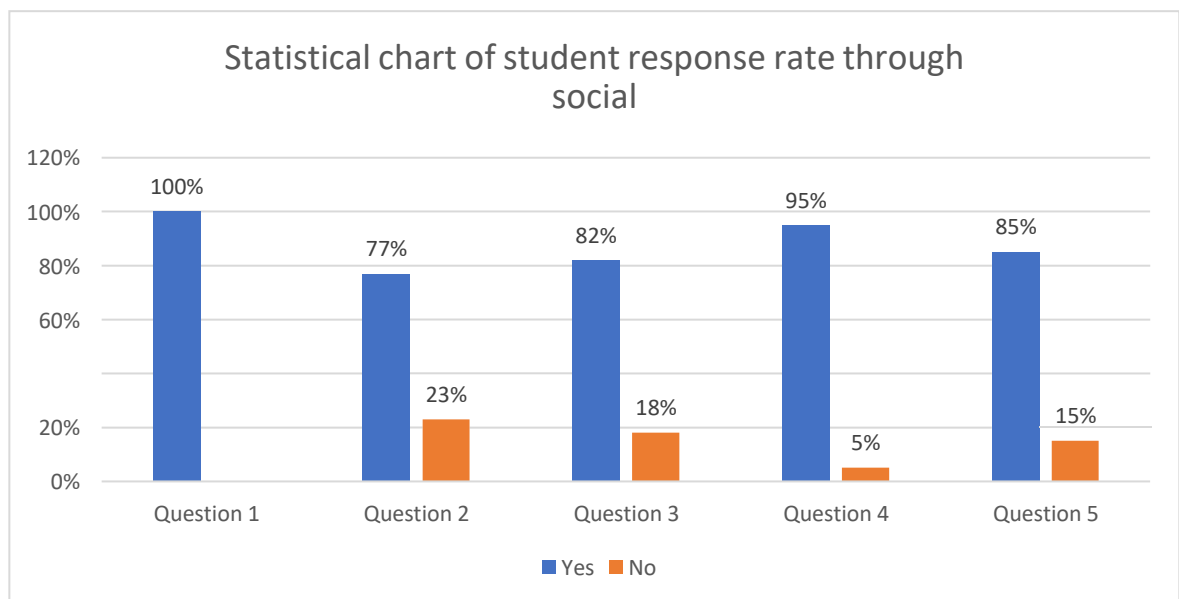
Many schools and state agencies use technology to set up official websites and facebook... Posting information about political ideas to reach out to students outside of school hours, in order to strengthen their knowledge. political theory. Applications and software appear more and more such as: Youth Newspaper, Vietnam Youth ... have affected students and many students have registered, logged in, tested their political theory knowledge.

Current status of technology application to political theory education from the perspective of current students:

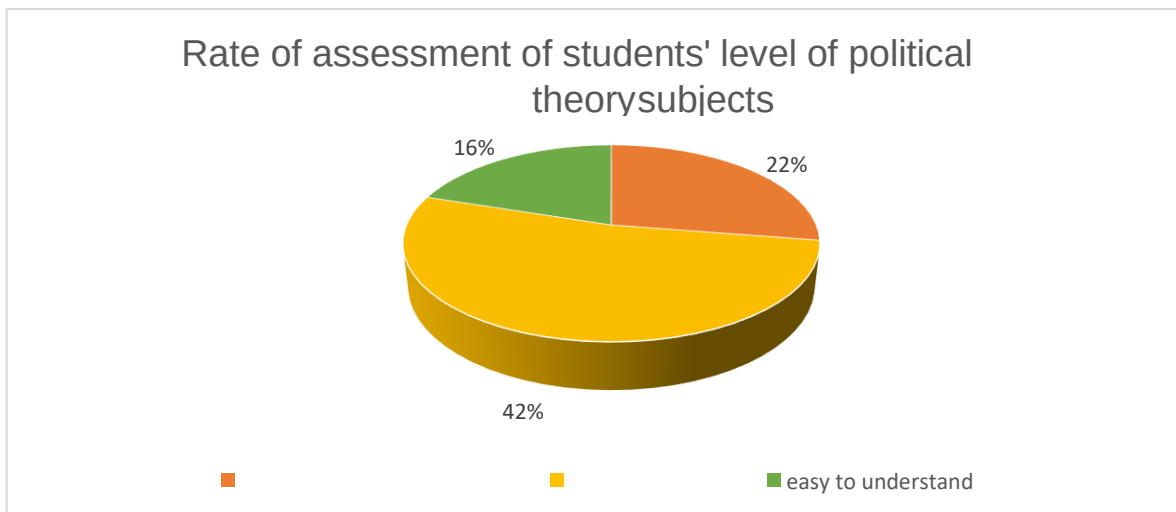
Conduct a random social survey on 60 students, equivalent to 60 votes by online form. With the following questions:

	Content Questions	Yes	No
1	Do you use technology (social networks, electronic devices, etc.)		

2	Do you often participate in contests and educational programs on political reasoning on the basis of technology?		
3	Are you interested in new technology software applied to teaching and educating yourself about political reasoning?		
4	Do you think it is advisable to popularize and apply more technology to education in political reasoning in the future?		
5	Do you think that educational learning to strengthen political reasoning by technology will cause complications?		

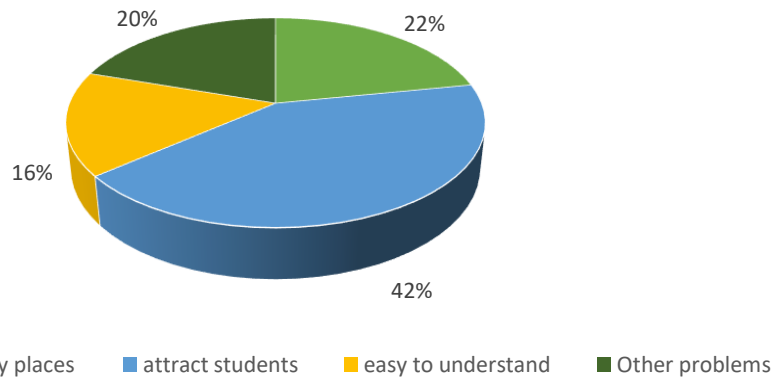


According to the chart above: For question 1: Do you use technology (social networks, electronic devices...)? Results received: the number of survey respondents chose "yes" 60/60, no answer chose "no". It shows that most students are being exposed to technology. Question 2: How often do you participate in contests and educational programs on political reasoning based on technology? Results received: the number of students who chose "yes" 46/60 and 14 answers that chose "no". The results show that the majority of students have regularly participated in educational activities of political thinking, but some have not actively participated. Question 3: Are you interested in new technology software applied to teaching and educating yourself about political reasoning? Results received: the number of students choosing the answer "yes" is 49/60, the answer choosing "no" 11 votes. Reflecting the feelings and feelings of many students who are interested in and accept the application of technology in political theory education. But among them, there is still a part of students who are not interested in applying technology to improve political reasoning. Question 4: Do you think it should be popularized and applied more technology in private education? political reasoning in the future? Results received: the number of students choosing the answer "yes" is 57/60, the answer choosing "no" is 3 votes. Most students expect to be able to use more technology in their political reasoning education in the future. Question 5: Do you think that educational learning to strengthen political reasoning by technology will cause complications? Results received: the number of students choosing the answer "yes" is 51/60, the answer choosing "no" is 9 votes. The results also reflect the convenience of technology in political education for students. A few still argue that complexity exists.



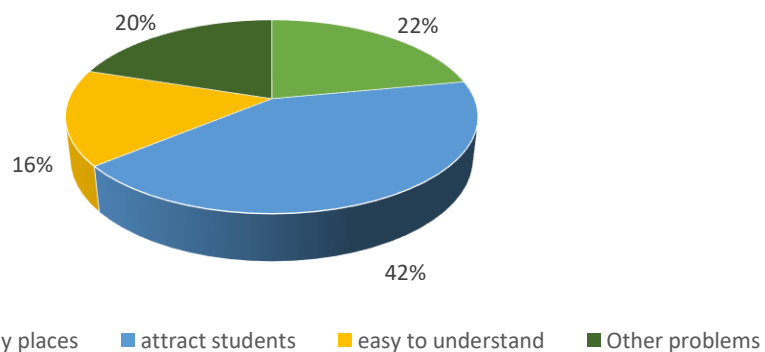
Conduct in-depth interviews with 50 random students. Because of the complicated epidemic situation, the interview format is via online. After the interview, received many different opinions of 50 people. In which, there are overlapping opinions and data are processed to analyze the problem within a certain scope. The interview results show that: For the degree to which the students feel about political theory subjects, political thought is assessed as difficult, accounting for 41 opinions, moderate level accounting for 7 opinions, and easy 2 comments.

Students' feelings when participating in the political theory education program by current technology applications.



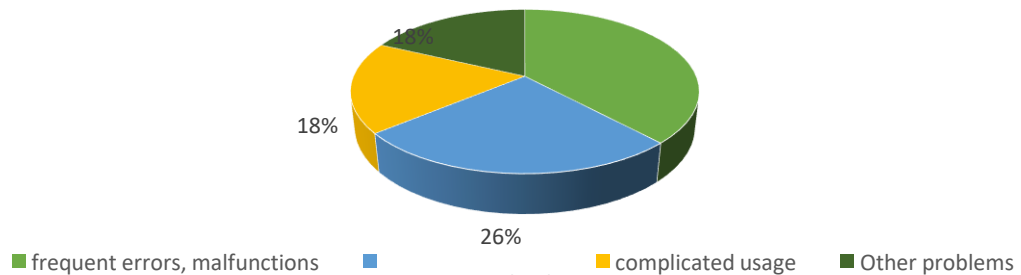
For students' feelings when participating in technology applications in political theory education, there are many different opinions. In which, there are 25 very good reviews, 10 good reviews, 11 normal reviews and 4 bad reviews.

Advantages of the application of technology to political theory education from the perspective of student



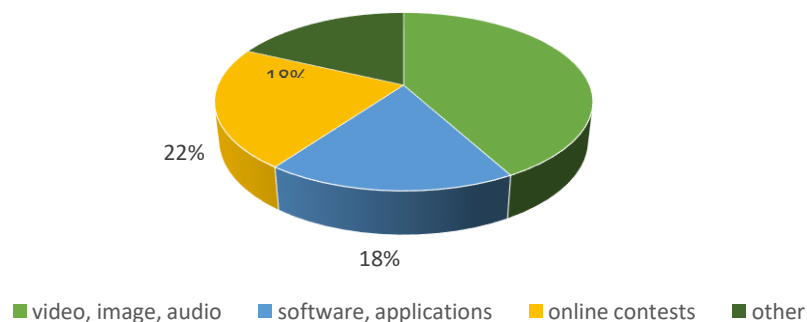
Advantages of technology when applied to political theory education for students. Through the survey process, the students commented on the following advantages: The opinion that this attracts students 21/50 answers, 11 comments that it can be used in many places, does not require a lot of time, 8 comments that using technology to educate reasoning makes it easy for students to understand. In which, there are 10 other ideas such as lots of useful information, simplifying theories, helping students access new technologies...

Students' opinions on limitations of technology application in physics education student political essay



Regarding the limitation of applying technology in political theory education for students today, there are also positive responses from students. There are 19 opinions that limit when the application of technology often occurs errors, technical problems. There are 13 duplicate comments about the limitation of overloaded content. Restrictions on how to use 9 students rated as complicated. Other answers such as: Few exchanges, not grasping students' attitudes... From there, it led to the exchange of students' opinions on proposing objective solutions.

Students propose to apply technology in political theory education



When interviewing the students, the students had suggestions for applying technology in political theory education. Most of the students recognize and base on the actual results that are being applied to propose, supplement and develop. In which, 21 comments suggested using video, images, audio, 9 comments on exploiting software and applications, 11 comments supported the continuation of online contests, 9 other comments such as: creating games play small games with technology in the learning process, create social networking accounts such as tiktok... to deploy educational content on political theory...

From the above survey results, the application of technology in political theory education is being completed with good progress. Many students have access to political theoretical thinking, helping students have new learning methods. From the student's perspective, some limitations need to be overcome.

3.2 Solutions to apply technology to students' political theory education today:

Some achievements of technology application to students' political theory education today: The application of technology in teaching and propaganda has improved the students' ability, thinking and knowledge of political theory. At the same time, the quality of teaching and productivity increase. Make it easy for students to understand. When applying technology through contests on political theory. The participating students will search for the question, in the search process it will be easier to remember. When participating, if students answer incorrectly, they can promptly correct errors, supplement and record new and correct knowledge. In teaching at school, the class is applying technology to use software to make the lecture more vivid, less rigid, dry and attract more students to listen to the lecture. Students can easily update official information through the use of technology. To avoid being lured and deceived by ideological misinformation, students themselves are equipped with regular political reasoning. Creating conditions for students to access technology and exploit it in the learning process such as designing programs, creating videos, games during presentations... Applying technology to theoretical education It helps to close the gap, save manpower, money and time. When using today's modern technologies such as the internet of things, the artificial intelligence, huge data sets, intelligent software inventions... In political theory education for students, it is accessible by students anywhere, anytime, regardless of region, creating Student friendly and approachable. Save on travel costs for participating students, costs incurred in the process of participating in external learning. Learning time when using technology software is also more flexible, can study at any time when students are free. Lecturers and organizers of lessons, activities, and propaganda for students will be easier to convey the analysis and main ideas of the lecture through images, making it easier for students to visualize. Save travel costs, shorten the distance for distant lecturers.

The outstanding achievement of applying technology to political theory education today can be said to be online teaching in the current Covid - 19 era. Since the complicated development of Covid - 19, schools have promptly adapted to transform, using technology to teach political theory subjects in particular and school in general for students. Some limitations when applying technology to political theory education today: The method of implementation is still complicated, and there are many shortcomings in its use. For technology applications in the classroom. Teachers have to spend a lot of time to develop lesson plans, design lessons, test programs. For online activities on the internet that transmit political content or encounter errors, access problems, network outages, etc. For users who often have technical problems, they cannot participate immediately, requires going through the process of waiting, processing. Many students lose data and work when using technology to test political theory subjects. The abuse of technology in the testing process, especially political theory subjects, is becoming more and more common. Students have reduced creativity, thinking minds when using technology to copy content into their own tests and exams.

A part of students is still apathetic, not actively participating in lectures and contests on political theory topics. Only participate in the form, not interested in the content. Many students do not know how to use technology in the process of studying these subjects, so they cannot keep up with the progress. As well as the ability to understand the lesson is also worse than other students. It is difficult to grasp the level of understanding and attitudes of students through competitions. There will be some cases: students fail the test, use technology to cheat in exams, sleep during online lessons...

Solutions for applying technology to students' political theory education today now:

Continue to use software on social platforms to organize online contests with educational content on political theory. But improving the way to participate does not need to log in and register, participants only need to fill in their name, student ID and the school they are studying. Encourage students to participate in creative contests using technology devices to present content on political theory. Both create a playground for students and help students consolidate their knowledge. At the same time, make the most of the advantages of technology. Embrace the trends of new technology. Applications where students are interested and actively participate. Apply it to propagate political theory education to students and application users. Regularly post good examples of political theory. Award-winning individuals with excellent performance on technology platforms. Organizing additional classes, improving political reasoning for students for free on zoom, google meet... When students participate, it will come with a bonus of training points so that students can increase their ability to be active in the classroom. work. For lecturers who apply technology in political theory education. Deploying training courses, guiding how to exploit and use technology in learning political theory. Require technical improvement of language, informatics, and technology knowledge to adapt to error situations and new problems in the future. Check the electronics, try running the program before starting. Searching for new technologies to implement its application in political theory education. Developing a model of "flexible political theory learning". Based on current advanced technology, a series of QR code scanning services have appeared. Taking advantage of it, we can compress data, political theory content like an online book. Combine with schools, libraries, public places to hang and paste QR codes. During play, entertainment and learning in schools, libraries and other places. Students can spend their free time scanning the learning QR code. Save time and effort of students when searching, can study flexibly anywhere, sometimes when needed. Create game applications on social networking platforms applied to electronic devices. In the game application, it will be in the form of answering questions, if it is correct, it will go to the next stage. Create a playground for students and consolidate knowledge.

3. CONCLUSION

In short, the application of technology in political theory education is increasingly diverse and directed by many students. Many applications and software have been exploited to serve the teaching process of political theory subjects today. But there

are still some limitations in it. However, research has shown the methods, new orientations for the development of technology application in political theory education now and in the future. Assessing the current state of technology application to political theory education for better exploitation solutions. Applying solutions to practice, the results of students equipped with political theory will be enhanced. At the same time, the implementation process will also overcome the limitations that have existed in the past time. During the application process, many new technologies will appear and the applied solutions will have to face new limitations. It is possible that the process of using it requires technical skills, the user's language level must be higher...

In the future, when technology develops to a new level. Political theory education requires adjustment and application of new technologies. The process of applying technology to go hand in hand with political life, specifically political theory education for students, will take place for a long time. Therefore, in the coming time, there will be many problems surrounding technology and politics, and political theory education requires researchers and students to explore and exploit. The application of technology in education Political theory education of students is a correct teaching method. Since applying it, the understanding of political theory has been extended to each audience, not just students. The degree of influence of political theory is also increasing in social life, many people are interested and following. Therefore, we must actively participate in technology-based political theory education activities. Developing and using technology to accelerate learning and achieve better results.

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THE APPLICATION OF DIGITAL TRANSFORMATION IN THE FIELD OF RETAIL TRADE

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ABSTRACT

Industrial Revolution 4.0 with the prospect of all computerized and connected production lines through internet-of-thing technology. The world is really transforming with this revolution. New achievements in the industrial revolution 4.0 are always discovered and applied. For commercial activities, especially retail trade, this trend is no different. Retail trade is setting new requirements to be able to meet the increasingly demanding needs of customers. What achievements of digital transformation have been applied in the field of retail trade? The research paper shows these application trends. Following this, the thesis has collected the data from primary sources using the explanatory approach of previous researchers. These analyzes indicate application trends for the retail trade sector. It partly shows how the world is operating the retail sector, thereby showing what Vietnam can further apply to further develop retail trade. We conclude that with practical benefits from digital transformation for management and business, businesses, supermarkets, agents, and retail stores in Vietnam have invested and applied technology software into business, consider this as an inevitable trend to meet the increasing demands of consumers and the competition of the market.

KEYWORDS: *Digital transformation, retail trade, information technology*

INTRODUCTION

The modern world is changing at an extremely rapid rate: old technologies are gradually being left behind, making way for new technologies with the ability to address goals more effectively.

Retail is the bottleneck in supply chains, the bottleneck. Not a single store is able to put on the shelves the entire range of goods that are supplied or produced. For a retailer, the critical task is to pinpoint the exact items to put on the shelves to maximize profits. What digital transformation can be applied to increase the efficiency of retail trade?

With small transaction volumes, spreadsheets can handle these tasks. But as the volume of trade increases, trade organizations place more and more demands on the information flows that accompany the movement of goods and enable sound management decisions to be made. The combination of information technology and the emergence of complex information infrastructures is creating new opportunities and challenges in retail chain management. Retail chains around the world are currently undergoing a transformation due to the growing spread of integrated

information systems. Accordingly, researching trends in applying digital transformation to increase the efficiency of retail trade is our main purpose.

BODY

Retail concept

Retail trade is a type of business activity in the field of trade, associated with the sale of goods directly to the consumer for personal, household, family, home use. That is based on the foregoing, retail trade is actually a relationship that arises between the seller and the buyer in the process of transferring and paying for goods. It combines seller preferences to receive income and buyer needs to receive high-quality goods and services. It is trade, realizing the produced consumer value, links production with consumption, and supports balance between supply and demand. It does not matter who and where sells goods and through what channels. They are sold to the final consumers.

Trading through information technology is developing rapidly, so today there is a fairly large variety of digital trading tools. This is an occasion to study trade with the help of IT and determine future prospects for effective development. This article focuses on retail, because there is direct work with customers, which involves its own characteristics through the digitalization of trade.

Tough competition forces us to look for new ways to fight for customers, and the integration of marketing tools and IT solutions becomes relevant. For competent and successful trading, IT solutions are needed that would be able to orient the buyer, calculate his behavior, and build individual offers. In addition, it is worth considering the main trends in retail, especially those that take into account the field of information technology.

The main trends in retail

With the help of information technology, the speed and accuracy of all processes increase. Retail competition is in the quality of the service, and the competition of the relevant information systems in ease of use or usability.

Transition of interaction with clients to social networks, for example, Instagram, YouTube. Basically, this is advertising targeting with the ability to select the target audience. Targeted advertising allows you to find a client by various indicators: gender, age, area of residence.

Now there is an omni-channel service, which implies that the client can place an order via the Internet, being anywhere in the world, pay for it in any way convenient for himself and pick up the order in a convenient place.

Another IT solution in trade is the introduction of RFID technology. RFID technologies allow you to identify objects with radio frequency tags and track their movement, speeding up the accounting of goods and guaranteeing their protection against theft. In the future, RFID tags will replace the barcodes we are used to, but

for now, only two drawbacks of this technology scare away retail chains: the high cost and the inability to recognize tags on metal cans and glass.

Reducing the material manifestation of trade in the form of shops and hypermarkets.

Laura Kennedy, the senior lead analyst in the consumer and retail practice of CB Insights, a technology insights company, said that technology tools in general, and automation in particular, will help ease the pressures of workers. These apps will make sales operations smoother and more efficient. Here are 3 trends in applying technology to retail that retailers need to anticipate in 2022: Pricing Technology, Headless tools, Smart Carts.

Integrated implementation

Integrated implementation is one of the most common information technology implementation methods used today.

Its main categories, which help to comprehensively implement information systems in trade are:

- grouping of goods and management of product categories (association of individual goods that are similar in physical properties, according to traditions of use, etc., identifying common patterns and further work with certain categories of goods); is the process of pooling similar products into a singular category and then addressing all business initiatives for that category as a whole.

Suppose we go to a regular grocery or department store, reason will naturally lead our feet to where we need to go. We will find a specific product by its category and related items. If we don't know, the signs will remind us to go to the right place.

The same intuition comes into play when shopping online. It teaches us how to organize products on the e-commerce platform. In e-commerce, product categories are displayed in the navigation system in the header of the website store. Needless to say, product assortment on an online store affects how customers find what they need - and its foundation is product assortment. Product classification (or product hierarchy) is the basis for how shoppers navigate and discover products. Setting it up creates a structure related to the products according to their attributes.

- security systems (for example, video surveillance used as a tool to determine customer behavior when purchasing certain categories of goods, and analysis of video recordings of the work of employees);
- management of electronic trade equipment;
- use of bar coding technologies;
- management of the pricing process;
- discount management (help increase sales in the store, force regular customers to purchase more products and attract new customers);
- discount management (help increase sales in the store, force regular customers to purchase more products and attract new customers);

- system of orders (in this matter, the period should be considered, i.e., how many days the stock of a particular product is calculated, so as not to there were interruptions in the supply of certain categories of goods);
- system of settlement with suppliers (prevention of delays in payment of goods to the supplier, delays in the goods themselves or their loss).

Today, the latest information and communication technologies are helping to establish a virtual conveyor for the sale of goods, bringing the retail business to new efficiency levels. Application of information products technology in retail largely determines the success of the development of a trade organization.

Application of digital transformation

A. Applying EDI technology

EDI stands for Electronic Data Interchange. EDI is the transfer of information from one electronic computer to another by electronic means, using an agreed-upon standard for structuring information" (According to the Commission's International Trade Law, United Nations committee).

Electronic data interchange is a global model of data exchange between counterparties that has replaced the traditional document flow. The main task - to standardize the exchange of transactional digital information, to provide the possibility of software interaction between computer systems of various segments, organizations, and enterprises. Advantages of using EDI technologies: automation of the interaction of accounting systems of counterparties; increased speed and accuracy data collection; availability of a communication platform, to which each client connects once and acquires an unlimited opportunity to communicate with all participants connected to the platform; help in disputable situations between partners; 70% reduction in the need for involved personnel, 80% reduction in the cost of consumables.

B. Another application of digital transformation

Data analysis systems - BI for processing a significant amount of information with greater speed, which allow you to quickly obtain summary data on the performance of the entire enterprise (for example, a SAP class system, Microsoft Dynamics AX, Oracle BI), analyze all the information available in a trading organization, regardless of the information system in which it is accumulated. The basis of this solution is a data warehouse that accumulates information from various sources and, thanks to a special structure, allows you to generate reports much faster than in ERP systems. There is no need to turn to programmers to obtain reports with the required data from different systems, upload this data to Excel, which significantly increases the speed of analysis and the quality of decisions based on it.

Customer relationship management systems - CRM. In an increasingly competitive environment, an increasing number of retailers are interested in knowing their customers better and implementing their assortment, marketing and discount policies more effectively. In addition to CRM systems, there are various IT products for

interacting with a client via SMS and specialized programs for working with bonus cards.

Store chain management systems (SCM), which remain in demand by trading companies (for example, Visual Pos Manager (VPM), which allows you to manage all cash desks and discounts of a retail chain from a single center, and which integrates with SAP Retail, Microsoft Dynamics AX, 1C, Oracle Retail, etc.). Among the criteria for evaluating the system, one can name - taking into account the needs of a particular retail segment, easy scalability with the growth of the organization, the use of modern IT development tools, a proven implementation and operation technology. Competitive advantages: functionality, reliability, and proven technologies for implementation, maintenance and user training.

Use of pocket computers or communicators (PDAs) - i.e. mobile commerce, RFID systems. These devices act as a repository of information about customers, goods, payments and are used to enter information about sales. The data is regularly synchronized with the main accounting system of the enterprise. Opportunities: registration of applications for the sale of goods; merchandising; calculation of the recommended quantity of goods for the order; accounting of cash transactions of returns, mutual settlements with the client; management of several companies; system of individual discounts; reminders about promotions, new products and discounts; catalog of photos of goods; sales agent visit planning, agent route control, GPS support, visit date and time control, etc. The system increases the efficiency of sales agents and saves their time for direct communication with customers.

Online stores

An online store is a site that sells goods over the Internet. Allows users to create a purchase order online, in their browser or through a mobile application, select the method of payment and delivery of the order, and pay for the order.

A distinctive feature of online stores is that they sell goods only via the Internet, without using traditional store trading formats, so the effectiveness of their activities does not depend on the characteristics of the location. Virtual retailers do not have to maintain a constant stock of goods, thus their operating costs are much lower than those of traditional retailers.

- Full customization. More and more online stores are implementing user behavior analysis technologies related to AI and machine learning. Intelligent technologies allow you to create an accurate portrait of the client, to study his shopping habits and online behavior. Thanks to this, stores better understand each user and make the most attractive individual offers;
- Photo Shopping. Thanks to the smart search for goods by image, you can find the item you like in online stores without even knowing its name or brand;
- Voice search. Many people use Alexa, Google Assistant, Siri for making purchases, payments, checking the balance;

- Use of video content. Video content placed in an online store directly on the product page has a positive effect on the purchasing power of customers, and also increases loyalty to the seller, increasing sales by 60-80%;
- Purchases through instant messengers. Young people are used to communicating through instant messengers, so they increasingly make purchases through instant messengers, for them it is convenient and familiar;
- Online fitting. New solutions allow consumers to immediately see how this or that thing will look in the interior. So you can choose goods for the home, clothes, household appliances and other categories of goods;
- Communication with the client using chatbots. A lot of online merchants use artificial intelligence to constantly (day and night) communicate with their customers.

The growth of the role of marketplaces. Over the past 10 years, marketplaces have been gaining ground from conventional online stores. Amazon, Alibaba, Ebay, as well as the largest national marketplaces account for almost half of the total market volume;

Case Study

A. Amazon Go

Amazon Go is a chain of convenience stores in the United States and the United Kingdom, operated by the online retailer Amazon. The stores are cashierless, thus partially automated, with customers able to purchase products without being checked out by a cashier or using a self-checkout station. As of 2020, there are 29 open and announced store locations in Seattle, Chicago, San Francisco, London and New York City. Now they are already fully working in many cities and have become commonplace for local residents.

Amazon uses several technologies to automate Go stores, including computer vision, deep learning algorithms, and sensor fusion for the purchase, checkout, and payment steps associated with a retail transaction. The store concept is seen as a revolutionary model that relies on the prevalence of smartphones and geofencing technology to streamline the customer experience, as well as supply chain and inventory management. The Amazon Go app for iOS and Android links to their Amazon account and is the primary method of paying for items at the store, alongside cash at certain locations. The app is required to enter the store, which has turnstiles that scan a QR code generated on the app.

The first thing you need to do is download a special mobile application to your smartphone - it generates a QR code, without which you can't go inside. Moreover, if you do not go shopping alone, then you need to scan the code on the turnstile as many times as people. The system itself will "remember" everyone thanks to computer vision technology and place the products in a single basket.

The entire ceiling of the supermarket is hung with artificial intelligence cameras, and the shelves have special sensors that monitor leftovers. If you change your mind about taking something, then just put the product back and it will automatically disappear

from the basket. In addition to buyers in Amazon Go, you can only meet employees who replenish stocks of goods and consultants who help in case of system errors and answer questions.

B. Homeplus virtual stores

In South Korea, Home plus is a major global efficiency levels. Home plus opens the world's first virtual grocery store. At Korean subways have virtual shelves with images of products and their QR codes. To make purchases, you must register on the retailer's website. When you point the camera at the QR code of the product will be added to the "basket" and then delivered to your home.

People could meet Tesco Homeplus wherever they go, not having to visit the actual store. Moreover they could make good use of the wasted times and enjoy their free time. After this campaign, on-line sales increased tremendously (Nov.2010-Jan.2011). Through this campaign, 10,287 consumers visited the online Homeplus mall using smartphones. The number of new registered members rose by 76%, and on-line sales increased 130%.

Solution

In Vietnam, not only businesses and supermarkets apply digital transformation in management and business, but food and beverage shops, fashion shops, and retailers in Vietnam have now also extensively applied digital transformation into retail trade.

To increase competitiveness, businesses and business establishments need to apply digital technology to connect and interact with customers. Here are some solutions to develop retail trade activities for Vietnamese businesses:

Firstly, select suitable retail models according to resources and capabilities; expanding online sales on trading platforms such as Alibaba, Lazada, Sendo... to develop online stores. Businesses and business establishments can integrate their website with social networks, forums or sales on mobile platforms to increase the number of customers viewing the website and increase sales.

Secondly, promote the combination of e-commerce with existing distribution types, forming a multi-channel distribution method in accordance with the general development trend in the world.

Third, businesses and business establishments can participate in training classes on management such as executive skills; financial management; orientation skills, planning... to improve efficiency in business administration.

CONCLUSION

Thus, we found that information technology contributes to the manifestation of positive effects and the reduction of negative ones in any market trends, as can be seen from the example related to free services. IT solutions can help reduce the cost of providing services in the future, due to which the client has to cover costs less or increase the profit of the seller. It is also associated with a decrease in various types of losses - reducing the cost of warehouse operation, in the case of the omni-channel

service, preventing loss expensive goods with the help of radio frequency tags, reducing transaction costs and the cost of finding the target, in addition, all this contributes to the retention of regular customers, where the economic feasibility has been proven by research.

The use of information technology in retail trade largely determines the success of the development of a trade organization. Information products are designed to simplify and improve the system for monitoring the company's operational activities (finance and costs, stocks and warehouse, purchases and sales, receivables and pricing policy), manage relationships with customers and suppliers, and control the sales process. If earlier the market offered solutions that were affordable only for large companies, then in recent years, full-fledged automated mobile trading systems have appeared that are available even to small businesses. In today's market, only those who constantly develop and use new technologies manage to maintain a competitive position. After all, as a result of implementation, there is a reduction in operating costs, additional income due to an increase in turnover and/or investment attractiveness of the company.

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AUTOMATED VISUAL QUESTION ANSWERING USING STATE-OF-THE-ART DEEP NEURAL NETWORK MODEL

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SUMMARY:

This research investigates the robust baseline model as well as the development of a basic system for Visual Question Answering. The field of Visual Question Answering (VQA) is now a developing field with numerous languages and image sources [1] that provide many benefits in practice. We shall construct a Deeper LSTM model within the scope of the study. In addition, we were successful in developing an automated VQA system. Our system could answer image-related questions fast and effectively based on model results from the Deeper LSTM approach and the Flask app supported by Python. This is beneficial in implementing the idea into reality and has far more development potential.

KEYWORDS: *Visual Question Answering, Deep neural network, Computer Vision, Natural Language Processing.*

1. PROPOSAL AND RESEARCH OBJECTIVES:

1.1. Proposals:

Visual question answering (VQA) [1] is a relatively new field that has gained interest and made significant progress in recent years [3], [4]. VQA is also a promising research field that combines natural language processing with computer vision. A VQA system could extract a correct answer to a question based on an image and a question related to it. Although the task is straightforward for people, computers find it extremely difficult. It is regarded an ambitious objective to create a system that can automatically answer questions based on random images. Great advancements have recently been achieved in addressing the VQA task, thanks to the development of modern machine learning algorithms and the implementation of a number of relevant research [2], [5].



English

- **Question:** how many people is riding on an elephant on a dirt trail?
- **Answer:** three

Vietnamese

- **Question:** có bao nhiêu người cưỡi voi trên con đường mòn?
- **Answer:** ba

Japanese

- **Question:** 汚れの道に象に乗っている人は何人いますか
- **Answer:** 三



English

- **Question:** what is eating the grass?
- **Answer:** horses

Vietnamese

- **Question:** con gì đang ăn cỏ?
- **Answer:** con ngựa

Japanese

- **Question:** 草を食べているのは何ですか
- **Answer:** 馬

Figure 1.1. Several example of the Visual Question Answering task.

VQA is beneficial in our daily lives. For example, we could implement automated visual question answering systems into the Chatbot platform to answer questions and discover information. Many real-world situations require visual question answering systems, such as customer service, recommendations, question answering, conversation, and customer system administration. Furthermore, it offers incredible capabilities for situations such as notifying displays to important and vital information in their surroundings.

We realized the significance of visual question and answer (VQA) systems to people. Moreover, analyzing models that have been and are being studied throughout the world to use and improve on the created data sets, such as LSTM[2]. Then, build the system so that Flask is easy to use. Finally, we discuss potential future possibilities for VQA and work with models to enhance outcomes and lead to more practical applications.

When it provides an additional solution to explore the field of question and answer on images, the topic has scientific significance. Furthermore, it aids in the implementation of practical solutions while developing apps in a variety of domains such as security, education, and healthcare.

1.2. Research Objectives:

In addition to contributing to the scientific research community, we constantly strive towards the ultimate goal of scientific research, which is to benefit society. The goal of developing models on the dataset is to utilize these models for practical applications in order to generate solutions that benefit the community. Moreover, the research aim to help people less fortunate who have lost sight by addressing questions about their surroundings and obtaining answers.

2. RESEARCH METHODOLOGY:

To develop an effective solution to the VQA task, we decided to employ the Deeper LSTM model, which has been used in the majority of research on automated VQA. According to Stanislaw et al., this model was created with the goal of making model training and inference faster than previous models. The model structure is divided into two parts: the multi-layer perceptron (MLP) and the LSTM model, which generates the answer using a softmax layer.

The LSTM model encodes the words in the question using word embedding, followed by a linear transformation of the image features to the size that corresponds to the LSTM encoder in the question. Questions and images are encoded using element-wise multiplication.

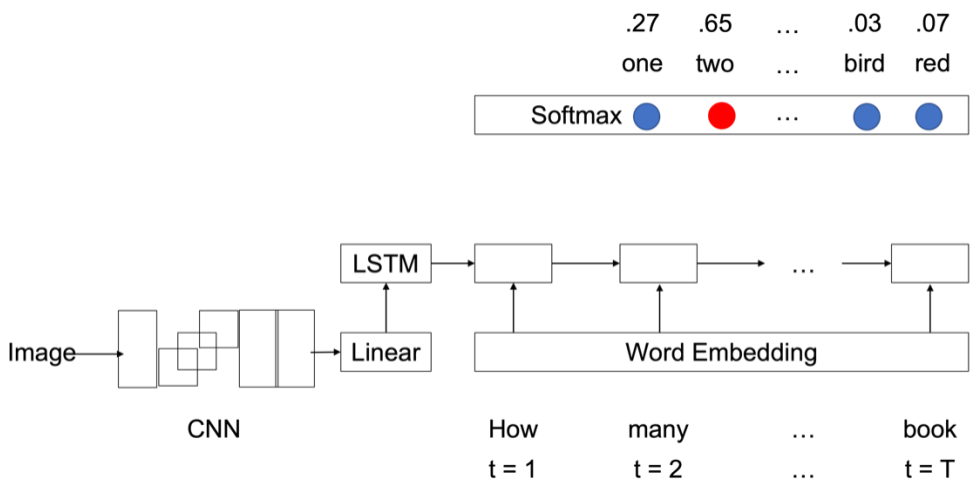


Figure 2.1. Overview of Deeper LSTM model architecture.

When developing the application system, we constantly strive to prioritize the user experience, particularly the processing speed, in all processes done on the developed system.

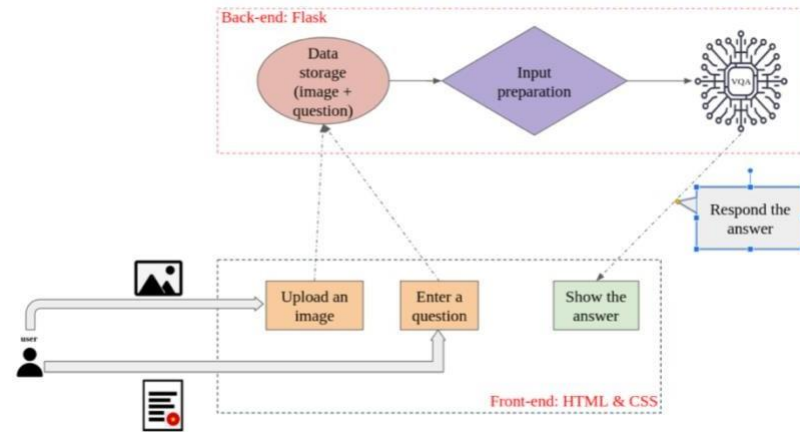


Figure 2.2. The operating procedure of the VQA system.

Create a front-end that receives photos, questions, and displays answers:

- We build a website interface so that users can easily interact with the system and test the automatic Q&A on images.
- Images and questions submitted by users will be saved as data by the system in order to predict the answers.
- At the end of the process, the system displays the answers corresponding to the images and the questions that was received.

Build a back-end that processes the input data and uses the trained model to predict the answer:

- Following the receiving of images and questions from users, this data will be delivered using the feature extraction processing procedures mentioned above. The processed data will be used to feed into the prediction model.
- The prediction answers will be sent back to the front-end for the user to view.

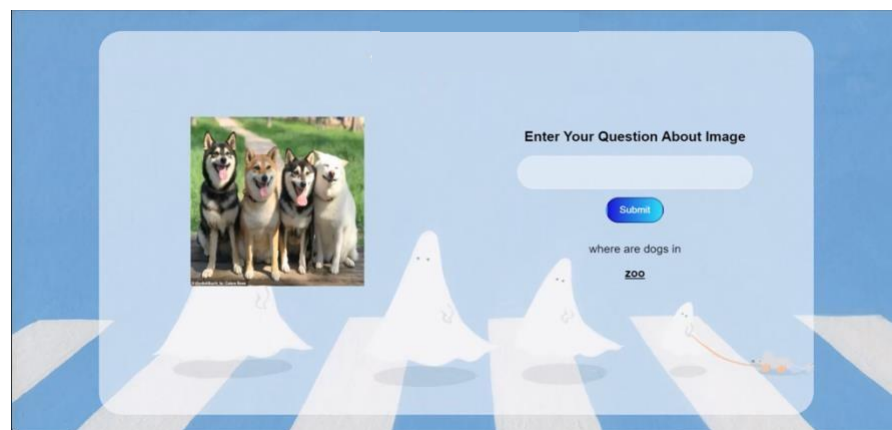


Figure 2.3. User interface of our VQA system.

3. Conclusion:

Visual question answering (VQA) is a hybrid of Natural Language Processing and Computer Vision that has the potential to revolutionize the field of artificial intelligence. In terms of experimental and research approaches, this is an area with numerous challenges as well as significant promise for exploitation. In this study, we implemented state-of-the-art (SOTA) deep learning models in the VQA task to construct applications and produce favorable outcomes.

We would like to perform analysis and enhance the quality of QA pairs as well as increase the size and variety of the dataset in the future. Moreover, we will continue to fine-tune the model parameters in order to discover the model that provides the best performance and user experience when using the application.

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MARKETING EFFECTIVENESS OF VIRTUAL VERSIONS: STUDY ON IMPACT OF FACTORS OF REAL INFLUENCERS AND THEIR VIRTUAL VERSIONS ON GEN Z CUSTOMER ENGAGEMENT WITH BRANDS

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ABSTRACT

This study is to explore the factors of Real Influencers and their Virtual Versions affecting the Engagement between Gen Z Customers and Brands. The author uses mixed research methods: qualitative research by conducting netnography through Internet community and 1:1 semi-structured interview; combined with quantitative research surveying 143 customers of Gen Z, then analyzing through SEM linear structure model by SMART PLS software. The results show that: Visual and Anthropomorphism of Virtual Version have positive impacts on Customer Attraction, which in turn affects Customer Engagement with campaigns and brands. Furthermore, Real Influencer is found to be mediating the relationship between Customer Attraction and Engagement significantly. The extra value of this paper is to provide deeper insights and useful information for administrators and marketers when using virtual versions of real influencers in marketing strategy.

KEYWORDS: *Virtual Versions, Virtual Influencers, Real Influencers, Customer Engagement, Customer Attraction.*

I. INTRODUCTION

The dramatic development of technology has led to a new type of influencer being generated by computers, which is Virtual Influencers. There are now more than 130 Virtual KOLs around the world in the luxury fashion industry. This brought on the emergence of the virtual version that could be called the digital twin of celebrities in modern marketing trends. The features or characteristics of Virtual Versions are graphically created based on Real Influencers and can increase their influence by interacting through social media. Using Virtual Influencer as a new marketing campaign has been applied by many big brands and created a significant engagement effect. For instance, Virtual Colonel of KFC attracted more than 150 million searches over two weeks, or DIOR's Angela 3.0 attracted more than 90,000 interactions on Weibo. Furthermore, in Vietnam, Virtual Version marketing has been applied by Clear called "Toc Tien Clear Head".

The effectiveness of Influencer marketing in customer interactions is proven by many related previous studies, Domingues Aguiar and Reijmersdal (2018) argued that brands using influencer marketing can increase customer engagement. However, there are few studies about customer engagement influenced by virtual influencers - the new trend in AI marketing. In a recent study on virtual influencers in 2022, Wietske Wolff demonstrated that whether an influencer is real or virtual had no direct impact on customer engagement but it had an indirect effect which is mediated by attraction. The direct impact of attraction on customer engagement has not been

studied in depth, especially for computer-generated influencers. This study focuses on observing both the direct and indirect impact of Attraction on Customer Engagement in the Virtual Version marketing campaign, which is expected to be a new marketing trend. Moreover, the author also tests the influence of Real Influencers on the effectiveness of this marketing strategy through the mediating role, which could contribute to the success of the combination of real people and virtual versions in the Virtual Versions marketing strategy.

Based on the literature review discusses the extant studies related to the context of the present study and helps conceptualize the proposed research hypotheses. The data analysis section tests the proposed hypotheses to draw conclusions and identify the potential contribution of the study.

II. LITERATURE REVIEW AND RESEARCH HYPOTHESES

Attraction Theory and Theory of Customer Engagement Marketing

Attraction theory (McCroskey & McCain, 1974), which studies the relationship between people, shows that the more attracted, the more people make a connection and engagement. The theory consists of three elements: Social attraction, Physical attraction, and Task attraction. In terms of advertising and marketing, influencers will create impressions through elaborate images and cultivate customers a positive thought about the product, which leads to purchase intention, word of mouth, and more (Argyris et al., 2020).

Theory of Customer Engagement Marketing (Colleen et al. 2016) mentioned that a business launches particular strategies based on the contribution of customers to the firm's marketing function. Many academics agreed that customer engagement leads to behavioral results; including word of mouth, recommendations, and online interactions or engagement (Vivek et al., 2012; Brodie et al, 2011). Previous studies have found that an effective marketing campaign in interaction can enhance customer satisfaction; increase the value of the business (Malthouse, 2013; Nambisan, 2002).

Based on these theories, Virtual Versions are expected to add further benefits to increase the attraction and engagement of customers toward marketing campaigns and brands.

Anthropomorphism, Visual and Content of Virtual Versions influence Customer Engagement

Anthropomorphism refers to the attribution of human characteristics to non-human beings (Epley et al., 2007), such as human-like appearance and emotions (Kim et al., 2020). The more human-like virtual influencers are, the more people will accept them and will result in a higher level of social presence (Schroeder & Epley, 2016), thereby developing attraction and trust.

Visual or outlook is often devoted in advertising to attract customers' attention, thereby influencing and stimulating their interest (Sandra, 1987). If an Instagram influencer's posts are visually attractive, followers may perceive him/her as a good

taster and expert (Ki & Kim, 2019). Thus, the author focuses on the external aesthetic image of Virtual Versions in this study to investigate how customers are impressed.

Advertising content is information about products and services; it provides customers with informative and entertainment values (Chen Lou & Shupe Yuan, 2019). The advertising content is created through the form of images, videos and stories in creative ways which help influencers to interact with their followers (Tafesse, W., & Wood, B., 2021). Novelty and creativity are the most significant advantages of using Virtual Influencers in general and Virtual Versions from real people in particular, increase customer attraction.

Based on the above arguments, the following hypotheses are proposed:

H1, H2, H3: Anthropomorphism, Visual and Content of Virtual Versions respectively have a positive impact on Customer Attraction.

Customer Attraction and Customer Engagement in Marketing Campaigns using Virtual Versions

Attraction is related to personality, appearance, behavior, talent, etc., or exclusive values of celebrities toward their followers. (Torres, 2019). Brands applying Influencer Marketing can not only boost sales but also involve attracting potential customers' attention, creating word of mouth, and especially driving customer interaction (Brown & Hayes. 2008).. Hence the following hypotheses are proposed:

H4: Customer Attraction to Virtual Versions has a positive impact on Customer Engagement.

Key factors of influencers such as Reputation (Ryu, E., & Han, E. 2021) or Inspiration (Ki et al. 2020) could result in good relationships between influencers and customers. Therefore, Real Influencers are expected to play an important role in the exposure of customers to a digital twin marketing campaign that result in engagement. Hence the following hypotheses are proposed:

H5: The effect of Customer Attraction on Customer Engagement is mediated by the Real Influencers on which Virtual Versions are based.

III. RESEARCH METHODOLOGY

Qualitative research

Netnography study is adopted as a qualitative approach by collecting opinions by observing occurring discussions from the online communities on virtual influencer ads and Marketing campaigns using Virtual Versions of real influencers. General conclusions about people's reactions on the Internet can be drawn from there. Then, using semi-structured face-to-face interview method, interviewees are gen Z and experts in order to have a broader and more in-depth view of researchable factors.

Quantitative research

An online survey is conducted on the Google Form and set up a questionnaire based on a Likert scale with 5 levels: (ranging from 1: *strongly disagree* to 5: *strongly*

agree) in order to collect primary data for measuring marketing effectiveness. There are 143 valid answers used as input data, all respondents are Gen Z (73.4% female, 25.2% male), mostly students in universities in Ho Chi Minh City.

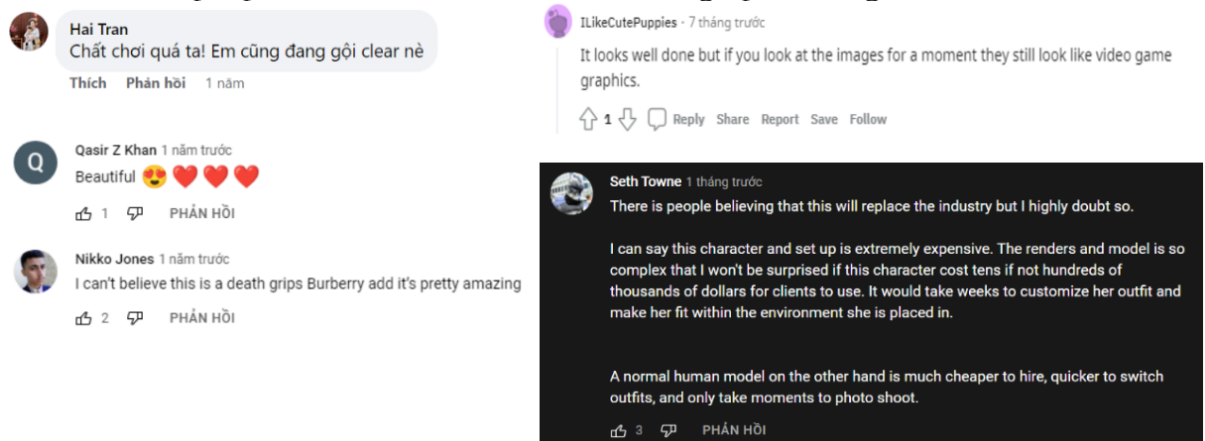
The author uses collecting data to analyze and test hypotheses through SEM linear structure model using SMARTPLS software combined with filtering data by SPSS.

Check the feasibility of the construct through the Outer Loadings test; scale reliability by Cronbach's alpha index (DeVellis, 2012) and composite reliability CR (Hair et al., 2016); convergence with the average variance extracted index AVE (Hock & Ringle, 2010); discriminant through square root index of AVE (Fornell - Larcker, 1981) and HTMT (Hair, 2010).

IV. RESULTS

Qualitative research

The result shows that while the majority of gen Z interviewed and more than 90% of Internet users are positively attracted by beautiful graphics and fresh images, there are still some people who are not satisfied with the graphic design of Virtual Versions.



Besides, it also indicates that Internet users and interviewees are extremely interested in the human-likeness of the Virtual Version such as the charming image and interesting life of Colonel KFC Virtual Version via Instagram posts. Therefore, the main factors creating the Attraction for Virtual Influencers in general and Virtual Versions of Real Influencers, in particular, are pointed out including Visual AI graphics, Anthropomorphism of the Virtual Version - the more lifelike and vivid, and Advertising Content.

The expert and Gen Z interviewed said that this marketing campaign creates newness in product marketing, thus enhancing impression and perception in Virtual Version or brands using this idea. This results in curiosity, then finding more and sharing with people around. However, the purchase intention hardly increases, because more than $\frac{2}{3}$ have no trust and just under 10% intend to buy the product out of interest in the Celebrities on which the Virtual Versions are based.

Quantitative Research

The result of testing the reliability indicators of the constructs and the observed variables showed that all the figures well exceeded the confidence threshold when the Outer Loadings coefficient was greater than 0.5. The Cronbach's Alpha values of the variables are all above 0.7, showing that the evaluation factors are acceptable. All variables have Average Variance Extracted AVE higher than the required threshold of 0.5, showing great reliability, convergence and close correlation with each other.

Two main evaluating indicators for testing the research model are Impact coefficient (β) and p-value. This study uses a confidence level of 95%, which means that the correlations must have a p-value less than 0.5 to be accepted. The result in the table below shows that while the H3 hypothesis is rejected ($p\text{-value} = 0.989 > 0.05$), the rest are supported. Customer Attraction has the most impact on Customer Engagement with $\beta = 0.651$.

Hypothesis testing results

	β	t-value	p-value	Result	f^2	Impact size
Direct effect						
H1: ANTH -> CA	0.287	3.394	0.001	Support	0.094	Small
H2: VIS -> CA	0.469	5.561	0.000	Support	0.240	Medium
H3: CON -> CA	-0.001	0.013	0.989	Reject	0.000	
H4: CA -> CE	0.651	8.101	0.000	Support	0.778	Large
Indirect effect						
H5: CA -> RI -> CE	0.107	1.997	0.046	Support		

According to these results, the official research model of the study is summarized:

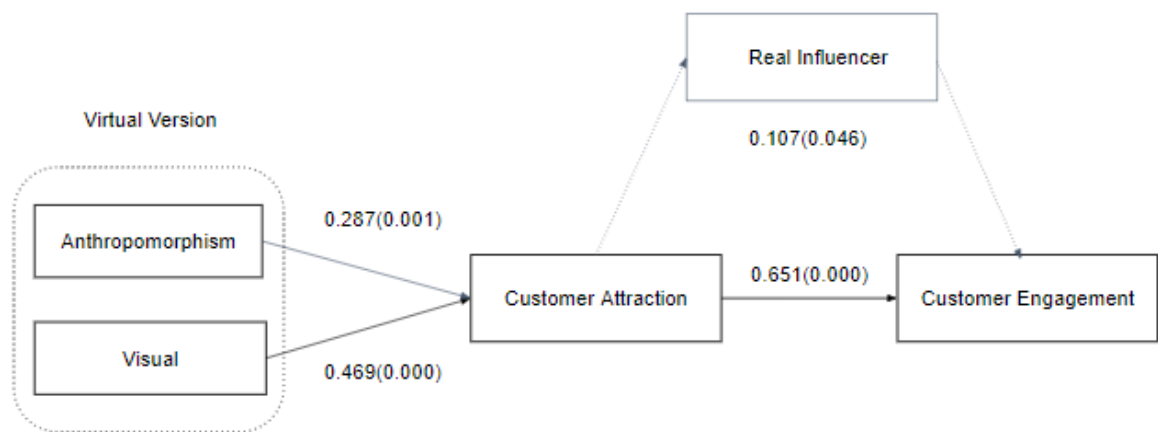


Figure 3.1.

VI. CONCLUSIONS

Qualitative research result through the Internet combined with short interviews indicate that marketing using Virtual Versions will increase the attractiveness of Gen Z while not having much effect on brand trust and purchase intention. Quantitative research shows that the factors of Virtual Version are Visual, Anthropomorphism exhibit positive impacts on Customer Attraction to the campaign while the Content has no effect. Besides, the result obtained indicates that Real Influencers play a mediating role in the relationship between Attraction and Customer Engagement, thus unraveling the new role of Real Influencers which Virtual Versions based on in marketing effectiveness of this marketing campaigns. It can be concluded that Virtual Versions Marketing creates marketing impacts effectively with Gen Z, especially on enhancing engagement.

Virtual Versions that are used for marketing not only have the visual, personality, and thoughts like a human but also are not confined to a specific space and time limit. Another plus is avoiding risks such as scandals from celebrities' private lives. Moreover, the research result shows that Attraction affects Customer Engagement significantly and leads to marketing success. These marketing campaigns should be considered and become mainstream in the future. However, brands have to research the market carefully because of the limited sample of this study (mostly study on students, which might be sampling bias). Future research can make more investigation of the target audiences based on demographic characteristics and social media behaviors. As virtual influencers or AI versions of celebs are not well-known in Vietnam now, it is desirable to dig deeper into the sample classification such as the level of domain expertise, comparing cross-national and cross-cultural studies in the future. Because Real Influencers play an important role in mediating the relationship of Customer Engagement with Marketing Campaigns using Virtual Versions, administrators should take their aspect into consideration when running these campaigns. We also have some following recommendations for administrators and marketer: First, Virtual Version's Visual requires constant improvement in AI

graphics technology to be consistent with real influencers, which should be more emphasized and invested in due to the most significant impact on Customer Attraction. Second, the brand should focus on creating the Anthropomorphism of the Virtual Versions such as maintaining their online activities via social network sites or articles, applying chatbots for communication and interacting with followers. On the other hand, some other reliable variables of Virtual Versions including reputation, authenticity, social interaction, etc. and extended effects for the outcome variable such as behavior, intention, or trust need to be further studied for a more comprehensive marketing campaign.

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MULTI-CLASS VEHICLE DETECTION BASED ON YOLO

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ABSTRACT:

In recent years, vehicle detection has become essential tasks in intelligent transportation systems and the accurate detection of vehicle from image data for traffic monitoring remains challenging. To solve the problems of intelligent transport systems, it is necessary to recognize the reality of the happening things. If we want to have parameters like the volume of traffic on the road or the traffic congestion, we have to recognize every vehicles on the road. In addition, the development of automatic-driving car is associated to object detection, especially vehicles on road, to keep a safe distance between other cars, reducing collision, handling many cases could happen to driving way, etc. In this paper the project's method concentrates on vehicle detection. We focus on the computer vision aspect. Experimental results indicate that the proposed method of custom model based on YOLOv4 achieved the highest classification accuracy of 89.97% in our testing data.

INDEX TERMS: *Computer vision, image processing, vehicle detection, YOLO, detection, tracking*

I. INTRODUCTION

Traffic monitoring with an intelligent transport system provides solutions to many different problems such as examining the number of vehicles on the street, estimating the speed, detecting accidents, and supporting traffic monitoring. The traffic monitoring system means basically detecting vehicles that appear in the videos and determining the actual locations. In case the video has many different kinds of vehicles and high traffic density, it is very difficult to determine locations and classify means of transport precisely in heavy traffic. Moreover, in different weather and environmental conditions, and in case there are many similar vehicles, the capacity to detect is relatively low. So, the accurate and rapid detection of vehicles has theoretical and practical significance.

With the rapid growth of computer vision and artificial intelligence technology, the algorithms for detecting objects based on deep learning have been extensively researched. These algorithms extract features automatically through machine learning. Some of the brilliant object detection networks such as SSD, Fast R-CNN, YOLOv3 and YOLOv4 were implemented to detect traffic volume by using a deep learning object detector. Huang et al. suggested a single-stage deep neural network called YOLOv3 and applied it to the dataset which was created in different environments to improve the real-time detect accuracy. Hu et al. recommended a

detection algorithm YOLOv4, which depended on video flows, as it has changed the speed of the detection improvement. Moreover, the most noticeable problem involved in traffic monitoring system is real-time operation to locate and classify means of transport precisely in heavy traffic and the number of traffic jams in total that militate against traffic monitoring. Thus, YOLO was developed like an efficient algorithm, based on regression for real-time detection and collecting statistics from traffic flows.

This research presents a real-time traffic monitoring system based on YOLO to increase counting efficiency and to classify vehicles. The contributions of this research are described as follows: (1) Real-time traffic monitoring system based on the YOLO model to classify moving transports. (2) Real-time traffic monitoring system is developed for real-time vehicle counting. (3) Our datasets are used to verify various methods and the proposed method of YOLO achieving the highest classificatory accuracy.

The rest of this study is divided as follows. Part 2 describes materials and methods, including the preparation for the data set, identification method, and classification vehicle method. Part 3 presents the result and discussion about the vehicle counting system and real-time sorting which was based on YOLO. Finally, part 4 presents some observations and an outline of future research about real-time traffic monitoring.

II. MATERIAL AND METHODS

To identify and count the number of vehicles in traffic videos recorded, this research carries out identifying, counting, and classifying vehicles based on YOLO; besides, it also detects the movement of vehicles based on comparing the central position of tracked vehicles and detection line.

A. Data set Preparation

The data set used in this study was prepared by collecting traffic videos recorded by online cameras installed along various roads in India. The data set was prepared from images collected on the Internet and others which were recorded with cameras installed along roads in India as well as images were published on Youtube, from videos recorded with security cameras. The collected images would be labeled based on the form of YOLO with 5 different features. Each row is a labeled object with *class id x center y center width height* format. The *class id* is the index number in the prepared classes names file, the rests imitate objects' rectangle bounding box. *x center* is the value that represents the center position of the object related to the horizontal frame. *y center* is the value that represents the center position of the object related to the vertical frame. *width* and *height* is the length and height of the bounding box. The collected data set is labeled including 4 different labels: car, motorbike, bus, and truck. Figure 6.3 shows four images were collected in different places and conditions.

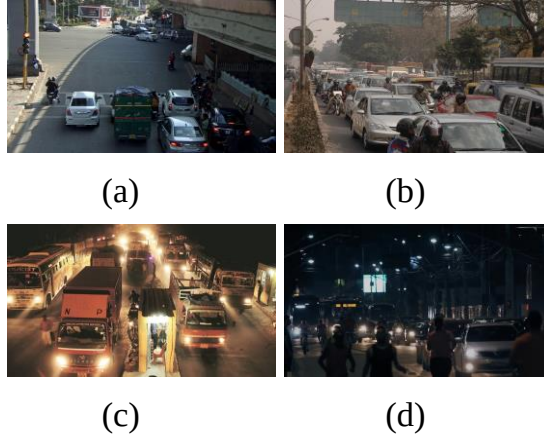


Figure 2.1. Images in collected dataset from India

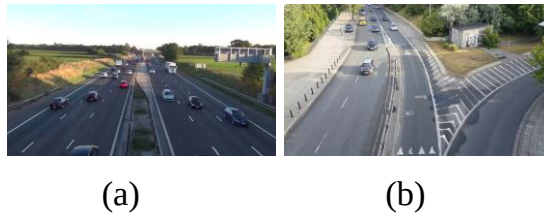


Figure 2.2: Images collected on Internet

B. Model Architecture

We used the YOLO algorithm to classify transportation. One of the reasons why YOLO is chosen to detect and classify is that it is faster than current recognition models although its accuracy is not so outstanding. YOLO is the most suitable and it is easier to access in real-time processing. Besides, YOLO also makes the prediction based on one single network which means that it can custom and train end-to-end to improve the accuracy compared with the actual data received. The most important thing is that YOLO recognized objects per grid cell, it carries more various predictions to give the final result. Description for the structure of YOLO used in this study. YOLO is a Convolutional Neural Network (CNN) used for real-time object detection.

YOLOv3

The YOLOv3 algorithm continues the basic idea of the first two generations of YOLO algorithms. First of all, YOLOv3 added 53 convolutions that skip connections, so it is called the Darknet-53 network. The Darknet-53 network totally includes 3 prediction layers that allow YOLOv3 to predict different spatial compressions. The detection takes place in every layer as the following:

- The first layer, in the 82nd layer, if the input image has dimensions 416x416. we will get a feature map of 13 x13 and lead to a detection feature map of 13x13x1024).
- The second layer appears at the 94th layer where we get a detection feature

map of 26x26x512.

- Finally, at the 106th layer where we obtain a detection feature map of 52 x 52 x 256.

Figure 2.3 shows the positions of all the layers in the architecture

The first map of 13 x 13 is used for the detection of large objects, 26 x 26 for medium objects and 52 x 52 for small objects. Furthermore, since the detection feature map for a small object has a greater value, YOLOv3 is extremely accurate in detecting small objects.

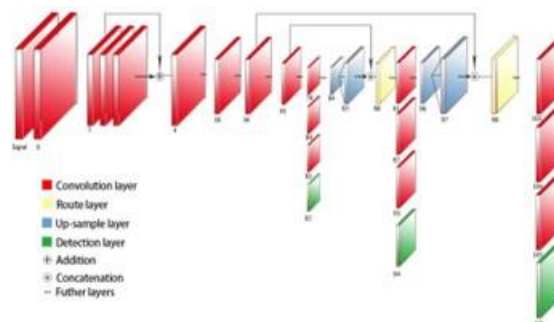


Figure 2.3: YOLOv3 Architecture

YOLOv4

YOLOv4 is the basis of YOLOv3, scales both up and down and is applicable to others networks while maintaining optimal speed and accuracy. The YOLOv4 shows greater advantages than many other tradition methods such as ATSS (Adaptive Training Sample Selection), ASFF (Adaptive Spatial Feature Fusion), EfficientDet and Centre Mask. YOLOv4 is among the quickest object detection systems, with high precision and decent real-time efficiency.

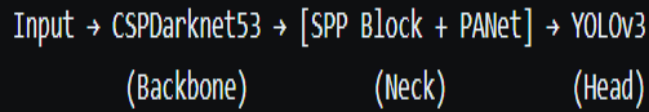


Figure 2.4: The sequence of YOLOv4 network

Backbone Network: YOLO's authors initially considered CSPResNext50, CSPDarknet53 and EfficientNet-B3 as the backbone networks. Finally, after a lot of testing and experimental results they chose CSPDarknet53 CNN [1]. CSPDarknet53, which is based on the DenseNet design, concatenates the previous inputs with the current input before proceeding into the dense layers. CSPDarkNet53 consists of two blocks: Convolutional Base Layer and Cross Stage Partial (CSP) Block.

Neck: The neck collects feature maps from the different stages of the backbone then mixes up and combines them for the next step. An additional block called SPP (Spatial Pyramid Pooling) is used to increase the receptive field and separates out the most significant context features, it also has almost no effect on network operation speed. The main role of PANet is to improve the process of instance segmentation by keeping the spatial information which helps in proper localization of pixels for mask prediction.

Head: YOLOv4 uses YOLOv3's Head in the Head module. The main function here creates bounding boxes and performs the classification. The bounding box (x, y, h and w) are detected. Here the x & y co-ordinates are the center of the bounding box expressed related to the boundary of the grid cell. Value w & h are predicted and related to the whole image.

Our custom model

After making a comparison between YOLOv3 and YOLOv4, we recognise that YOLOv4 has better detection performance for occluded and overlapped objects. Due to the essential difficulty of vehicle detection, the overlapping and occlusion of vehicles, YOLOv4 is more suitable as the vehicle detection algorithm embedded in vehicle detection than YOLOv3. Therefore, our custom model based on YOLOv4 architecture with its inherent features.

III. VEHICLE DETECTION AND CLASSIFICATION

In this study, to detect and classify vehicles, we used collective images for training the customized model which is created base on the YOLOv4 architect. After that, we make a combination with trained model and program to count, and track vehicles with implemented functions. In training process, when the recognized object in a label was available, all the bounding boxes of the objects are extracted, and passed to the YOLO model to be classified. However, as YOLO can duplicate detections on the same object; we need to attach non-maximal suppression to fix this error and remove duplications with lower confidence.

IV. VEHICLE COUNTING

The recognition of vehicles as objects enclosed by boundingboxes is the premise for the implementation of counting the number of vehicles recognized by the model. Combine with id-class, which was predicted from the results of the model classification, to count the number of each vehicle type in each frame. Whether the exactly number of vehicles that can be performed depend entirely on the number of boxes defined per id-class. If there are more than one bounding box of an object, it will result to more counted numbers as well as the model's fail to recognize the object in the image and it will also reduce the number.

v. VEHICLE TRACKING

Based on the box identified from the model with indexes including to coordinate of the object. Thus, we need to keep track of each frame continuously to identify the movement of the coordinates of the object's center point, compare that coordinated with the defined line in the middle of the frame. If an object has a midpoint moves through a line, it will be determined to have moved in some direction. If midpoint go through a straight line from below, it is moving up and vice versa if it goes through a straight line from above, it is moving down.

vi. RESULTS AND DISCUSSION

Training process with handing label dataset

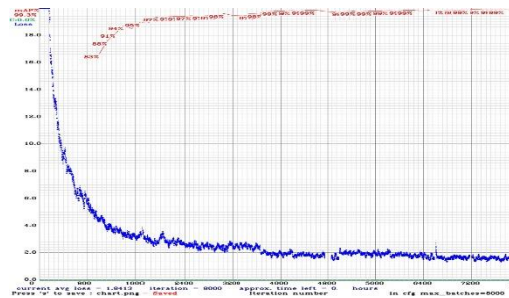


Figure 6.1: Training chart

The parameters of the model are performed through the number of iterations during training process in the TABLE I:

- Precision – Reliability of the model. This parameter will show the value that model predict positive, how many % of them are correct.

$Precision = Intersection / Detected\ box$

- Recall – Sensitivity of the model. This parameter will show how many positive prediction of real object can be correctly captured by the model in frame.

$Recall = Intersection / Object$

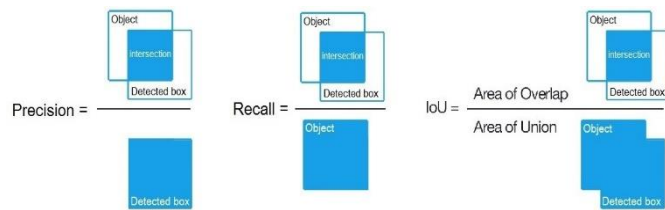
- mAP - mean Average Precision. For each class in the

problem we will have an AP(Average Precision) value. In this case, mAP is simply the average of AP values of different classes.

- IoU - Intersect over Union. Average intersect over union of objects and detections for a certain threshold = 0.25. This parameter can be calculated by the quotient between Area of Overlap and Area of Union

$$\text{Recall} = \text{Intersection} / \text{Union}$$

The best model is selected at the state that gives the highest mean average precision, we're also concerned with IoU parameter.



Iterations	Model based on YOLOv4			
	Precision	Recall	mAP(%)	IoU(%)
4000	0.90	0.95	98.28	76.69
5000	0.90	0.97	98.69	76.89
6000	0.91	0.98	98.87	77.63
7000	0.92	0.98	99.32	79.77
8000	0.92	0.98	99.34	80.30
Best	0.92	0.99	99.42	80.09

TABLE 6.1: Model's Parameters

AP(%)				mAP(%)	IoU(%)
Car	Motorbike	Bus	Truck		
99.06	99.19	99.53	99.88	99.42	80.09

TABLE 6.2: Best status of model trained with hand-label dataset

Training process with pseudo-label dataset

We found that the model trained on the hand-labeled dataset had a lower recognition efficiency compared to the original YOLO model, so we redirected the model training through the selected dataset whose label is pseudo-label labeled by original YOLOv4 model. The results of pseudo-labeling show that the number of objects identified in the photo is relatively large and not suitable for the target audience, so it is also necessary to remove inappropriate objects and adjust the object's id-class corresponding to the model under construction. The model parameters shown in the table below are completely similar to the concepts and calculation methods mentioned in the previous section.

Iterations	Model based on YOLOv4			
	Precision	Recall	mAP(%)	IoU(%)
4000	0.87	0.95	95.99	75.64
5000	0.83	0.96	95.99	72.36
6000	0.89	0.94	96.33	77.68
7000	0.89	0.95	96.93	79.15
8000	0.89	0.95	96.90	79.41
Best	0.89	0.95	97.01	79.54

TABLE 6.3: Model's Parameters

Testing process

Photos with all the objects that the project is aiming at and recorded in many different lighting and weather conditions are distilled to serve as a common test for the models to be compared. In this set, with each image containing only one object, belongs to the group of objects that can be recognized by the naked eye. The aim of this test is to make a general assessment of the ability to classify vehicles in a frame because it is difficult with our ability to evaluate the recognition accuracy through the bounding box.

Model	Classification accuracy
Original YOLOv4	91.56%
Train with Handing-label dataset	87.63%
Train with Pseudo-label dataset	89.97%

Table 6.4: Comparison classification accuracy

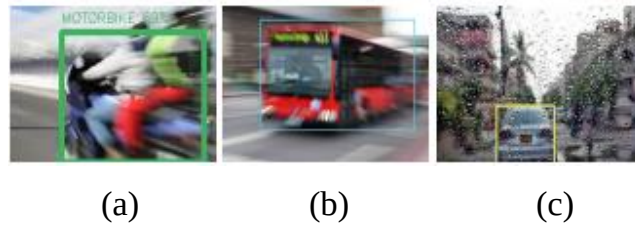


Figure 6.2: Objects can be detected

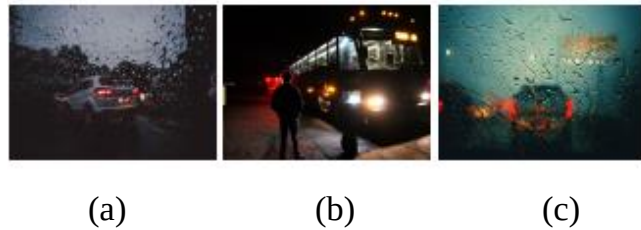


Figure 6.3: Objects can not be detected

Reality Experiment

The images and videos recorded in the field on the roads in Ho Chi Minh City are taken as documents to determine the practicality, development ability and real application of the model. The model selected for the experiment is the group's trained model under the label pseudo-labeled through YOLOv4. The reason why it is chosen although the low calculation is that the given traffic conditions in these areas mostly appear the two-wheeled vehicle, lead to the fact that the trade-off is a small fraction of the recognition accuracy and it is completely reasonable.

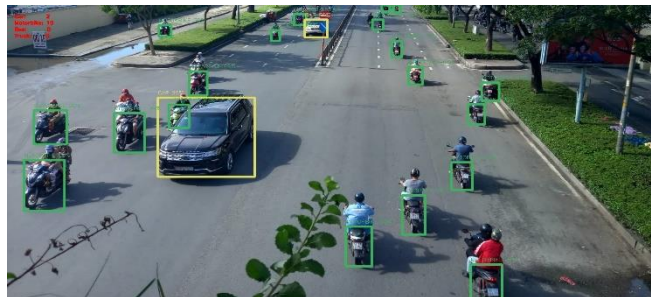


Figure 6.4: Detection on Nguyen Van Cu Street

Discussion

The results show that:

- There is not too significant difference in classification accuracy between all three models. But it also shows that the custom model cannot pass the pre-trained model from the author of YOLO.

- The fact that the model with the same YOLOv4 architecture but with the original trained on the dataset with a larger image volume still has higher accuracy than the model trained on the collected dataset.
- The trained model based on pseudo-labeling provides higher accuracy than manual labeling.

In fact, the custom model shows that the overall recognition of the two-wheeled vehicle is much higher than the original. Under the influence of some external conditions, the models still show relative accuracy. There are a few conditions that make the models completely unrecognizable such as the impact of direct white light, the effect of rain as they make the image to be blurred, the object in the dark or the vehicle moving at high speed, ...

VII. CONCLUSIONS

This study established a method counting and tracking vehicles in frame, which combines between detection and track movement of vehicles. The architecture of model is rooted in the fully developed YOLO model. As a result, we achieved the highest classification accuracy of 89.97% in our dataset. The accuracy is quite high but our study still has some restrictions. Because of splitting vehicles into specific groups, we cannot distinguish some special vehicles like vans, tuk tuk, ... Additionally, data collected from the bad environmental conditions (too bright or too dark) might affect the accuracy of the detection. According to the research reported in this paper, the model can be improved to handle videos that have unfavorable environmental conditions and we can split the existing vehicle groups into smaller and more specific groups so that special vehicles can be detected.

In summary, vehicles in India have similar characteristics to Viet Nam's ones. Therefore, the methodology and results of the vehicle detection provided in this analysis will become important references for transport studies in Vietnam in general and in Ho Chi Minh City in particular.

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PERSPECTIVES OF CURRENT STUDENTS' VIEWS ON BECOMING A GLOBAL CITIZEN IN THE DIGITAL SOCIETY

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SUMMARY:

Hello everyone, I'm Ánh Dương. I'm currently a sophomore, and I study Management Information Systems at Baking University. Before analyzing the details of my view about today's topic, let's briefly summarize the main points of this essay.

In this essay, firstly I think we need have a general defination about "global citizen" in order to have a certain understand about this issue. Next, based on above general defination, I will sequently express my opinions about: How has nowadays's society digitized? How fast is it? How do current students perceive about becoming a global citizen? Is it necessary to raise students' awareness about becoming a global citizen in an increasingly digitalized society?...as well as many of related issues from the perspective of a student like me. Finally, through my own observations, I will once again summarize the contents of the above essay as well as give some advice to students about becoming a global citizen in today's digital society.

1. Definition about: global citizen in a digital society.

Global citizen is a phrase that student can heard many times via many different ways such as: social networks like facebook, instagram,..., loadspeakers or electronic newspapers. However, the fact that not many people are really interested and delve into this phrase as soon as it is mentioned, and, it is inevitable that many students do not undestand or understand this phrase superficially. Therefore it is necessary to define what "global citizen" is. So, what is "Global citizen"? There are many different opinions about this phrase. As the definition of Oxfam Education, Global citizen someone who has a deep awareness and understanding about their position in the world. From that, they can play an active role in issues that related to peace, sustainability and equality in society. UNESCO states that, "Global citizen refers to the feeling that belong to a large and shared human community, emphasizing political interactions/relationships and interdependence about economy, society, and cultural between local, national and global". Michelle Bachelet, former president of Chile also shared that Global Citizen exists at different levels, in different contexts and at different times, with no institutional framework can certainly define what it means. Furthermore, they will act without restriction or geographical differentiation. Their goal is to protect human dignity, promote social responsibilty and international solidarity, and in that tolerance, inclusion and recognition of diversity are most important than anything else.

In my opinions, although there are many different ways to explain and understand about “Global citizen”, in general, the content that they refer to, all of them are towards the comprehension and perception of their own at the level of a common community and not merely an awareness within a particular individual or family. And, please realize that the nowadays of society around us, in this 21st century is a century of digitization, and this world is no longer a sphere but it is a flat world a world where the development of all aspects of human life like economy, politics, culture, ... overcome barriers of space and time, so learning about global citizens as well as how to do this is extremely necessary for student's nowadays. And, may be, it will gradually become an indispensable requirement for young generation because they are potential persons and their mission is to be the future owners of the world.

2. Perspectives of current Students' views on becoming a global citizen in the Digital Society

As a student of MIS - a discipline whose development is always an "update", that mean, always trying to keep abreast with the development of society and digitalisation, therefore my interest in this issue is deeper and deeper. Living in a society where the development of science and technology is getting faster and faster as today, it would be a pity if you only limit your thinking and your knowledge within in your individual, work for the individual, develop the future for the individual, live and enjoy life for the individual. In my opinion, living in a life like this is really boring and outdated. A in a society which more and more integration, more and more modern like that, but you only limit yourself within an individual, why? why don't you try to expand your vision a little further, from the effort for your benefit to gradually increasing to the benefit of the local you live in, the city you live in and, someday you will feel that those efforts and those benefits are community-oriented, global-oriented.

Temporarily not concern about international students, in this this essay I will focus more in VietNameese students. In my personal opinion, VietNameese students are facing with many barriers in trying to become citizens. Although they were born in a society where globalization and digitalization are developing rapidly and they have access to science and technology from a very early. Why do I think so? Simply because I also a Vietnamese student and I am facing with those barriers like that. So what are those barriers?

The first is the language barrier: in my opinion, Vietnamese students are facing with many difficulties in foreign languages, specifically English. Although you can see that a lot of students have got a lot of IELTS, there even have a lot of students with very high IELTS score like 7.0, 8.0, 9.0, compare to the total, the number of people who know and use English fluently in work and daily life accounts for a small percentage. There are many reasons that make much more difficult for students to learn English, and some typical reasons can be mentioned are: cost, too many

documents, differences in lifestyle, time limited and tons of other reasons. This barrier has gradually made students more and more evasive, increasingly self-deprecating, thereby forming more stable thoughts, particularly, Specifically, they often think that after graduating, they will find a stable job, if they are lucky, they can find a high-paying job and that is so satisfied. And, in my opinion, these stable thinking has inadvertently become the second barrier that makes Vietnamese students become more and more shy and ignorant about how to become a global citizen. Fairly to say, the above difficulties and barriers are not all, the main thing is still in each student themselves, they seem to be lacking in initiative, they still shy away and sometimes is ignore with this issue. And this is a big disadvantage for Vietnamese students, because the society and the world dose not stop there, the transformation and strong development of science and technology nowadays is counted in every second, every minute, every hour, not a week, a month, a year. Why do we allow ourselves to be motionless in the moving world? Why don't you find our flexibility to keep pace with its movement?

I feel that Vietnamese students should pay more attention and actively learn about Global Citizen, because I think it is necessary for your future and it is also necessary for the development of the world in the next 10 years. , 20 years later, 30 years later,...and so much more. Why is it important, and why is it necessary?

First, let's find the answer to the question of: Why becoming a global citizen is necessary, especially for students?. Because students are a young, dynamic and creative force among the intellectuals of any country. They are the ones who have the opportunity to learn and have access to constantly updated knowledge. Moreover, today's students are fortunate as they were born in a digitalized society, a society where it seems that human activities from business to entertainment are all have the intervention of electronic devices, a society in which people and nations are leading towards automation in operations. Because they live in a society like that, they need to be more proactive in integrating themselves into the international community, understanding global issues, and directing their benefits to the development of international community. Digital conversion on almost every field seems to have gradually abolished the concept of "The earth is spherical" and replaced it with the concept of a "flat world". This change has contributed to pulling students more and more closer to international integration, but at the same time, it also brings a lot of challenges to the student generation if they do not actively tune in with that development and are easily drowned, controlled and abandoned back behind. So, in my opinion, it is extremely necessary for students to actively learn and direct their own goals towards how to become a global citizen and it can even become a requirement. It is mandatory in the next few years because in today's society, we just need to ignore a second and we miss a lot of important knowledge in the world and we today cannot accurately predict what is the world of tomorrow. In addition,

becoming a Global Citizen is not only a training skills or improving knowledge and understanding, but also the ability to be aware of the big and overarching problems in today's society affect to sustainable development and social injustices. Be proactive if you don't want to be an archaic in a digital society.

The above analysis is my answer to the question of why it is necessary for students to learn about how to become a global citizen in a digital society like today. Next, let's find the answer for the question: Why this is important?

What happens when the future owners of a country are only forced to think and perceive themselves within the country, limit international integration, and are afraid to exchange with friends from five continents in this global and always live in association with personal benefits? Can a passive country exist in so many active and strong countries? In my opinion, an integrated country is a country where there are integrated people, so it is very important for students to learn about citizenship as soon as possible.

Moreover, current dilemmas such as: global warming, greenhouse effect, climate change, melting ice,... are not the problems of a country, they are the problems of every country. and even for individuals, so that students put their own thoughts and concerns more about global issues is an important factor in helping to overcome difficult problems. You should realize that there are none of country can survive and develop comprehensively with its independence, but the fact that a country's development or decline can also have a positive or negative influence on surrounding countries. And, and if things get worse, it can create a “blue ocean effect”. Therefore, beside the initiative of students, the school also actively creates conditions for students to have more opportunities to approach the issue of global citizenship and the issues surrounding it to stimulate interest. thinking, interest and awareness of students on this issue.

Many of students will probably say: “Yeah, I really want to work hard to become a global citizen, but what qualities do I need to have to be more favorable for process of becoming a global citizen? I don't think the qualities I talk about may not be a universal standard for everyone, but I think it will work to your advantage if you have it, specifically:

Firstly, you should have good foreign language skills, especially is English. Simply because this is the common language, and seemingly all international exchanges.

Second, you should try to think broadly, accept and respect the differences between countries and cultures.

Third, you should try to live a more active life because no one can live a passive life and integrate into the community.

Finally, you should learn more about information technology, science and the internet to have better access to the changing of the world.

There are many students who are hesitant to try to become a global citizen, They know that it will be beneficial for themselves, but how the specific benefits are, they still do not know, so they still feel that very confusing. In fact, in the process of your efforts to become a global citizen, you have also created a lot of long-term benefits for yourself, specifically:

- Improve your own knowledge, acquire more social and international knowledge, understand more about different cultures, enrich your awareness of community and the world.
- Practice critical thinking skills in receiving different sources of knowledge, the ability to see and analyze problems has also improved a lot.
- Improve the ability to use foreign languages - especially communicative English.

There are many other benefits as well, but it may be difficult to describe in words, it's better to feel it through your own efforts.

Above are all my views on the issue: global citizenship in a digital society. There are just personal thoughts from one side, but hopefully through this essay, students will be able to start thinking about this issue and gradually, each student will realize that they are actually themselves is a small piece on this large society, each has a role of its own, not just an ordinary citizen. Moreover, the current society is a digital society, which requires people to try to adapt and be able to control it in a beneficial direction. In summary, not only students but also the school should create all of good conditions for students to access to the above problem so that they can improve their self-esteem on the one hand, and on the other hand, immerse themselves in the development of the world.

THE CURRENT STUDENT PERSPECTIVE ON BECOMING A GLOBAL CITIZEN IN A DIGITAL SOCIETY.

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SUMMARY

In this study, I try to develop in the most optimal way about the perception, the thoughts of students, the future generation of young people about the concept of global citizenship in the Digital Society. First, I clarify what it's like to be a global citizen, what are the criteria for becoming a global citizen, what are the benefits that global citizenship brings. How is the current state of global citizenship in society going on? Then, come up with orientation solutions for students how to become global citizens? And set a good example of global citizenship. Finally, give direction for future development and conclude. I think my orientations can improve the orientation of the concept of global citizenship for students, help you better understand this issue, and suggest solutions to improve the quality and number of global citizens. I believe that this essay can improve young people's thinking about global citizenship.

KEYWORDS:

Foreign languages, skills, culture, education, integration, globalization.

I. ASKING THE PROBLEM

Have you ever thought you would set foot in a distant land? Have you ever dreamed of becoming friends of all five continents and four tanks? Have you ever wanted to go and go a lot? Maybe people are thinking it's good or it's just for you guys to warm up some kind of thing. For today's society, integration into global citizenship is essential. It's no longer a fantasy or fantasy dream as most people think.

Today, as the world integrates, people have more opportunities to study, work, and develop themselves. We are not only citizens of a country but become global citizens. Due to globalization in the world. Globalization is an extremely favorable condition for every citizen to become a global citizen. When border barriers are broken down, goods, currencies, information, labor... Open, international assignments are no longer a hindrance to every citizen becoming a global citizen. The explosion, the rapid development of information technology, science and technology make it all. This world is smaller, "flattened", it has opened up countless opportunities for people, the internet as the key to opening the world, into the treasure of human knowledge. Becoming a global citizen is a trend of the world, a dream, a goal that young people are aiming for and striving to achieve.

Global citizens are people who can live and work in one or more different countries, they can cross the boundaries of space, time, culture,... But the work they do must benefit the global community. Global citizens or people in general live together on this planet and we have a responsibility to stick together to move the world forward in a more civilized direction.

A "global citizen" is someone who has knowledge of the wider world and is conscious of his role in the world, understanding, respecting and appreciating the diversity of the world; be willing to take responsibility for your actions; join the community at many levels, from local to global, to fight against inequality, discrimination, social injustice; Ready to take action to create a world into a fairer and more sustainable place.

In practical terms, global citizens are those who have at least a few of the following characteristics: traveling to many parts of the world, having more than one nationality, having regular face-to-face contact with people from different countries, having an understanding of the culture of many countries around the world, have an international income level, have an impact or contribute to many countries, etc.

As such it can be understood: Global citizens are people who live, work in many different countries, may have one or more nationalities. Global citizens are citizens with a basic knowledge of human cultural issues who can exchange study and work in any country, can integrate with citizens all over the world, have the capacity to solve common problems of humanity such as: protect the environment, fight war, repel epidemics. A global citizen is someone who regards the problems of humanity as the problems of his people, his own and knows how to think about acting for a better world.

II. WHAT DOES IT TAKE TO BECOME A GLOBAL CITIZEN?

Based on our understanding of global citizenship, we can map out the first step on our journey to global citizenship: removing all barriers to boundaries, geography, and culture of nations in their perceptions. This may seem easy, but not everyone can do it. And it will be even more difficult for introverts who just want to be next to the familiar things.

The second thing is also very important, to become a "global citizen", you need to have a good knowledge, skills, culture, in accordance with the requirements of the world. You also need to have good enough foreign language skills to be able to communicate with citizens of other countries, carry out fish activities of exchange, exchange, cooperation effectively. In the current period of integration, most diplomatic and commercial activities in the world use foreign languages, especially English, if your English ability is limited, then it will be a huge obstacle in your journey to become a global citizen. Even if your professional skills are excellent, but your foreign language skills are poor, what you do, what you achieve is only regional, national, not much benefit to the global community. "Learn, learn again, learn forever" - Lenin. Indeed, learning is the process of absorbing the new, complementing and cultivating knowledge, skills, experiences, perceptions,... And it needs to be done for the rest of your life. For example, reading books, watching the news is the traditional way but still brings value to learners. With the ability to speak a foreign language, the easier it is for us to learn, the faster we can update the information that is happening in the world. Not only that, this is a way to keep the brain healthy, preventing the process of degeneration leading to a number of diseases

such as memory loss.

If foreign language and technological skills are a necessary condition, independence skills are a sufficient condition. I do not deny that there are now many parents who over-protect their children, causing them to lack initiative and assertiveness in life. Let your child be independent from an early age, only by standing on their own two feet will they have the courage to face the waves out there.

It is necessary to have an understanding of the different cultures in the world; have essential skills such as problem-solving skills, communication skills; teamwork skills; practical skills, creativity ... in which the ability to use foreign languages, the ability to use information and communication technology is extremely important. In addition, it is necessary to foster the core moral qualities: self-esteem, self-respect, patriotism, responsibility ... The cultural character of a "global citizen" is very important. It is necessary to maintain the "national cultural identity", at the same time to dry up, screen and receive the appropriate and progressive cultural values of the world, diversifying its cultural sense. Besides acquiring and learning knowledge, young people necessarily need to have experiences in life to form life skills. Form global thinking, global consciousness, national consciousness in the right way.

To be an effective "global citizen", young people need to be flexible, creative and proactive at work. They need to be able to solve problems, make decisions, think seriously, communicate ideas effectively, and work as a good team. These skills and attributes are increasingly recognized as necessary to succeed in other areas of this Digital Society era, including many workplaces. These skills and qualities cannot be developed without the use of active learning methods through which students learn by doing and collaborating with others. "Education is not only a cultural tradition but also a provider of alternative perspectives of the world and an enhancement of the skills to explore them."

Some young people say, "Only those who are rich, successful, and abroad are global citizens." So you haven't heard the story of "Kimura's Magic Apple"? The story of the old farmer Kimura has put a lot of effort after the failures, exhaustion of property, suffered many scandals in growing apples, has reaped the harvest. The story answered that to become a global citizen not to be rich or a great official but what is necessary is to have qualities, competence and education.

"In a rapidly changing world, the only path to failure is not to take risks." - Mark Zuckerberg And it would be great if each of our students strives to become a global citizen like Muong Ha Anh Phuong teacher, who is the top 10 outstanding teachers globally. A teacher who loves young people, knows how to overcome difficulties to reach her dreams, has contributed an example of a teacher who suffers hard. She is Pham Thi Thanh Nhung born in 1982. Graduated from Da Nang University of Foreign Languages, currently studying for a Master's degree at the University of Leeds (UNITED KINGDOM). Formerly the founder and leader of the social group for the blue sea (Da Nang). She has attended many international youth conferences and forums, been a UNITED NATIONS goodwill ambassador for the millennium

natural development goals. She was born with the qualities of a world citizen. But in fact, until she entered college, her book was still full of criticism of "study hard, but shy personality". That's why there's such a great deal that there is a Pham Thi Thanh Nhung like today. It is a non-stop process to cultivate knowledge, participate in part-time activities, young volunteers, with extremely valuable experiences that have accumulated luggage for her to enter the integration period confidently and achieve a lot of success in life. If we have achieved these qualities, it means that we are ready to become global citizens, meeting the potential human resources for our country.

III. CONCLUDE

"Global citizens" can integrate into the flat world but retain their national identity. This is a major challenge for young people in the trend of world integration; Criticizing those who misunderstand the concept of "global citizenship" should lose their national identity regardless of his father's traditional cultural values.

Thus, to become a global citizen, it is not a day-to-day affair but a long process for each citizen to strive for. Hopefully in the not too distant future there will be more and more global citizens, especially the colorful global citizens of Vietnam. If you're young, if you really think you need to break your own boundaries. If you talk about something then it is a dream, if you visualize it then it is possible, but if you plan then it will be a reality.

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ESSENTIAL DIGITAL CAPABILITIES FOR A GLOBAL CITIZEN IN DIGITAL SOCIETY

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ABSTRACT

Digital society is a progressive society formed from the application and integration of advanced technologies in the process of operation and development. Among them, Information and Communication Technology (ICT) plays the most important role in controlling digital fields such as Health, Education, Finance - Banking, Agriculture, Transport, Energy, Natural Resources and Environment, Industrial Production, etc. Moreover, the development of a digital society is reflected in the rapid adaptation to the most modern inventions such as: Internet of Things (IoT), 5G Technology, Big Data, Cloud Computing, etc (Prantosh Paul, P.S.Aithal, 2018). The elements of a digital society are interconnected through advanced telecommunications and wireless connectivity systems and solutions. Digital society including digital citizens and digital culture, together with digital economy and digital government is three important pillars for the development of a country. Besides, under the impact of the fourth industrial revolution and the trend of globalization, each country needs to promote international cooperation, strongly integrate into the global environment and develop a new generation of global citizens. Therefore, in order to enhance the competitiveness of the country, today, the first priority is to develop a generation of qualified global citizens in a digital society. Understanding this issue, this article has analyzed the components of the digital society (Deutsche Bank Research, 2011), thereby proposing four necessary digital capabilities for the rapid development and adaptation of a global citizen in the digital society.

KEYWORDS: digital society, digital capabilities, digital tools, global citizen, innovation, communication, identity.

I. INTRODUCTION

The term "digital society" has been officially widely used since the early years of the 21st century, in the second wave of digital technology in the digital transformation process (from 2000 to 2010) with two featured characteristics: real-time technology and available anywhere, anytime. In December 2003, the World Summit on the Information Society was held in Geneva, discussing the principles of building an information society with continuous challenges in the new millennium (World

Summit on the Information Society (WSIS), 2003). Thus, the term digital society has been discussed and studied since the early years of the 21st century.

According to Global System for Mobile Communications's "Advancing Digital Societies in Asia" Report (Kenechi Okeleke, Henry James, Yoonee Jeong, 2016), "digital society" can be understood as a society where citizens through a network of smartly connected devices and services to work, communicate and play. At the same time, citizens in a digital society can use a variety of public and private services, including finance, education, health and transportation services, by using digital technology.

In "Digital Media & Society", Simon Lindgren (Lindgren, 2017) pointed out that digital society is made up of two elements: digital media and society; in which, digitized social media dominates the activities of society. According to Neil Selwyn (Selwyn.N, 2019), the digital society is formed from the connection of a network of smart devices on the basis of a digital system in many areas of social life.

Thus, the essence of the digital society is through the technology-digital system and digital communication, to connect society on the digitized method (Internet of Things), promote sustainable, humanistic and modern social development. In addition, according to the book "Questions and Answers on digital transformation" (Think Tank Vinasa, 2019), digital society is the society of people in the digital environment; after all, citizenship is still the most important element of a digital society. Moreover, the globalization trend emerging since the Second World War is dominating the international integration activities of the world, which has produced a generation of global citizens for each country in particular and the whole world in general. Thus, every citizen today lives both in a digital society and in a global society, becoming a global citizen in a digital society (Al-Rodhan, N.R and Stoudmann, G, 2006). This requires each individual to equip themselves with specialized and social knowledge, especially capabilities necessary for development. This article recommends and analyzes four digital capabilities: (1) Digital creation and innovation, (2) Digital communication and participation, (3) Digital development, (4) Digital identity (The University of Derby TEL).

II. ESSENTIAL DIGITAL CAPABILITIES FOR A GLOBAL CITIZEN IN THE DIGITAL SOCIETY

1. What are digital capabilities?

Digital capabilities, basically, are the knowledge and skills which help people learn, work, entertain, trade, etc in a digital society. They mention human's capacity to use

hardware (devices such as: keyboard, screens, microphones), software and services based on Information and Communication Technology (ICT). At a higher level, digital capabilities can be expressed in terms of keeping pace with evolving ICT, critically evaluating benefits as well as drawbacks of ICT devices, suggesting solutions addressing ICT's defects or failures, and personalizing ICT systems.

Developing digital capabilities not only helps us integrate, interact and connect with people in our personal lives, but also succeeds at work. Especially for global citizens in the digital society, each individual needs to improve their digital capabilities to compete in the labor market, become creative, integrate and support each other in digital spaces.

2. Essential digital capabilities for a global citizen in the digital society

First, digital creation and innovation capability, this is the capacity including knowledge and skills systems required for the creation of digital resources. Besides, this capacity is also about the ways we research available materials, solve our own problems, thereby developing innovative ideas using digital technology.

In terms of digital creation capability, at a basic level, it refers to the production of digital materials such as images, videos, podcasts, audio, articles. When we master this skill, we can program to create games, applications, social networking platforms or professional websites.

About digital research and scholarship capability, besides collecting and analyzing information or data, it is also the ability to develop new, creative ideas, methods and tools; assess the impacts of the digital environment; absorb and contemplate knowledge and scholarship receptively. Therefore, digital citizens can propose a new way to set up an organization or department that operates on a digital platform, guiding people to adapt to modern innovations.

Second, let's discuss digital communication and participation capability. Generally, this capacity focuses on how we work, interact and connect through digital means. More specifically, digital communication skills include using a variety of digital methods from text messages, emails, videos to social media platforms to communicate with people and identifying the right communication tools for each situation as well as specific purpose, such as negotiation, announcement, or entertainment. The most important thing is to respect each other, the privacy of each individual and respect the culture, traditions, and national identity of each region.

Besides, digital collaboration ability refers to the ability to join digital groups; collaborate to achieve common goals, complete set projects, bypass cultural or

language barriers with the help of digital tools. At the same time, each individual needs to join, build a network or social forum to create, maintain online connections and share necessary information safely, ethically.

Third, in terms of digital development capability, this is all about learning and developing yourself and others. How to develop this skill? First of all, for ourselves, taking advantage of the development of the digital society with the endless source of knowledge available from digital materials (videos, quizzes or lectures), each individual can participate in online courses from reputable institutions. At the same time, use the right digital tools such as Google Calendar, iMindmap, Trello to plan, personalize and maintain an effective study schedule, as well as self-assess and motivate in the learning process.

Also, stay connected and share your experiences for others. Take the time to record and save the courses we take, useful learning resources, effective learning methods or online guides which support learning by using digital tools; then, take every opportunity to share experiences, help others develop digital capability skills.

Last but not least, digital identity management capability is the ability to effectively manage one's personal identity online and maintain a healthy relationship with technology. First of all, build and develop digital identities, profiles as well as manage digital reputation on different platforms, such as LinkedIn or Facebook. At the same time, behave ethically and responsibly in digital spaces. Next, establish a balance between work and life, between the digital world and the real world; use the privacy settings supported on each platform to limit the amount of information accessed, limit distractions at work, determine when to switch off and take a break.

III. CONCLUSION

Digital society is a progressive society, formed on advanced technologies, especially Information and Communication Technology, and interconnected to each other through a modern wireless connection system. This essay has summarized different views on the definition of digital society (about the components, methods of connection and operation). However, after all, the essence of digital society is still, through the digital media system, to create a sustainable development society, with the most important goal being the development of its citizens (or digital citizens).

At the same time, when globalization is taking place strongly, affecting international cooperation around the world, each digital citizen is also a global citizen. To thrive in this digital society, every global citizen needs to equip themselves with the necessary digital capabilities. The first is digital creation and innovation capability,

which aims to help each citizen stimulate creativity in creating modern technological products, proposing new solutions to operate digital organizations. Second, it is digital communication and participation capability that facilitates each global citizen to interact and communicate effectively in a variety of ways, thereby participating in digital forums. Third, each person also needs to practice digital development capability to help themselves improve their knowledge and skills in a scientific and efficient way with the support of digital materials, as well as share and help others create effective learning community. Fourth, the most important thing is the digital identity management capability, because once citizens designate and develop their own identity and maintain a balance as well as a reasonable relationship with the digital world, they show the role of owners to digital society.

Therefore, each global citizen who is proficient in the above digital capabilities will have favorable conditions in conveying their opinions in an intuitive and vivid way; active and multi-dimensional knowledge acquisition; as well as opening up many career opportunities in all fields with good income. Besides, learn how to interact adhering to prescribed communication standards; build a safe, effective digital community together to accomplish goals. In addition, each digital citizen takes advantage of many opportunities to improve himself through digital learning tools as well as create an online learning community. And the last thing, develop personal values when participating in the digital environment as well as ensure a healthy relationship with the digital society.

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“EXPERIENCE OF POST SOCIAL DISTANCING IN FREIBURG”A PERSPECTIVE OF A VIETNAMESE EXCHANGE STUDENT HAVING STUDIED IN GERMANY

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I. INTRODUCTION

I applied for the exchange program scholarship in the major Social work in University of Applied Sciences Freiburg (hereinafter referred to as my host university) around one year and a half ago, with the hope that this pandemic wouldn't hinder my way to Germany. As I had successfully got accepted, I came to Germany on October 1st 2021, after Ho Chi Minh City had terminated the “social distancing” policy for 01 day.

Germany then has entered a new phase of the coronavirus pandemic with the removal of most protective measures after a period of two years. I studied for two semesters in Freiburg, Germany. The first semester was from October 2021 to February 2022 and the second one lasted for 4 months from April to July 2022. During my first semester, Germany still had certain restrictions on many aspects like regulations at schools/universities or at shops, hospitals or rules with vaccination, etc. but then since April, many pandemic restrictions had been removed. I will talk more about this in Body part.

And may I say it, that I was lucky enough to have a chance to go to Germany and study during the pandemic. Even though it was already post social distancing time, I still got to experience a new Germany compared to Germany before covid-19, still with many good and reasonable regulations for its residents.

II. BODY

1. Education in host university

First of all, I really like the fact that my host university provided a variety of both online and offline classes, all of them were in English, for international students.

There were lectures where we could make them online classes and there were more practical ones for the interactive classes. During my first semester studying here, I couldn't attend many classes offline because they only allow classes with less than 25 people attending so that we could stay at proper distance. But then we were able to take Art therapy, Music therapy (two of which are very rare in Vietnam), Disobedience: discussing a book class, etc. as our face-to-face sessions as there were no more obligations to not be present in a class of more than 20 people during my second semester nor the regulation to check vaccination certificate everytime classes started. That helped us a lot because most of the classes required interaction, quick feedback and body movements to successfully happen. Besides, almost all of the subjects I took there were very interesting and unique in their own way that

I was lucky enough to enroll in.

What also fascinated me was their hostility and multiple activities for both German and international students.

During social distancing and lockdown period, all stores were closed and we were also put into the norm of doing things at home, just like in Vietnam. We had had virtual gathering up event, we had made Christmas wreath online and so on. To make up for the time not having any offline activities for us - the international students, during the first semester, my host university later hosted various international cafés, where we could gather to chat, have a coffee, exchange ideas and practice our German as well as organizing sport event, picnic day, many view seeing sites and a city tour where they explained historical and fun facts about Freiburg. I felt so welcomed and cozy with this amazing program. It was like I was fed after a long time of fasting.

The last thing about the education I experienced here even during that time was the way they encouraged not only students but people in general to read as much as possible.

It was very easy to access to the books in Freiburg. There were books on the streets for taking and also giving. There were libraries which didn't require membership for people to enter. There were also people reading almost everywhere I went to: on the streets, on the trams, the buses, at the parks, etc.

The public libraries here are mostly well equipped too with computers to search for the book titles, comfortable chairs, sofas, tables, spacious rooms, bathrooms, lockers and even tap water! They also provide a few more foreign languages (for example: English, German, Spanish, Chinese, etc.) for book lovers from all over the world. There was no reason not to read a lot here! Looking at many people reading was one of the things to motivate myself to read more too!

2. TRANSPORTATION

What Germany has successfully put into work is their application of various means of transportation into life. For example, there are these types of transportation in Germany: City rapid rail (S-Bahn), metro (U-Bahn), tram, bus, regional train, car, scooter and bike, etc. Even though not every region has all of the mentioned above, it's abundant for a person to have multiple and reasonable choices of transiting here.

Where I lived, which was Freiburg, had 3 main means of transportation: The city rapid rail, tram, bus and the regional train. I found them accessible, reasonable and comfortable.

Firstly, to get to school, university or work without cars, scooters or bikes (as the prices for them aren't as affordable as in Vietnam), we could use public transportation like trams and buses. They are placed almost everywhere around the region. Even during the social distancing policy, all of these means were still available almost 24/7 for everyone. It is compulsory to wear face masks inside in order to protect people's health. So with or without covid, Germany has accomplished running their public

transportation wonderfully.

There are 5 main rails of tram leading to different directions and destinations. About 22 buses ride around the city everyday. 6 city rapid rails and many regional trains waited to serve throughout the whole country. And since Freiburg is one of the city of universities in Germany, where I lived was close to almost every important and interesting locations (namely the main hall, the train station, my host university, the city center, etc.)

One of the most specular things about these types of transportation is that they calculate the exact time of arrival to the stop. In other words, if the electric signs show the next tram comes in 4 minutes, it really comes in 4 minutes. We could check their timetables right on their application “VAG”. This aspect proves that this is very accessible to me.

Secondly, normally the price for a semester ticket consisting of 4 months in use for the tram and bus is only 89 euros for students.

This is the discounted price for students studying in all regions of Germany in order to motivate and support us as we aren't the main labour resource yet. The discount even got higher during the traveling months: June, July and August with only 9 euros per month and 27 euros for the total of these 3 months. If you had already purchased the semester ticket, the travel center would refund you a reasonable amount of money.

This doesn't only encourage them to take public transportation more and therefore, reduces gasoline from the vehicles to the environment, but also create opportunities for their citizens and residents to get to know the country better by traveling with a cheapest price they could find. In fact, with this new ticket, I had myself travelled to many other cities and general states without worrying about the price. Even though it also created situations like waiting in long lines, standing on the trains as there were too many people, I think that it is a good idea for every social class to have a chance of cost effective travelling.

Lastly, I have never found any public transportation of Germany that were in bad conditions. Plus, the people's awareness is on another level!

All of the public transportation in Freiburg is well equipped with modern and creative designs. Normally the ticket inspectors don't check for your tickets when travelling by most of the public transportations here. This network operates on honesty principle. It is up to you who choose to buy the ticket or not. But when they accidentally do the check up and you don't have tickets in your hand, you will be fined for around 60 euros. It's very easy to breach the law and go without buying tickets, but most people here still went for a ticket even though there wasn't anyone to check theirs. From my perspective, this is very encouraging for faith and honesty in people, and a feeling of everyone obeying the law as well as the good quality of facility were what made me feel comfortable traveling here even though it was during covid time.

3. ENVIRONMENT

With a great variety of green regions, Germany has done a great job reserving them by having propagandas and policy to raise people awareness and protect the biodiversity. The threat of extreme climate change hasn't changed during covid time, not to say it even increased through time. As a result, Germany had also raised their goal of securing procedures for the expansion of wind energy along with maintaining ecological protection standards and supporting endangered species in the long term. Even though they've been facing major problems, such as: wanting to achieve their climate goal at the same time with accomplishing digitization, modernization and economic goals, the Federal Agency for Nature Conservation still really focused on the sustainability of their resources.

They had the task of setting up national programs to help species, with which the species affected by the increase of renewable energies in particular are to be supported. In Freiburg, there were events of cleaning up garbage along the way to mountains, or propagandas to encourage people to eat more vegetables and less meat. In other words, Freiburg maintains and supports its natural heritage through numerous protected areas and a provision of clean air and clean water in many ways possible.

Never have I ever seen animals like hedgehogs, squirrels, rabbits, mallard ducks or swans, etc. walking that freely in front of people like in Freiburg. That shocked me greatly to witness such connection between humans and nature as the residents here take care of their living area pretty well, that the animals didn't feel any threat against them.

Secondly, one of the things to not overlook is the garbage sorting system. This was what made my experiences in Freiburg interesting and eye opening.

Dealing with trash is costly. And as consumerism is rising, it is even more difficult to manage them. Therefore, sorting garbage really helps with reducing resources for processing them, as well as taking advantage of all recyclable and reusable sources from them. Plus, one of the most important things to fight back the disease is hygiene. Keeping all trash on track by sorting them out and have regulations of fining policy is one way to achieve it.

There are 5 main types of garbage bins in Germany: the blue bins (for papers and cardboards), the yellow/orange bins (for plastic and metal containers), the brown bins (for bio trash such as food, dead plants, etc.), the grey bins (for the other types of trash that don't fit the previous mentioned category) and the glass bins with 3 different types: white, brown and green bins, so that we could easily sort our colorful jars or glasses, etc. Normally, in Freiburg, the waste collection schedule is on Wednesday. The team would come and collect the already sorted trash and put them separately in the landfill.

Being in the "trash sorting system" was an awe experience to me. I got the chance to see how serious and obedient each individual was about the process and I could really feel how much they loved their living habitat through that.

Other than that, a green life also requires the lifestyle of “zero plastic waste” and “less meat consumption” style, which Freiburg has been doing quite smoothly. There is a plastic/glass bottles returning system that ran in Germany since 2003 and recently increased its category of refunding. To be more specific, when purchasing drinks like beverages or alcohol, customers have to pay a small extra amount of deposit for the containers (from 0,03 euros - 0,25 euros), which later we will get refund for them when they give the empty bottles back (at the collecting points like the beverage stores). Almost all of beverage plastic bottles and tins along with some types of bottled alcohol are refundable. This encourages people to acknowledge more of what they buy and consume in order to keep it in mind and return their bottles as well as make the process of recycling or reusing the used bottles much more easier.

However, even with great ambition at conserving the environment, it's unavoidable that the man-made climate change will still go on changing and increasing. But the

important thing is adaptation to climate change. That is why trying to preserve the

environment and aim to sustainability are what I love about Germany and their policy. As I experienced it there, I was wondering if it's also possible to apply in Vietnam, my home country.

III. CONCLUSION

My journey to Germany was a unforgettable, life changing and amazing lessons in my life. I'd the chance to go, learn and experience all sorts of things while living there and is eager to share it with the world.

Witnessing Germany's regulations before and after social distancing had me really thinking about ours and how we could also make the situation better too. Those I mentioned above were the main and most standout aspects I've observed throughout my studying, not to mention the other “little things” like their democracy in human rights and way of consuming goods, etc. I really hope that this could be giving a hand to a suggestion of a better campaigns for our environment, an improvement in our education system as well as the increasement of our participation in public transportation. All of these would gradually and eventually helps both our nation and the world become more sustainable and worth living.

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CURRENT STUDENT'S PERSPECTIVES ON BECOMING A GLOBAL CITIZEN IN A DIGITAL SOCIETY

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I/ POSE THE PROBLEM:

a. Over the centuries of development and change, now in the era of digital transformation revolution 4.0, which has revolutionized industrialization and modernization, education is the basic foundation to solve all problems in life. live up to now very practical. So, prepare for a "super smart" and "super-efficient" social model called "society 5.0". The goal of this social model is people-oriented and people-oriented, exploiting the best human aspect of new technological achievements, this patch is practical for becoming a "Global Citizen" (abbreviated CDTC) present? Shows that this is an important global issue in the future. Below is an article about a first-year student's perspective, Gen Z majoring in Engineering and Technology.

Introduction: What is global citizenship?

Personally, I revolve around building a ship, objectively, I do not have professional knowledge, but I can easily imagine the answer, the ship is called "Become a global citizen". Become global population” is in mind, you are not limited by the barriers of borders. That is the mindset of Global Citizen. There is not yet an exact definition of CDTC, each organization and individual have their own definition of CDTC, some people say that it is when traveling to many countries, speaking multiple languages or going to a strange place and handle many tasks... They divide ourselves terribly: human mindset, that is the boundary drawn from the ancients about the border. Why is there such a division? because they gather all the people who are like-minded, in one place. And instead of learning the differences from each other, they despise and banish those differences, if compared from a scientific point of view of the roots, the human and apes' genomes are other 0,1%, but between different ethnic groups in the world it is much lower, when there is a border we have a comparison, then the small-scale discrimination hates each other, the large-scale is different. each other: “You believe this, I believe that” ... stickers define people: they are judged by appearance such as blue-haired westerners, white Europeans or North Americans, and others. brown people from Latin America or South Asia... Living in a mixture of people who tend to avoid, they just try to find myself a community of people of the same color in other countries around the world. For example, the Vietnamese community in Japan, Korea, China... they just hang around a Vietnamese hometown and ignore countless good things around, just keep the right culture and way of communicating with people from the same family in their homeland. When they go to a big amusement park, they put a label on myself, they just join a corner and hang around in it, ignoring all the games around... There are mindsets that Vietnamese women just making friends with

housework in the kitchen corner compared to someone who works in a multinational company or someone with 200,000 followers on Instagram...

Don't suggest to yourself that: "I'm Vietnamese", In the country, they label themselves "I'm an ethnic minority". This common mentality makes the meeting again have an invisible distance. This will be removed when you remind yourself that it is only your perspective, "The hardest thing is not to do anything to change the world, but the hardest thing is to change yourself".

BODY:

I am fortunate to enjoy all the privileges of a peaceful country, stable economy, Gen Z like me are people who are exposed to the internet every day, exposed to modern cultures and knowledge. In the world from a very young age, realizing that learning is essential, there is hardly a country that can be the second Vietnam to have all the capabilities for comprehensive development as good as it is today, if the Remind yourself that if you have to improve your thinking every day, then the opportunity will follow closely and clearly grasp the opportunities. In European countries, like the US, the best environment is still sending international students abroad to experience and study in order to have a rubbing environment and create a foundation for global thinking. Studying abroad now means more international experience, students have many teachers who are industry experts and inspirational people. In addition, the fact that students go to school to teach knowledge in the style of teachers and students has become obsolete, they can stay at home and Google to get the same results. The school needs to provide an ecosystem for students to interact and connect between students, teachers and external partners such as businesses, research, Lab, industry experts and even sports and student needs. recreational activities for students. Thus, the old classroom model is no longer suitable and needs to be transformed into a model like operating in enterprises. Students will not only study with students on campus, but also expand to students from the international community through the form of online exchange. On-campus service transforms into a student-centered "resort service". In addition, students will need There are many "teachers" from industry experts (mentors), learning at businesses, learning from influencers, learning from people with experience and life skills.

Degrees from a prestigious university are also worthless if you have no real ability. IELTS: Considered one of the definitions of success in the digital and integration age? It's boring when we sacrifice our whole life to achieve the fame demanded by others, judging by the number of points on the paper but forgetting the true value of who each person is, what impact on humanity. If you focus only on results then it is very easy to get discouraged, instead look back on your progress every day and always try to be better than yesterday. Success in the past does not define success in the future or in the future. The world is so big and we don't have much time to explore it all. When I have a mindset and goals, I will have a solution. "We make the world our home, and we will not forget the place we were born, Let's take great care of the place where we cut our umbilical cord, and we wish the best for our homeland, with our work. With technology and technology, we can reach anywhere in the world, our

vision is unlimited, no longer keep the thought of being born and raised behind the village's bamboo ramparts, always reminding ourselves to think outside the box in order to perform. their goals in unfamiliar locations.

3. CONCLUSION:

Success messages: First, work needs to be profound, to the point, to take prestige as capital because no one is forcing them to respect you, but it is your actions that will shape who you are. in the future even if the only person watching or witnessing is myself, Things like glittering appearance will surely disappear with time

Second: Don't think about money when working: Just do it and be surprised when you look back Your work has been deepened, 1% better hard work every day is necessary, no need to compare anyone Compared to your surroundings, as you move forward the money will follow you, look up and just focus on getting better at yourself every day. That is the core of the number of people who become successful.

Third: Morality is a lamp that shines in the night, only when you have a strong soul and morality in yourself, the work will be developed in the most profound and powerful way.

Fourth: Invest more time and effort into your strengths rather than trying to improve your weaknesses. If you find that your resources are weak in a certain area, find the best person in the field to ask them. If you don't like something change it, if you can't change it change your opinion. Don't complain.

Fifth: There is no right path: Global citizens do not need to be perfectionists, there is no way with 100% probability, instead just wish for 60%, the number you pass will give you a multiplier. When it comes to happiness, when you have a clear purpose, you will be more dedicated to your passion.

Sixth: Actively learning new languages will help you catch opportunities. There is a saying: "There is no cure for regret in this world", Only when you firmly grasp the knowledge and skills in your hand, the opportunity is something you will firmly grasp and the international language is an important baggage.

Seventh: Always wish for the best, but prepare for the worst. Because when we take a risk and are well prepared to face it, we reduce the likelihood of the worst-case scenario. And even if it does happen, you are ready to face it.

Eighth: Youth is the time when you can easily overcome your comfort zone, because without being hindered by things like your own family or busy work, conquer yourself and you will conquer the world. 9th: "It will pass" What makes you feel afraid? For each thing that scares you, give reasons why you fear it? Next put "Change" in your daily dictionary. Living in today's high-risk environment, far from being reckless, you can only succeed when you accept beyond your comfort zone.

10th: Lack is the engine to move forward. Like a boat that can't move forward as it wants because of lack of fuel, Modern people with today's environment, the most unfortunate thing is the lack of preparation.

You do not necessarily have to force yourself to complete the goal of going to many different countries early, there is no denying that it has a lot of benefits, when your eyes are opened, you will have a lot of solutions. It's very helpful to create small global activities around where we live: Respond to Earth Hour, don't throw trash on the street, ride electric bicycles instead of motorbikes to protect the environment and participate various organizations of civilized social work.

“If you can't do great things, do

Small things in a great way.” - NAPOLEON HILL

People really don't need big things to be great. donate clothes you don't use anymore, stop helping people in accidents, give a beggar a change of money... comfort and ease their pain. Praise others when they succeed. Send positive messages to relatives and friends every day. Encourage the people around you when they are trying to assert themselves. Please share skills or knowledge that you know. You can change the world by helping one person at a time. Living with an open heart will make your life happier.

People who think outside the box are often those who dare to embrace new things, see work through new lenses, and are willing to drop exploration and learn new things. They believe that new ideas may not be convincing to the majority, but they still nurture and support their ideas. They realize that having an idea is a good thing, but executing the idea is much more important. The more you go out, the more problems you will see as if they are invisible, but invisible does not mean that they do not exist, thereby seeing many solutions and solutions. When you set foot in a new land that you want, it is very different from hearing other people talk about the beauty of that place, for example when you are told a lot that Japan is beautiful but only if you the experience will tell you what the climate is like there, how nice the Japanese people behave, how the voice sounds... Thinking outside the "box" has never been a simple matter and not everyone can also get, can pursue. Success comes only to those who dare to think and dare to do. Self-esteem is a beautifying point for yourself, for your loved ones, and for your family, and more importantly for a better civilized society. From early childhood education, self-respect is when you always evaluate yourself, you are a witness in even the smallest deeds. It is good deeds that will foster a solid inner strength. Global citizens are independent people, solve problems on their own before really needing help from others, CDTCs value the teachings, practice the teachings regularly, take root The roots of the beauty of Truthfulness, Compassion, and Beauty are painted on the ship when going out into the big waves, spreading everywhere I go to the beauties of the Universe. Global citizens need to nurture their own reputation, a person with high responsibility, always on time, a voice when presenting to help listeners understand, seeing wrong actions immediately stop their work. CDTC considers understanding oneself to act with others, respecting the freedom of others, always attaching importance to equality. CDTC are people who know how to live the truth, they have their own rules of the game, they do not circumvent the rules, cheat, lie from small things. Considering the value of people more than material things, people are the most precious capital, acting rationally not

based on temporary emotions is a virtue that needs to be nurtured to become a person worth living.

Don't feel guilty, be yourself. No matter who you are, your life is already different, your tattered appearance doesn't tell your way of life, stripping away all appearances, we are all the same. It is a positive common point, and the difference is to live with the aspirations of each person.w

“Global citizens are people who love the planet, love living humanity, are eager to learn and do not discriminate against any culture.” – Professor: Phan Van Truong

Back to boat building, hone your hard skills and soft skills in many fields and cultures of the places you want to move to. Give yourself an inner strength, strong endurance like boats far out at sea in those stormy days, with a single thought, big boats must go to places with big waves, from there to move. - Thanks for listening.

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**GEN Z'S INTENTION TO CHOOSE AN INTERNATIONAL WORKING
ENVIRONMENT IN THE DIGITAL SOCIETY (MAIN OBJECT OF
STUDY: STUDENTS MAJORING IN INTERNATIONAL RELATIONS
AND LANGUAGES**

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ABSTRACT:

This article aims to determine the factors affecting the intention to choose a job in the international environment of Gen Z - the future employers in the next 20 years. From the processing of 1089 answers based on the survey, the results show that up to 84% of students (mainly living in Ho Chi Minh City) born from 2000 to 2004 choose to work in an international environment. In particular, the factors that affect Gen Z's intention to choose an international working environment are personal and economic needs. More specifically, GenZ desires to have a balance between work and life and always has a spirit of growth, focusing on self-development, so the influencing factors also revolve around the issues of salary, bonuses, and potential to grow. This study provides empirical evidence for country education administrators to have appropriate strategies in building and training high-quality human resources to meet the needs of employers and proposing solutions to attract high-quality human resources, which emphasizes human resources for the internal and sustainable development of the country. This result also enriches the theoretical array about Gen Z with the case in Vietnam.

KEYWORDS: *Gen Z, job choice, international environment, Vietnam*

INTRODUCTION:

Gen Z is a demographic group of people born in the late 1990s to early 2010s (1). With the largest number (2), this is the group of people that will become the main workforce of the world in 10-20 years. Currently, Gen Z is a pioneer in the field of technology, which allows them to expand their knowledge, study, and works in a variety of environments.

In the context of increasingly strong globalization, a world without borders is an inevitable trend. Now, all of us have the opportunity to contact and learn about the outside world through a phone and the internet. Has this impacted the choice of place to work: domestic or international? Employment for Gen Z, who will be the future social employers, is a matter of concern. Gen Z has many strengths such as confidence, understanding of their own values, knowing what they want and like (3) accepting differences in life (4) and especially they have the ability to learn, Highly adaptable, easy to work with technology environment (5). In addition, these young people also have weaknesses such as a much higher job-hopping rate than previous generations (6), (7), easy distraction, and lack of sleep (8); and they are also very easily influenced by social networks (4). Generally, Gen Z is seen as a pioneer

in technology and digital-related professions, creative, and able to work across borders. Do these characteristics affect the job choice of Gen Z students in Vietnam? Gen Z's choice of the workplace is influenced by what factors? These are the issues that this study will shed light on.

FACTORS IMPACT ON JOB CHOICE OF Gen Z IN THE DIGITAL SOCIAL AGE

Gen Z has received a great deal of attention from academics with topics such as Gen Z attitudes in the workplace (9), new frameworks for leveraging the uniqueness of future generations (8), author activities that Gen Z brings (10), characteristics and career orientation of Gen Z (11). Many studies have determined that the factors affecting Gen Z's job choice come from personal needs (12); economic factors (13); psychological factors (5); and environmental factors (12), social justice (9).

The impulse of individual needs factors (Individual needs): Interaction and self-improvement

Gen Z is aware of their own worth (3), so their work comes from a personal need factor. Gen Z always wants to learn not only at the level of equipping knowledge but also to upgrade themselves through being heard and recognized for their achievements; above all, helpful comments will be the motivation. large enough for Gen Z to mature and have more experience (14). Gen Z in particular and individuals who tend to work in a multinational environment in general also expect opportunities to hone their foreign language and technical skills. Ability to quickly adapt to a multicultural working environment helps them advance in their work (12). Besides, a suitable workplace for personal development, with a reasonable balance between working hours and personal time, helps to expand one's relationships and will be a positive working environment for employees. Gen Z (15). However, this generation is also often assessed as having a culture of "like it is to rest" because they want to be free, comfortable, and do what they like, but do not want to be forced or listen to the direction of their parents. They think they have a lot of time and opportunities to try until they really choose a suitable place and a career direction (7).

Economic-driven: Stability and Income

Overcoming the economic crisis after COVID-19 and the 2008 crisis of the previous generation, Gen Z wants a stable job. A survey by Insideout Development found that out of 1000 Gen Zs, 69% prioritize safe work over passion. Specifically, occupations with stable salaries over the years and the desire to stick with the company for a long time (16). In addition to the desire for stability in the workplace, salary is also one of the determining factors in choosing a job. Gen Z considers salary an important factor when choosing a job because a high salary is proof of success (16), and saving for retirement is also a goal that This child sets out for himself (17). In addition, a high salary can help Gen Z young people have more comfortable financial freedom. According to young CEO Nguyen Quang Thai - founder of brands Curnon, Weehours, and Inkaholic, at a very young age, Gen Z wanted to be able to buy a house for themselves because the house would bring personal

elements of each person (18). To be able to buy a home at a young age, Gen Zers will consider what jobs can bring them closer to their desire to be independent and financially free.

Psychological-driven: online community and self-confidence

Gen Z is the generation born in a period of social turmoil with economic turmoil and financial crises, along with the constant development of information technology – these have influenced the trend. employment choices of this generation. As a generation with many contradictions (5), they tend to learn, listen and rely on their surroundings to decide the direction of employment and are not relatively stable enough. to rely on their interests, forte, and short to choose jobs (17). Therefore, Gen Z wants to connect with the community by working in an environment where they can interact with colleagues, superiors, and customers in the community (19) to learn more about working skills. and how to communicate, as well as strengthen self-belief. As a result, a work unit that can create conditions for Gen Z to develop spiritual values and work skills will be able to attract them.

Besides, low self-esteem about not having enough necessary soft skills is a big psychological barrier in the job search process (17). This leads to the result that this generation chooses jobs that are often unstable and intend to stay in a unit for a long time.

Promoting environmental factors - society: environmental protection, social responsibility, and open space

Gen Z is an emotional generation; they are sensitive to changes around them (7). Gen Z is increasingly interested in contributing to improving society and doing meaningful things rather than making a lot of money (20). One of the essential things is to protect the environment and pay attention to the political background to build the country. Max Mihelich

(21) described that Gen Z is very concerned about environmental issues such as global warming or climate change, which shows that they have a high responsibility for the environment. with natural resources. Units interested in environmental protection and sustainable development values (12), units with similar political and policy views on contemporary issues such as equality, non-discrimination, gender or race (9), and units that respect differences (8) are also places where Gen Z is a priority. The recent COVID-19 pandemic has also changed Gen Z's thinking about the working environment: they have started looking for jobs that can be done remotely while ensuring progress. In addition, units with a strategy for humanity's future, especially the future after the COVID-19 pandemic, also give Gen Z more confidence to decide to work there (22).

Synthesized from previous studies, there are four factors affecting Gen Z's intention to choose a working environment, including the promotion of economic factors and the promotion of psychological factors, the promotion of individual needs factors, and the promotion of environmental - social factors.

Table 1 below presents the scale used in this study. The factor "intention to choose a working environment" is a dependent variable with 03 measurement variables. Four independent variables include four main factors: "Personal need" has 04 measurement variables; "Economics" has 06 measurement variables, "Psychology" has 04 measurement variables; "Social environment" has 04 measurement variables.

Table 1. Table of criteria for measuring job selection motivation of Gen Z

ST T	Measurement criteria	Sources
Personal motives		
1	Comfortable, low-stress working environment	McLaren (2019) Giang, N (2021)
2	Be fostered through work, gain more experience, upgrade yourself, develop yourself	Rachmawati (2019)
3	Be trained in foreign languages and adapt in a multicultural environment	Rachmawati (2019)
4	Expand relationship	Rachmawati. (2019)
Economic motives		
5	Opportunities for personal and professional development	McLaren (2019)
6	Safe and stable work	Đoàn Trúc, 2021
7	Meaningful work, improve quality of life	Workforce Institute (2019)
8	Full allowance and insurance	Workforce Institute (2019)
9	Saving for retirement	Workforce Institute (2019)
10	High salary = success	Elle (2021)
Psychological motives		

11	Influenced by traditional norms, values, and opinions of society	Bencsik, Juhász, & Horváth-Csikós, 2016
12	Influenced by emerging job trends	Bencsik, Juhász, & Horváth-Csikós, 2016
13	Peer-pressure	Workforce institute, 2019

14	Want to be connected with the community (colleagues, superiors, customers, community...)	Fodor, Jäckel, & Szilagyi, 2018
Social environmental motives		
15	The unit cares about environmental protection and sustainable development values	Rachmawati, D. (2019).
16	The unit has similar political and policy positions on contemporary issues such as equality, non-discrimination (e.g., gender, race, etc.)	Gaidhani, Arora & Sharma, 2019
17	The unit has a strategy for the future of humanity, especially after the COVID pandemic	McKinsey, 2021
18	The company respects the difference	Pichler, 2021

Source: Author's synthesis from analysis of previous studies

RESEARCH METHODS AND DATA

This study aims to determine the factors affecting Gen Z's intention to choose an international working environment. Therefore, the research method is quantitative by surveying the opinions of Gen Z - people have a year of birth from 1997 to 2012. In this study, students aged 17-25 years old (1997-2005) were invited to respond to a questionnaire via Google form posted on forums. Students of universities, mainly in Ho Chi Minh City and surrounding areas. The survey also reached survey subjects through emails sent to university clubs. The survey period is from February to March 2022.

The questionnaire consists of two main parts: personal information and factors

affecting the choice of the working environment.

The personal information section reflects some basic characteristics of the survey subjects, in the form of multiple-choice, including email, year of birth, training industry, school, opinion on work life, and choice of primary environment to work in.

The part of factors affecting the choice of working environment, the factor "personal", "economic", "psychological", "environmental, and social", is the independent variable measured by 18 variables. "Choosing an international working environment" is a dependent variable, measured by four variables (see Table 1). The questions are Likert scales with 05 levels from low to high (from 5 strongly disagree to 1 strongly agree).

The total number of answer sheets received was 1113 tables. After checking for technical errors, 1089 tables that met the requirements were entered into SPSS software for processing. Data analysis techniques include descriptive data statistics, reliability test (Reliability test), and accuracy test (Validity test) of data sets; then will do a regression test to determine the factors affecting Gen Z's choice of working environment.

RESULTS AND DISCUSSION

Descriptive analysis of samples

The survey subjects of the study were statisticized through the following factors of age, training majors, and viewpoints:

Demographic Statistics

In terms of age, the majority of respondents were in the age group of 18 - 20 years old, corresponding to the level of education from the first to the fourth year (the early period of Gen Z). Specifically, there are 13 young people in the age group -13 - 17 (corresponding to grades 7 to 11), 35 from the age group -23 - 25 (corresponding to fresh graduates from 3 - 4 years), and 1041 students in the age group -18-22 (corresponding to 12th graders and first-year students to fourth years) participated in the survey with the respective percentages of 1.19%, 3.21%, and 95.6% respectively. Thus, the majority of respondents in the survey were in the age group of 18-22 years old. Gen Z students in all four age groups tend to choose to work in a foreign environment but are based in Vietnam (75.6%). Next is working in pure Vietnamese units (15.9%). The choice to work in an international environment in Vietnam comes from the desire to develop at work, but in terms of balance between family and work, more young people prioritize family than young people prioritize career a bit.

Regarding the training major, the foreign language major (English, French, German,...) accounted for the highest percentage, with 358 pupils and students; followed by International Relations with 207 students; Economics accounted for 45 students – corresponding to the percentages of 32.87% respectively; 19.01%; 4.13%. In addition, there are 421 students from other social sciences as well as some natural

sciences. The survey shows that all industries tend to choose to work in an international environment, in which working for foreign units in Vietnam accounted for 89.8%, equivalent to 822 people, which is higher than the choice. choose to work in a purely foreign environment. In which the percentage of students in the group of foreign languages and international relations tend to want to work in an international environment is higher than that of other major groups, respectively 35.7% and 35.7 % respectively. Gen Z still wants to have a workspace suitable for themselves in terms of geographical distance, convenient factors for personal activities, and personal and family life. Although they are the future and modern generation of the country, most Gen Z students in Vietnam are influenced by previous generations and tend to want to find, preserve and develop the foundations, ancient, long-standing, and sustainable values (23).

In terms of work-life balance, the proportion of Gen Z who tend to choose the view of working hard while enjoying life is 79.8%, and only 16.1% spend more time on work, and 3.9% spend more time on personal hobbies. More specifically, students who choose to work in an international environment will likely choose a life balance higher than the group that chooses to work in a pure Vietnamese environment by 5%. In each industry group, 89.37% (International Relations), 79.61% (Foreign Languages), 73.33% (Economics), 68% (Engineering), 66.67% (Information Technology) and 77.91% (Information Technology). other) have a work-life balance option

The regression analysis results show that personal and economic factors impact Gen Z's choice to work in an international environment.

The Personal Needs factor positively impacts Gen Z's choice of work environment. Rapid career advancement is a top priority for Generation Z (12) because it motivates them to work harder and focus more on their work. Gen Z is said to be a curious generation, one of the criteria that makes them choose a job is that it can give them new things to improve themselves (15). Gen Z also wants to improve their foreign language skills to adapt to a multicultural environment, which is also affecting Gen Z's job choice. Nowadays, countries often have Student exchange programs, growing foreign companies in Vietnam with good salaries, and dynamic and creative working environments; these are the things that attract young Vietnamese people. In fact, in the survey, the foreign language factor reached the highest level (level 5), with 523 people agreeing. When going to work, Gen Z also hopes to expand their relationships to seek opportunities to become global citizens. Gen Z's relationship is not only limited to the country but also beyond the territory. This story originates from the continuous development of the Internet, which makes the users of social networks such as Facebook, Instagram, and Zalo increase; from there, they have more opportunities to make friends with foreigners. in virtual interactive spaces, (23). One reason Gen Z wants more foreign friends is to overcome the language barrier because the Vietnamese education industry is increasing the quality of foreign languages of students and students in the country. helping Vietnam accelerate the process of

international integration and exchange. International English certificates such as IELTS, TOEIC, and TOEFL are almost a prerequisite for students to graduate at most universities in Vietnam (30).

Former Minister of Education and Training Phung Xuan Nha said: “Building an English-speaking community, arousing an environment where people like to speak English, like to read English, a learning society, creating becoming a far-reaching movement where people who know a lot teach those who know little, not only for students, but also for adults, and the whole people can learn foreign languages” (31).

Economic factors positively affect the choice to work in an international environment. This result was confirmed by Claire Madden in a 2021 study of Gen Z's desire to find a job (32). Gen Z often finds stable and secure jobs after taking a heavy financial hit from the COVID-19 pandemic. In addition, one of the economic factors affecting the outcome of job selection is whether the job can contribute to society, whether the company cares about the community and employees, and specifically corporate social responsibility (CSR). Chastity Heyward's research verified this in 2020. Research confirms that a CSR strategy shows that a company cares for and treats everyone, including employees (33). Gen Z also wants to be assured of benefits when working; specifically, according to the Workforce Institute, more than 30% of Gen Z worldwide expect to be paid on holidays and leave to promote balance. life. An extraordinary feature of Gen Z is that they also want to retire early. According to a study by the Center for Generation Dynamics (CGK) on the state of Gen Z, details of which were

shared with Yahoo Finance, 70% of survey respondents are Gen Z (10-25 years old), saying that it's important to invest now so they can retire in the future. The key factor that determines Gen Z's desire is salary. Almost half (44%) of Gen Z measure success based on salary. With a generation hungry for recognition like Gen Z (17). High wages motivate Gen Z to work harder, while low wages discourage Gen Z and make quitting easier (Freedman, 2022).

Therefore, it is not surprising that compensation determines whether Gen Z chooses a job or not.

CONCLUSION

Economic factors and personal needs influence Gen Z's choice to work in an international environment. Gen Z's choice of the working environment and life perspective has different points. different from previous generations. Research results show that Gen Z is a generation with extensive knowledge and pioneering technology; Gen Z's life always has the dense appearance of electronic devices and smart items. In addition, Gen Z's view of choosing a job always balances it with their personal life. It can be said that Gen Z attaches great importance to their spiritual life and wants to find a flexible job that allows them to have time to rest and relax. Finally, the trend of working online has become one of the top desires of Gen Z, and they feel that their work efficiency is still enhanced when working and exchanging without having to go to the office.

It is worth noting in this study that 75.6% of Gen Z want to work for a foreign company, but only 16% of you want to work for a pure Vietnamese company. So in the future, who will work for domestic companies? If the percentage of Generation Z working for foreign companies increases in the coming years, how will the brain drain problem in Vietnam be solved? What will the country's position be if talented people join the army and contribute energy to foreign leaders? In addition, the shortage of personnel causes brain drain and a great loss of funds when we constantly invite foreign experts to work, but the work efficiency is sometimes not as good as that of the domestic ones. implementation country.

Understanding the characteristics and expectations of Gen Z is understanding the future owners of humanity in general, of the nation in particular. To build high-quality human resources, the country's managers must offer reasonable remuneration policies in Vietnamese companies. In addition, companies need to focus on training and fostering human resources and making changes in the office culture environment to suit the characteristics and personality of Gen Z. At the same time; Educational administrators also need to have certain studies on the lifestyle and thinking of the current Gen Z to create a training program that is appropriate to the reality, providing the necessary knowledge for the younger generation. . In addition, the teaching style and knowledge transfer also need to be constantly updated to be able to properly approach the learning audience, so that knowledge is not wasted. At the sametime, it is necessary to promote the responsibility to society - the community as well as the creativity and learning spirit of Gen Z so that they have the opportunity to rub shoulders, thereby becoming leaders in the development not only of the world, first of all, Vietnam. In 10 - 20 years, this young generation will become the main labor force of Vietnam, if the country's administrators and senior leaders in agencies do not have policies appropriate to the actual situation, sustainable development programs to determine thinking towards Gen Z, the brain drain will continue to get worse and worse.

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BECOME A GLOBAL CITIZEN IN A DIGITAL SOCIETY

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SUMMARY:

The main driving force of the digital society is digital technology, based on the rapid growth of information and data, which changes every aspect of social organization, from government, and economy to people. Digital society, in a narrow sense, includes digital citizenship and digital culture. It is predicted that by 2025 the vast majority of people in the world will experience a tremendous change in just one generation: From almost no access to information to having access to all information on the Internet. The world through a smartphone. Therefore, this paper is based on current reality as well as through assessment through collected data, making recommendations, and forecasting changes in social life, risks, and challenges. Knowledge in becoming a global citizen, new norms and cultures are formed. The sudden change in culture will lead to challenges in becoming global citizen, it is the responsibility of every company to prepare cultural knowledge, skills, attitudes and behaviors in a new society. People to become global citizens. This study includes the following specific topics: (1) Theory of new points in the digital society (2) Notes on becoming a global citizen. Becoming a global citizen is one of the mandatory requirements of an increasingly developed society, so it is important to grasp the trends of the times and prepare carefully.

KEYWORDS: *Global citizen; digital social knowledge; challenges and opportunities of digital citizenship; knowledge and skills of global citizens.*

1. PROPOSAL AND RESEARCH OBJECTIVES:

1.1 Theory of new points in the digital society.

Digital society is the process of change and transformation of the entire social life when the activities of people and businesses are brought to the digital environment. The digital social environment is a global environment, there are no borders in the transmission of information, communication, commercial and business activities, etc., all take place quickly. The striking change of this society is the degree and transformation of communication, improvements, immaterial. Since then, these connections are not as simple as in real life, they make social links more permanent, and also more complex, all interactions and connectivity are higher. From there is the ability to participate globally with the help of devices that will make people spread their images, personal information, and social activities together both passively and actively, both actively and simultaneously. Negatives are hard to control.

The main driving force of the digital society is digital technology, based on the rapid growth of information and data, from which all changes take place in almost all aspects of society: From government, and economy, to people. Since then, a digital society in the narrow sense will include two main groups: digital citizens and digital culture.

Digital society is a potential environment for many commercial activities to develop, with potential activities in collecting user data to find potential customers. There is an environment where consumers cannot know about the process they are being tracked, also known as "electronic footprint", that in a digital society is an open environment, diverse connectivity, and information. quickly, but compromises the privacy, trust, and security of citizens. In a digital society where everyone has access to the internet, property rights and privacy become even more important – hence in a society that has become and increasingly borderless, and the field becomes more invisible, leaving strong impressions is still possible.

Over the years there has been a massive shift, users moving from digital citizens to digital leaders and making a greater impact on online interactions. Instead of being passive in use, now with the prevalence of the internet and smart electronic devices, a more proactive approach, including “using the internet and social media to improve the quality of own life and that of others” has taken place as part of everyday life. Digital society has penetrated more and more deeply into people's activities through convenient services increasingly dynamic and constantly changing forms of online trading.

And digital citizens have used information technology, intelligent communication in all areas of life, from local to national and global levels. The simplest behavior begins as: Reading newspapers online; information search... more complex actions: using social networks; blogging; participating in sharing opinions on online communities and using e-commerce platforms to buy and sell directly... these behaviors go beyond simple internet activities. Since then, the influence capacity of digital citizens on digital platforms has been increasingly enhanced, not only at accessing information and interacting, creating content on digital platforms... can perform even more important functions: Engage in online political activity; society and develop spontaneous business models.

1.2 Requirements for becoming a global citizen.

a. About capacity:

Like starting to enter a completely new environment, similar to when we enter the school world, we will gradually be influenced and take on new characteristics, personalities, skills and behaviors. ...in that world every day. And these influences can go in two directions, both positive and negative, so learn that world in advance

and prepare personal factors: Including knowledge, attitude and behavior Conformity is important. Being a global citizen in a digital society means that each individual becomes a part of that digital community, so to become a global citizen in a digital society, one needs to equip and cultivate the essential competencies to participate:

- + Ability to think critically (Critical thinking): The digital social environment always has many risks, challenges, and even illegal fraudulent acts take place (such as spreading rumors, smearing honor; uncivilized marketing and promotion activities...) from diverse audiences. Critical thinking helps users distinguish right from wrong in the face of good content and harmful content, thereby forming trusted connections for themselves and minimizing the unsavory ones. trust. Using critical thinking means that each citizen is not in a hurry to draw conclusions based on his or her emotions, rather it is necessary to gather the data necessary to fully understand a situation and then analyze and draw conclusions. the most reasonable argument, thereby avoiding possible manipulations.

- + Ability to integrate and perfect: Integration is the ability of individuals to quickly adapt, the digital social environment changes from moment to moment, and integration is to adapt to new flows of information and perspectives out every day. Each individual participating in the digital social environment brings to that environment their culture through behaviors such as sharing information; content commentary... comes from many different countries, with different ideas. The ability to integrate and perfect also shows the ability to integrate but not to dissolve, and to keep one's own cultural identity and personality in a diverse and complex society.

- + Decision-making capacity: Decision-making capacity is based on logic, grounds, and grounds. There are three basic types of decision-making: including normative decisions; instant decisions; in-depth decisions. A digital social environment is a place where information is freely distributed, and malicious content, and manipulative behavior is common. For low-educated citizens, students... need to cultivate the ability to make decisions with depth and consideration before raising problems, thereby avoiding causing behaviors that create problems, controversy and conflict in the network environment.

b. About skills:

- + Digital identity skills: This is an important skill to help digital citizens know how to manage content related to their privacy and personal information. For example date of birth, address, and phone number... in addition to managing information necessary for users to identify each other, sharing too much identity information will cause bad actors to take advantage of it to steal information. Information aimed at impersonation, fraud, profiteering, posting provocative articles, posting fake

information... Equipping with digital identity knowledge and skills is a way to protect personal data in the environment complex field.

+ Digital literacy: Most schools now have a BYOD (bring your own device) policy so digital literacy is becoming increasingly important – especially with kids for kids to use technology, the internet and social media not only in school but also in careers. Digital literacy will help global citizens in this society learn to manage shared content as a life skill, thereby also leaving a good mark to create an online reputation.

+ Skills in using digital media: Digital media is the basic foundation and driving force of activities on digital society. According to statistics from Brands Vietnam, a person uses an average of 9 different social media accounts and spends an average of 2 hours and 16 minutes a day on social networks, so a citizen living in a digital social environment, It means contributing to the culture of the community itself. And that culture is transmitted mainly through digital media, represented by websites, social networks, online advertising, video games, software... each takes advantage of this can deliver its entertainment, digital marketing activities. With the support of digital media platforms and digital media, businesses and retailers can all improve digital marketing performance, increase sales and price deviation. Research from the Pew Research Center indicates that 38% of adults in the United States read news online.

+ Skills to manage screen time: Thanks to digital technology, people have reached a higher level of convenience, and tools and techniques are means of supporting individuals to participate in activities. Activities in schools, workplaces... are simpler and more effective. This is also a skill that requires a balance of global citizens to balance online and offline environments. Thereby minimizing the negative impact on your mental and physical health.

+ Digital social-emotional understanding skills: Digital society is different from the real-life environment, when coded languages and signs make it difficult for us to recognize and understand the other's true emotions like in real life. Without knowledge of social-emotional skills and cultivating self-control, assertive communication, conflict resolution, or empathy for others will help us limit the exposure of weaknesses in the online environment society and avoid being taken advantage of.

c. Regarding rights and responsibilities: For digital citizens, rights and responsibilities also mean being conscious of protecting yourself and protecting others with whom you interact.

- Responsibility of the person posting information online: Thanks to the characteristics of the digital environment, the tasks are done very quickly, so it is difficult to control and handle in time. In particular, the use of images related to the identities of other individuals, as well as the intellectual property of other authors. A

word, or comment can also spread at a rapid rate and negatively affect the honor and dignity of others in the digital social environment, causing more bullying cases. According to statistics 17% of respondents feel these platforms damage relationships and lead to limited interactions with each other in real life. 15% of young people have an unrealistic view of other people's lives, and 12% feel that social media affects teenagers, causing them to feel pressure to compare with others and leading to psychological problems. Thereby is also the responsibility to voluntarily denounce criminal acts, infringing upon copyright ... to handle according to the intellectual property law as soon as there is a violation.

- Responsibilities of intermediary organizations providing Internet services: Pages such as Youtube, Instagram, Facebook, etc. can be mentioned as intermediary organizations providing internet services, although they do not participate in the posting or uploading of Internet services download the information, but it is necessary to take measures to promptly handle cases of illegal uploading, otherwise it will be prosecuted and considered criminal complicity.

- The responsibility of pure internet users: Users in the digital social environment need to respect the content of other individuals, by using and updating useful information, and avoiding streaming acts that have harmful effects may be considered for the crime of storing and harboring falsehoods. (according to Article 121-7 of the French penal code)

3.CONCLUSION

As a citizen in a digital social environment, each citizen is a messenger representing his country and his community, so the most important thing is to educate, propagate and disseminate awareness to the people. . The law does not easily handle violations in a timely manner, especially with long-term and permanent psychological consequences. Currently, the right to be forgotten in cyberspace is still controversial, so the awareness of cultivating culture, skills, and capacity... is about each person protecting themselves and those around them. Therefore, the general principle that should be ensured by all citizens is respect, protection, and education.

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CONTRIBUTIONS OF ICT INFRASTRUCTURE TO ASEAN MEMBERS' ECONOMIC GROWTH

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1. SUMMARY

This paper aims at analyzing how Information and Communication Technologies (ICT) infrastructure factors contribute to economic growth in ASEAN member countries. By using the panel data in the 2005 – 2020 period and analyzing by pooled ordinary least squares (POLS), fixed – effect and random effects regression, the author found different effects of ICT infrastructure variables on economic growth. While Fixed Broadband and Internet have positive coefficients on GDP, results of Telephone and Mobile Cellular remain controversial. From research results, the paper also gave recommendations on developing ICT infrastructure in ASEAN.

KEYWORDS: *ICT Infrastructure, Economic Growth, ASEAN.*

2. BODY PART

2.1. Literature Review

Since the 21st century, ICT development has become a popular topic for researches in the Southeast Asia region, especially for those on impacts of ICT factors on economic growth.

Some studies mainly used ICT infrastructure such as telephone, fixed broadband and mobile cellular as indicators of ICT development. Sapuan and Roly (2021) used the log - log regression model including Fixed Broadband subscriptions and Percentage of Internet users to measure ICT development in 8 ASEAN countries: Cambodia, Brunei, Indonesia, Malaysia, Myanmar, Laos, Singapore, Vietnam and Thailand. By using POLS and GLS regression estimation, this study showed that all ICT infrastructure indicators positively and significantly affected GDP per capita, which means that ICT infrastructure is an important aspect for ASEAN economies. In addition, it was found that foreign direct investment (FDI) has a positive correlation with ICT infrastructure. Similarly, Lee and Brahmasrene (2014) also used these ICT infrastructure indicators, but divided into two groups of factors: ICT readiness (fixed telephone lines per 100 people and mobile cellular telephone subscriptions per 100 people); and ICT use and intensity (Internet users per 100 people and fixed broadband Internet subscribers per 100 people). By using Cointegrating Regression Estimators, it was found that ICT factors positively and significantly contribute to economic growth in ASEAN countries. Meanwhile, the model developed by Yong Jing & Ab-Rahim (2020) used both POLS, fixed - effect and random - effect estimators, which all showed negative coefficients of fixed broadband subscription on GDP growth, while other ICT infrastructure factors significantly contribute to economic growth. However, this study only examined ICT effects in 5 ASEAN countries: Singapore, Thailand, Indonesia, Malaysia and Philippines; and the regression model did not include control variables such as Capital and Labor Force. Therefore, it can be seen

that there have been different and controversial results about the effects of ICT development on Economic growth in ASEAN.

2.2. Research methodology

2.2.1. Data Collection

In this paper, the author used qualitative methods to analyze how ICT infrastructure factors contribute to economic growth in ASEAN countries: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. ICT infrastructure indicators include: Fixed broadband subscriptions, mobile cellular subscriptions, telephone subscriptions and Internet users. These indicators have been used in previous studies on ICT development and economic growth. Further explanations are given in the Table 1.

Beside ICT infrastructure, the author's model also included control variables affecting economic growth such as: Gross fixed capital formation, Labor Force, FDI inflows, Trade openness.

The data was collected from World Bank Data, which covered the timeline from 2005 to 2020. To measure economic growth, the author chose constant GDP instead of current GDP, which indicates real economic growth instead of nominal economic growth (World Bank, 2022).

2.2.2. Research model

Because the sample included 10 countries and the timeline covered for more than 15 years, the suitable regression model is panel data analysis, including pooled OLS, fixed – effect and random – effect estimators (Wooldridge, 2015).

The regression function is written as follows:

$$\ln GDP_{it} = \beta_0 + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \beta_3 \ln broadband_{it} + \beta_4 \ln mobile_{it} + \beta_5 \ln telephone_{it} + \beta_6 \ln internet_{it} + \beta_7 \ln FDI_{it} + \beta_8 \ln trade_{it} + u_{it}$$

Table 2.6. Summary of variables

Dependent Variable: $\ln GDP_{it}$ (Natural logarithm of GDP, constant 2015 USD)			
Label	Explain	Expected effects on dependent variable	References
$\ln K_{it}$	Natural logarithm of gross fixed capital formation	Positive	Ahmed and Ridzuan, 2012

$\ln L_{it}$	Natural logarithm of total labor force	Positive	Ahmed and Ridzuan, 2012
$\ln broadband_{it}$	Natural logarithm of fixed broadband subscriptions	Positive	Sapuan and Roly, 2021; Majeed and Ayub, 2018
$\ln mobile_{it}$	Natural logarithm of mobile cellular subscriptions	Positive	Albiman and Sulong, 2017; Majeed and Ayub, 2018
$\ln telephone_{it}$	Natural logarithm of fixed telephone subscriptions	Ambiguous	Albiman and Sulong, 2017; Majeed and Ayub, 2018
$\ln internet_{it}$	Natural logarithm of Internet users	Positive	Sapuan and Roly, 2021; Majeed and Ayub, 2018
$\ln FDI_{it}$	Natural logarithm of FDI inflows	Ambiguous	Sapuan and Roly, 2021
$\ln trade_{it}$	Natural logarithm of total export and import values	Positive	Sapuan and Roly, 2021

Source: Compiled by author

2.3. Results and Discussion

2.3.1. Sample descriptive statistics

The results of sample descriptive statistics are given in the Table 2. Overall, standard deviation values of all variables are smaller than mean values, which indicates that the data collected are clustered around mean values. In addition, the logarithm of FDI has two missing values because there are two original FDI values being negative.

Table 7.2. Sample descriptive statistics results

Variable	Observation	Mean	Standard Deviation	Min	Max
$\ln\_gdp$	80	25.37	1.51	22.63	27.66
$\ln\_L$	80	16.28	1.78	12.09	18.73
$\ln\_K$	80	23.97	1.53	21.15	26.53

<i>ln_mobile</i>	80	16.68	2.08	11.77	19.77
<i>ln_broadband</i>	80	12.83	2.68	5.49	16.63
<i>ln_telephone</i>	80	14.25	1.84	10.40	17.53
<i>ln_internet</i>	80	15.42	2.16	10.37	18.81
<i>ln_fdi</i>	78	22.13	1.54	18.04	25.03
<i>ln_trade</i>	80	25.39	1.71	22.30	27.75

Source: Author's calculation

2.3.2. Regression analysis results

Overall, most of ICT infrastructure variables were found to significantly affect GDP. The regression results of three models – Pooled OLS, fixed effect, and random effect are given in the Table 3.

Table 2.8. Regression results with POLS, FE and RE models

Independent variable	Pooled OLS	Fixed – effect	Random – effect
$\ln K_{it}$	0.490*** (0.042)	0.211*** (0.057)	0.490*** (0.042)
$\ln L_{it}$	0.222*** (0.028)	0.826*** (0.140)	0.222*** (0.028)
$\ln broadband_{it}$	0.061*** (0.016)	0.062*** (0.014)	0.061*** (0.016)
$\ln mobile_{it}$	-0.111*** (0.022)	-0.044** (0.021)	-0.111*** (0.022)
$\ln telephone_{it}$	0.022 (0.018)	-0.009 (0.016)	0.022 (0.018)
$\ln internet_{it}$	0.009 (0.021)	0.028 (0.135)	0.009 (0.021)
$\ln FDI_{it}$	-0.066*** (0.024)	-0.031 (0.022)	-0.066*** (0.024)

$\ln trade_{it}$	0.335*** (0.031)	0.217*** (0.045)	0.335*** (0.031)
Intercept	3.587*** (0.702)	1.610 (2.202)	3.587*** (0.702)
Dependent variable: $\ln GDP_{it}$			
Between R²	0.9175	0.9454	0.9175
Within R²	0.9922	0.7890	0.9922
Overall R²	0.9898	0.7870	0.9898

Source: Author's calculation

Note: *** and ** are statistically significant at 1% and 5%

Among ICT variables, Fixed Broadband is the strongest and remains the most stable in all regression models. In both three models, this variable has positive coefficients on $\ln GDP$ and has statistical significance level at 1%. Internet users and Telephone subscriptions also positively contribute to GDP growth, but the p-values are greater than 10%, which shows no levels of significance. Meanwhile, mobile cellular has negative coefficient on GDP.

For other control variables, Gross Fixed Capital Formation and Labor Force still positively and significantly contribute to GDP growth of ASEAN countries. Trade openness is also a significant drive of economic growth in this region. Meanwhile, FDI inflows have negative coefficients on GDP, which is consistent with previous results on ASEAN economies by Sapuan and Roly (2021).

In addition, the author also evaluated the model's determination level through determination coefficients (R – squared). The Between R² values range from 0.9175 to 0.9454, indicating that the chosen model accounts for about 91.75% - 94.54% of variance between separate panel units (ASEAN countries). The Within R² values show that the model explains more than 99% of variance within panel units. Therefore, the chosen model has strong determination levels.

2.3.3. Post – estimation testing results

After regression analysis, the author conducted post – estimation tests to check whether the model have errors. Results in the Table 4 show that the model has no serious errors. Among these, it is proved that the model has no omitted variables with the p – value at 0.3471.

Table 2.9. Post – estimation testing results

Error tested	Method	Null Hypothesis (H ₀)	Indicator	Conclusion

Omitted variables	Ramsey Reset test	Model has no omitted variables	$p - value = 0.3471$	Accept H_0
Multicollinearity	Variance Inflation Factor	Model has no multicollinearity	$Mean VIF = 10.70$	Accept H_0
Heteroscedasticity	White test	Model has constant variance	$p - value = 0.1164$	Accept H_0
Auto correlation	Run test	Model has auto correlation	$p - value = 0.04$	Accept H_0

Source: Author's calculation

2.3.4. Discussion on research results

As mentioned in regression results, among ICT variables, Fixed Broadband is the most significant and stable factor contributing to economic growth in ASEAN. According to the author's calculation, 1% increase in Fixed Broadband subscription would lead to about 0.06% increase in total GDP. To explain this, the ASEAN Digital Masterplan 2025 stated that building and developing fixed broadband infrastructure is one of the most important strategies, as well as indicated that the region has high percentages of broadband connectivity between members, especially the “leader” in digital connectivity supply – Singapore (ASEAN, 2021). Further statistics are given in the Table 5.

Table 2.10. Broadband connectivity across ASEAN members

ASEAN countries	LTE coverage (% of population)	Fixed broadband (% of households)	International bandwidth (kbits/s/pop)	Telecoms Investment (USD/pop)
Myanmar	76%	1%	3	N/A
Cambodia	80%	6%	18	23
Laos	43%	7%	14	15
Vietnam	97%	77%	66	N/A
Philippines	94%	19%	11	14
Indonesia	98%	14%	22	13
Thailand	98%	51%	71	27

Malaysia	93%	44%	56	73
Brunei	95%	69%	170	N/A
Singapore	100%	113%	806	157

Source: ASEAN, 2021

For the variable of Internet, it was found to positively affect GDP but had no statistical significance. This can be explained by the fact that many ASEAN citizens are still not accessible to Internet services. In some countries such as Laos and Myanmar, it is impossible to indicate percentages of households using Internet (ASEAN, 2021). In addition, results of Telephone and Mobile Cellular are consistent with results by Sapuan and Roly (2021) on ASEAN economies. This means that, some ICT aspects do not necessarily affect GDP growth within the given period, but it can become long – run effects which require further investments (Majeed and Ayub, 2018).

In addition, this paper also found that GDP in ASEAN countries is positively affected by control variables, including Gross Fixed Capital Formation, Labor Force, and Trade Openness. These results again prove that economic growth in ASEAN is mainly dependent on domestic factors and activities. Meanwhile, FDI inflows are found to negatively affect GDP growth, which is consistent with the research on ASEAN-5 by Sapuan and Roly (2021). This can be explained by unequal distributions of foreign direct investment sources in ASEAN members, which leads to big gaps between countries.

2.4. Recommendations on developing ICT infrastructure in ASEAN countries

As mentioned previously, ICT infrastructure may have long – run impacts on economic growth. Therefore, ASEAN members need to increase investments on ICT infrastructure aspects, as well as improve quality and coverage of advanced infrastructure such as 4G and Internet connection. In addition, it is better to allow private and market sectors to invest in ICT aspects along with state members (ASEAN, 2021). This suggests that ASEAN governments should look more to global sources to help fund some of these domestic measures, such as the World Bank and the International Finance Corporation (IFC).

However, it is also necessary to consider adverse impacts of the COVID – 19 on investment incentives. These barriers include: (1) Restrictions on foreign ownership and control of operators; (2) High cost of passive infrastructure deployment; and (3) Telecommunications regulations that reduce investment incentives for the major market participants. To reduce these barriers, governments need to build up opened policies and special institutions to attract investment sources, especially during the pandemic.

In addition, it is important to have collaboration and experience exchanges between ASEAN members in developing ICT infrastructure. Particularly, there are certain

barriers to digital and ICT productivity in ASEAN countries, which can be explained by lacks of infrastructure, digital skills and ICT startups. Therefore, governments need to regularly exchange and support each other in developing ICT aspects. This will enable the ASEAN to step forwards in the Digital Masterplan in general and ICT development in particular.

III/ CONCLUSION

ICT infrastructure factors have different impacts on economic growth in ASEAN, which can be explained by current situations of developing ICT in the region. Among ICT variables, fixed broadband is the most significant drive of economic growth. In addition, the paper also found positive effects of Gross Fixed Capital Formation, Labor Force and Trade Openness on GDP of ASEAN members.

This paper mentioned ICT development only at infrastructure aspects, then suggested recommendations on developing infrastructure in ASEAN countries. However, there are still further angles of ICT to research, such as: ICT investments, ICT capital, ICT human development, ...

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APPLYING DIGITAL TRANSFORMATION IN THE IMPLEMENTATION OF INTERNATIONAL AFFAIRS FOR YOUTH DURING THE PERIOD 2020 - 2022: CONSIDERING THE SPECIFIC CASE OF ASEAN

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ABSTRACT: The influence of Covid-19 has brought about tremendous changes in diplomacy implementation in general, and international affairs for youth in particular, by applying digital transformation and shifting to virtual platforms. The fact is that digital transformation has now been an inevitable and irreversible trend in the “new normal” context, it creates new methods for the effort of networking the youth community across the globe as well as in ASEAN. During 2020 - 2022, the international affairs for youth among ASEAN member states together with that of ASEAN and its strategic partners have been deployed digitally, formed an unconventionally diplomatic environment which by far differs from before. The article aims to shed light on key theoretical issues in correlation between digital transformation and diplomacy, analyze the practical application of digital transformation to the implementation of international affairs for youth in ASEAN, then make necessary suggestions for Vietnam in an effort to educate and train new model of young global citizens practicing this field.

1. INTRODUCTION

With its rapid spread and strong infectiousness, Covid-19, from the starting point as a pneumonia variant, has become a serious threat to the stability of the ASEAN community, causing serious consequences in all aspects of life. ASEAN community in detail, South East Asia in general, turns out to be the region facing serious developments of the pandemic with an average number of positive cases higher than 2000 per day. Indonesia - a vital member state of ASEAN - suddenly recorded most severe epidemic in the world with 77,000 infections as of 7/2020 [1].

The complication of the pandemic in the region has directly brought ASEAN nearly to a verge of crisis. The pursuit of typical policies of temporary border closures and limiting international contacts to limit the spread has disrupted the flow of goods, cut off trade contacts, and significantly disrupted diplomatic activities. In the context of crisis, the requirement of the implementation of international cooperation becomes a vital concern. But the method of implementing ASEAN diplomacy must now have a comprehensive adjustment towards digitalization, transforming the method from traditional diplomacy (directly via dialogue) to non-traditional "diplomacy 4.0" (indirectly through the application of information technology). This transformation has become an irreversible trend, opening up new dimensions to diplomatic practice during the pandemic, and even later, in the “new normal” context.

ASEAN's diplomatic activities are an abundant and diverse picture, integrating various subjects in the hierarchy, in which youth exchange (hereinafter collectively referred to as international affair for youth - I.A.F.Y) is a prominent factor, bearing the most typical features of the "ASEAN spirit", and also the field that directly

affects the contribution capacity of the ASEAN youth community. The memberstates' tradition of implementing I.A.F.Y is associated with cultural exchange activities, forums to share knowledge and common vision among potential young leaders in the community. However, the emergence of Covid-19 has posed a huge barrier, leading to the result that the implementation of I.A.F.A to be transformed in form and supplemented in content, requiring appropriate application of digital transformation, exploiting the potential of the digital technology field to enhance the role and position of I.A.F.Y in challenging time, promote youth's ability to contribute in the successful pursuit of the ASEAN Community Vision 2025.

Considering the urgency of approaching systematically and appropriately to analyze aspects of strategic opportunities, the author decided to choose the topic "APPLYING DIGITAL TRANSFORMATION IN THE IMPLEMENTATION OF INTERNATIONAL AFFAIRS FOR YOUTH DURING THE PERIOD 2020 - 2022: CONSIDERING THE SPECIFIC CASE OF ASEAN".

The article aims to clarify the 02 concepts of "digital transformation" and "international affairs for youth", analyzing the dialectical relationship between the digital transformation and diplomatic activities. On that basis of theory, the article applies to the analysis of some practical activities of I.A.F.Y implemented by ASEAN (and its allies) in the direction of digital transformation, objectively evaluating the implementation process to propose some optimal recommendations for Vietnam in effectively carrying out I.A.F.Y, aiming to form a comprehensive value system of the model of young global citizens with all the necessary qualities and capacities in the modern diplomatic environment.

2. METHODS

In order to meet the purposes, the essay utilizes qualitative approaches, mainly documentary research method, case studies method, and event analysis method. The method of researching documents is used to exploit and systematize theoretical contents from scientific articles and updated news sources. Following that, it helps clarify the concept of "digital transformation" and "international affairs for youth" as well as the relationship between the 02 terms. Case studies method and event analysis method are 02 common methods in the science of international relations which allow the article to have a more practical approach, integrating the theoretical basis into specific cases in reality.

3. RESULTS

3.1. The definition of relevant terms

About the definition of "Digital transformation": It is a certainty that "digital transformation" has now become the top concern in every corner of practice. The imagination of an automatic society back to nearly a century ago has no longer an impossibility. Here in our modern world, it is the presence of a "global village" in which people transform their lives by applying "digitalization" and "digital transformation". Vital as they are in the modern society, there has no such a consistent answer to the question: "Is there a parallel existence between these 02

terms?”. On the one hand, some scholars look on these 02 terms as one, and “digitalization” is itself “digital transformation” [2]. On the other hand, some studies require a separation between the 02 concepts [3]. In Vietnam, it remains in common that “digitalization” can hardly be itself “digital transformation” without any differences. If “digitalization” is understood as “the process of modernizing and transforming conventional systems to digital systems” then “digital transformation” is understood as “harnessing the data derived from the digitalization process, then applying technologies to analyze, transform that data and create newer values” [4]. Although there remain various approaches towards “digital transformation” and “digitalization”, should it reach consensus about the key concepts when it comes to this term: “Digital transformation” is a modern process, changing the traditional approach and exploitation of data into applying digital science and information technology achievements to create efficiencies in specific activities at certain fields.

About the definition of “International affairs for youth” (I.A.F.Y): In fact, there is no official or consistent recognition of the name for I.A.F.Y on a global scale in general, ASEAN in particular. Depending on the characteristics of socio-culture, political institutions, and the way the administrative apparatus is organized, each nation will have different approaches to this term. For example, in the United States, the field of youth cooperation activities is concretized with the name “US Foreign Policy - Youth Perspective”, aiming to promote the potential of elite young individuals with thinking and leadership capacity, contributing to the effective implementation of government diplomacy [5]. While in Indonesia, this activity is known as “Indonesia Youth Diplomacy”, with the main mission is to educate awareness and train diplomatic capacity in the Indonesian youth. In addition, with the current international environment attaching importance to integration and building diverse relationships, many international organizations also approach this content with various names, such as: “youth and international cooperation”, “youth involvement in foreign affairs”, etc. In Vietnam, activities on international youth cooperation are officially designated as “International Affairs For Youth”, becoming a vital content contributing to the official functions the National Committee on Youth of Vietnam - a specialized unit on issues related to educating, fostering and training youth in the country. I.A.F.Y is a specific field of activities, belonging to the work of “People-to-People Diplomacy”¹, which has the mission (1) “to inspire international friends to understand, sympathize, agree, unite and support the revolutionary effort of the Vietnamese people and youth”, (2) “to take advantage of the international cooperation to elevate, educate and train cadres”, (3) “to contribute to the expansion of the world's progressive democratic youth solidarity working for peace, national independence, democracy, development and social progress” [6]. Based on the analysis above, there are conclusions to be drawn. Although there remains inconsistent names and specific missions, the contents of I.A.F.Y can be considered with these points: (1) I.A.F.Y is a diplomatic activity aiming to form an international youth engagement network, train and educate the young people to promote their potential of leadership and

diplomacy⁷⁷; (2) youths are both the stakeholders and the beneficiaries in I.A.F.Y; (3) the general mission of I.A.F.Y is to develop sincere and goodwill relations between international relations subjects, especially nations, based on efforts to strengthen relations among youth communities, gradually sharing strategic benefits in the long run.

3.2. The relation between digital transformation and diplomacy

The emergence of the pandemic has become a driver of the intensity and scope of digital transformation in diplomacy. Because in such a context, digital transformation is no longer an option, it is a mandatory solution for every country and state. In the process of operating into real life, the relationship between digital transformation and diplomatic work has been tightly braided together, forming new dimensions, uniting and dominating each other.

The relationship between digital transformation and diplomacy has been expressed through a relatively new concept in the science of international relations as well as information science and technology: "Digital diplomacy". The term first emerged in 2007 with the inauguration of "a virtual embassy" by the Swedish Government, created with the aim of maximizing the possibility of promoting Swedish culture and history despite barriers regarding boundaries, distances and travel costs thanks to the integration of the use of the Virtual World Second Life [7]. Since this event, scholars have recognized the great room for "Digital Diplomacy", and they believe that the interpretation of this term cannot be merely limited to the introduction of "a virtual embassy", but it is likely to be the trend of diplomacy in the 21st century.

Many research efforts have been made to shed light on the meaning of this term and also to demonstrate the relationship between "digital transformation" and "diplomacy" based on scientific theory. In 2015, Segev and Manor defined "digital diplomacy" by arguing that this is the activity of a state entity, using social media intentionally to achieve diplomatic goals and promote the image of the nation. One year later, the approach to this term was expanded, instead of approaching the content simply by referring to "social media" as a technological tool, Manor redefined "digital diplomacy". Accordingly, this term describes the impact of information technology achievements (from email to smartphone applications) on the implementation of diplomatic work. Compared to the previous definition, this definition of Manor clearly has a broader approach when referring to "digital" in the term "digital diplomacy", using the phrase "information technology achievements" rather than only "social media" as before.

Although there is no scientific basis that can draw an absolute and unanimous conclusion about "digital diplomacy". However, through legitimate efforts from many scholars in the process of studying the definitions for the term, the relationship between "digital transformation" and "diplomacy" has basically been

⁷⁷ 01 of the 03 main pillars of Vietnam's diplomatic system which includes : Party Diplomacy, State Diplomacy, and People-to-People Diplomacy)

shaped. This relationship can be looked on via 02 sides:

About the format: diplomatic activities and international integration no longer take place conventionally, but are transferred significantly in terms of platform, means, space, and method of operation thanks to the impact of digital transformation. Diplomatic reception will now be more than simply the appearance of national flags, ceremonies, and conference tables; it will take place on online conference forums, requiring supplements, changes in etiquette and operating procedures. Similarly, activities on voting, negotiating, and uniting of opinions among subjects will also be prioritized on specialized software, implemented digital transformation in quantitative inspection and calculation. Digital transformation is also bringing innovation in the approach to information related to diplomacy by using the Big Data, IoT, Cloud Computing and Online Database rather than the usual storage method. *About the content:* Digital transformation is not only a "cover" of diplomacy, but also an object affected by diplomatic activities and vice versa, becoming an inseparable content of diplomatic policy. The context of high competitiveness requires countries to actively seek partnerships to develop information technology, strengthen digital transformation capacity through academic exchange and scientific cooperation. Security in the network environment, especially information security, has also been a critical factor that dominates the foreign policy-making activities of almost countries. As intergovernmental conferences and negotiations have entered the digital transformation process, this requires strict monitoring and security of information to prevent the risk of interference from negative subjects. In addition, the activeness towards the exchange of information and the level of freedom of speech on digital forums mean that the governments have to offer practical mechanisms to strengthen the national reputation and protect the national image against the flow of disinformation, against, and demeaned activities. To itself, the diplomacy will enhance the capability among the nations in implementing digital transformation thanks to the effort to cooperate and collaborate in doing research about digital transformation and formulating policies to strengthen technology exchange.

3.3. The practice of implementing digitalization in international affairs for youth of ASEAN

During the period of 2020-2022, under the significant impacts of the pandemic in almost nations, ASEAN's I.A.F.Y is required to transfer to online platforms in a synchronous way. Many cultural exchanges programs cannot be carried out as planned due to the border closure policy. Hence, digital transformation has become a typical feature for I.A.F.Y in ASEAN.

"The Ship for Southeast Asian and Japanese Youth Program" (SSEAYP) is a prestigious annual activity organized by ASEAN and Japan with the participation of young people playing the key role in their collective. The traditional format of SSEAYP organization creates conditions for delegates to participate in long-term trips on cruises, landing in ASEAN's member states and the allies to develop strong friendship and create a foundation for sharing progressive knowledge values.

However, the outbreak of the pandemic from 2020 forced SSEAYP to alter its exchange activities from on-site to virtual contact for the first time in its prestigious history. In his opening remark at SSEAYP 2020,

H.E Sakamoto Tetsushi , Minister of State for Youth Affairs, Japan, also expressed:

...the global COVID-19 outbreak has significantly impacted any exchange program beyond borders and made it difficult to conduct the ship program this year as initially scheduled. On the other hand, today's online technology allows youths to connect virtually and immediately with youths from countries oceans away. Utilizing those options of technology, we have decided to undertake the challenge of hosting this program as an alternative international youth exchange platform.[8]

In 2021, when the pandemic presented peak crises for many countries in Southeast Asia, the activities of I.A.F.Y continued to implement digital transformation more thoroughly and strongly, focusing on those fields that exert direct influence on youth. "E-ASEAN Youth Volunteer Programme" 2021 is held entirely via teleconference on the theme "Strengthening ASEAN Education Delivery Systems in Challenging Times". This activity is organized based on a common awareness of the serious impacts that the Covid-19 has made towards education leading to a lamentable truth that the online education activities caused division among many groups of young people in ASEAN society. Therefore, the first and foremost purpose of the activity is to provide the necessary insights into the nature of education in the current period, equipping skills to apply information technology creatively in education and knowledge sharing; thereby arousing in the ASEAN youth community the spirit of determination, contributing to the effective implementation of online education policies in new conditions. Within the framework of the program, youth delegates had access to the concept of "Education for Sustainable Development" (ESD) and opportunities to implement ESD through the lens of ASEAN youth. [9]. In April 2021, ASEAN, China, and United Nations Development Programme (UNDP) held the 5th ASEAN-China-UNDP Symposium on the theme "Enhancing the Roles of Youth in Achieving the SDGs". The symposium focuses on assessing and absorbing the views of ASEAN and Chinese youth before the comprehensive challenges that Covid-19 has caused to the lives of young people. Furthermore, at the symposium, representatives of ASEAN, China, and UNDP as well as youth delegates participated in discussions and sought opportunities for action to strengthen the key role of youth in the effective implementation of the SDGs on virtual environment and promote the role of youth in their efforts in pursuit of the ASEAN Comprehensive Recovery Framework (ACRF) [10]. All discussions and networking activities took place using online conferencing tools, the diplomatic reception was also altered in specific details to suit the new format of the conferences.

In 2022, the region witnessed positive changes in the Covid-19 situation, preparing to enter a different context, opening the doors of adaptation and proactive response in the "new normal" context. Activities on I.A.F.Y now combine online and face-to-face forms simultaneously, digital transformation continues to be the mainstream and

take on new roles in new conditions. The 1st ASEAN Youth Dialogue can be seen as a typical example during this period. This is a large-scale activity in the field of I.A.F.Y, and the first program to be held in direct contact after a long period of disruption due to the pandemic. The dialogue was held both online and in person in Siem Reap, Cambodia on the theme "Youth in the Era of Fourth Industrial Revolution: Opportunities and Challenges in Post-Pandemic Recovery". Facing the complex changes of practices and requirements of the digital era, the program has actively exploited and gathered the views of the ASEAN youth community as well as the Republic of Korea youth for efforts to effectively develop 08 key areas. During the Virtual Pre-departure Programme phase, the digital transformation effort was clearly demonstrated when the program was operated on the Zoom platform, integrating many technological elements to form a virtual stage with multiple functions similar to that of a stage in reality, performing interactions on the Mentimeter platform, putting into use the online data space to systematize information related to the program (<https://www.aseanyouthdialogue.info/>). The dialogue also takes advantage of various social media platforms: Fanpage "First ASEAN Youth Dialogue" on Facebook with nearly 1,500 followers; the account "first.asean.youth.dialogue" on Instagram; the group for networking online via Whatsapp.

3.4. The pros and cons of ASEAN when implementing digital transformation in international affairs for youth

In order to objectively evaluate the process of applying digital transformation to ASEAN's I.A.F.Y, below are some of the author's analyses on the achievements and drawbacks.

About the achievements:

Firstly, digital transformation in youth cooperation activities of ASEAN's member states as well as between ASEAN and allies has a considerable investment in the format and method of implementation. In most of the I.A.F.Y activities carried out by ASEAN and its partners from 2020- 2022, these activities have been carried out on popular online conferencing platforms such as Zoom, but not merely interacting and exchanging via cameras. Instead, most of the activities are integrated using visual effects technologies (VFX) to create a visual impression, utilizing interactive online tools (such as Mentimeter) to automatically collect, synthesize, and promote interaction among delegates' opinions. Visualization is an important factor when practicing IAFA on online platforms because it affects young people as a psychological effect, enhancing the level of concentration and active role of delegates.

Secondly, digital transformation in I.A.F.Y initially built an online data space to synthesize and systematize information. In lieu of individually transmitting each document or using the traditional method of document synthesis, from 2020-2022, ASEAN's I.A.F.Y activities have built a specialized portal on digital platforms, expanding knowledge-sharing opportunities to delegates and a larger community. In July, ASEAN has advocated building a landing page at [the](#)

<https://www.aseanyouthdialogue.info/> creating unity in accessing information and exploiting necessary data sources during the program, enhancing the possibility and flexibility of information discovery.

Thirdly, I.A.F.Y activities gradually effectively exploit the Internet of Things (IoT) in the implementation of communication and information dissemination and connectivity. Typical I.A.F.Y activities of ASEAN and allies are now exported on almost viral social media platforms such as Facebook, Instagram, Youtube, etc, as well as posting public information on websites popular with young people in the region. Within the framework of the program on I.A.F.Y organized by ASEAN, Whatsapp is a typical tool and is often used in many ASEAN youth cooperation activities. With its flexible nature, good security, and popularity among young people, Whatsapp has become an important digital platform that helps ensure the flow of information, create interaction between young people, remove geographical barriers to focus on networking opportunities and shaping a space that values openness, liberality, and psychological characteristics of the youth.

About the drawbacks:

In addition to the initial achievements, it is undeniable that the implementation of digital transformation in ASEAN's I.A.F.Y still remains some shortcomings in practice.

To begin with, although the online data space was initially built, these spaces/websites exist in isolation from each other, not synthesized on the same official system. This makes access to information and access to data sources scattered, making it difficult to disseminate knowledge to the community and challenge the activities to learn and research the content of programs. This fact can be seen by listing here two cases of The 1st ASEAN Youth Dialogue and SSEAYP. While in the first activity, the website used to compile documents was <https://www.aseanyouthdialogue.info/> administered by the ASEAN Secretariat, the documents of SSEAYP were published on the Cabinet Office site under the responsibility of the Japanese government (<https://www8.cao.go.jp/youth/kouryu/en/sseayp/2020/sseayp.html>). The major point of friction here is that the access to the content and information for I.A.F.Y of ASEAN and allies do not gather and systemize on a consistent platform (or at least present in both sides - ASEAN and the co-organized nations) but appear in various sources with separate portals and data systems.

Furthermore, the selection of young delegates to participate in I.A.F.Y has yet to focus on the technological capacity of delegates. In fact, in almost criterias for selecting delegates, the criterias for information technology capacity are not thoroughly considered, and in some cases, they are not even listed in the official selection criteria system. This leads to the capacity to implement information technology activities in many programs to be affected, many youth delegates encountered a disparity in their ability to apply technology to the process of cooperation and connection with each other, leading to a lack of synchronous

operation mechanism.

5. CONCLUSION

Based on the theoretical and practical analysis above, the article draws such conclusions as follows:

First, the definition of "digital transformation" and "digitization" has not yet reached a final consensus. However, "digital transformation" can be basically comprehended as a modern process, changing the traditional approach and exploitation of data into applying digital science and information technology achievements to create efficiencies in specific activities at certain fields.

Second, digital transformation and diplomatic activities in general, I.A.F.Y in particular, have a dialectical relationship, affecting and connecting with each other. The digital transformation process both contributes to the contents and the forms of I.A.F.Y - an important area in the diplomatic strategy of many ASEAN member states and allied nations. *Third*, in the process of operation, the digital transformation in ASEAN's I.A.F.Y has simultaneously achieved initial achievements, but also encountered challenges in terms of the systematicity and criteria regarding technology capacity in selection process.

On the basis of the above objective consideration, the article hereby proposes several suggestions for applying digital transformation in the activities of Vietnam's I.A.F.Y as follows:

First to be mentioned, the Vietnamese Government need to pay higher attention to the education of technology capacity, improving the understanding of digital transformation associated with educational activities on international integration skills in the youth community. Through the leading role of the National Committee on Youth of Vietnam, organizing training activities on digital transformation skills, practical skills of virtual diplomatic work on online platforms, and skills in applying digital transformation technologies to I.A.F.Y.

What's more, progressively doing research with the aim of establishing a theoretical system about the model of young global citizen working in the field of diplomacy, taking it as a navigation and orientation for the Vietnamese youth community, a compass for the process of implementing I.A.F.Y. In particular, identifying technological capacity as a vital factor, constituting the model of young citizens in the present time. The article proffers a system of values necessary for young global citizen model. The system is formed on the basis of absorbing the youth model system of values mentioned in the campaign "*Building a new model of Vietnamese youth value period 2018-2022*" developed by the Central of Ho Chi Minh Communist Youth Union and tolerating more criterias related to the diplomatic field:

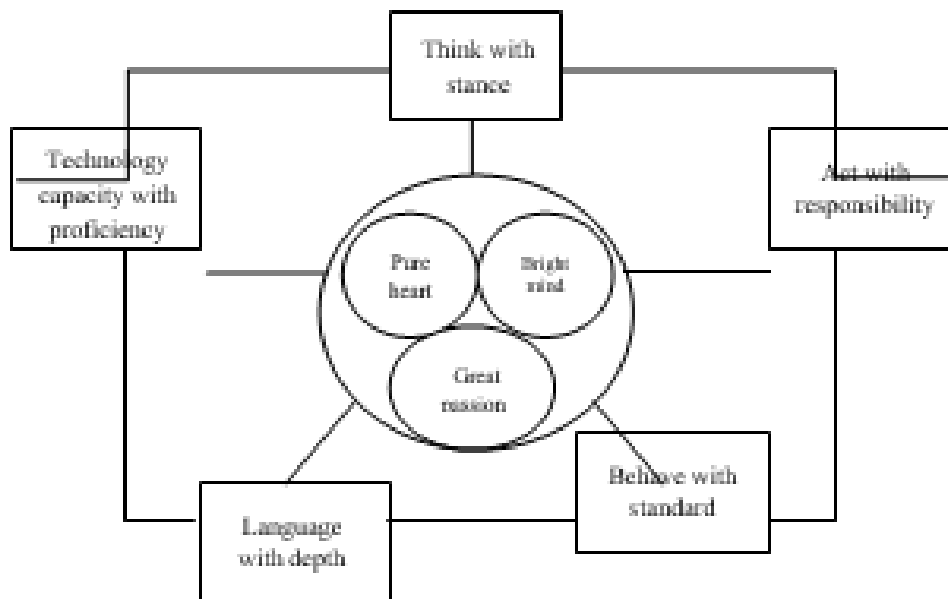


Figure 5.1: Diagram illustrating the system of values for Vietnamese youth model practicing I.A.F.Y

Besides, putting stress on the effort of capturing public opinion among young people on the socialmedia platforms. The diversity of information and the freedom for youth to speak up mean that there should be mechanisms to efficiently shape the stance in thought of young people. I.A.F.Y is not only about face-to-face contact, but also the virtual contact via statements and views shared by the young citizens on online environment. Hence, the Government should consider these contents and invest to enhance "information work and propaganda of foreign affairs activities with high efficiency andpervasiveness, reaching more target groups", especially the youth community. [11]

Last but not least, proactively foster digital transformation skills through academic exchange programs for young people taking place between ASEAN memberstates and allies, especially highlight the role of nations with technological superiority in the region such as Singapore, South Korea, Japan, China.

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GENERAL ANALYSIS OF THE VIETNAMESE ONLINE TOURISM INDUSTRY IN THE DIGITAL ECONOMY

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I. INTRODUCTION

In recent decades, tourism has gradually become an indispensable demand of human life. It has experienced several changes to adapt to the strong development of information and communication technologies. Associated with the transformation of digitalization, Internet platform has combined with traditional tourism to establish the revolution of the method of travelling, especially during the Covid- 19 pandemic. Customers will not have to waste their time on finding the physical representatives of the travel agency to book the tours, instead, they can immediately book their favorite one through the websites or apps.

II. BODY

1.1. Definition of online tourism

From the theoretical perspective, online tourism, also known as e-tourism, is the application of digital technology in the processes and value chains of the tourism, including travel, hospitality, tourism professions, catering, transportation, etc., so that company can maximize its performance and operational efficiency. It is believed that e- tourism enhances the strong interactive model between business-to-business, business-to-customer and customer-to-customer based on digital environment and technology platform.

1.2. Trends of Online Tourism

1.2.1. In the world

Currently, there are more than 2.5 billion people around the world connecting to the Internet via mobile devices, and surprisingly, the service "Tourism and hospitality" is ranked second in the top 5 of the most attractive issues from users of mobile devices. More specifically, more than 70% of tourists use smartphones to search for information and calendar services such as flights, hotels, and car rentals...; 80% of travelers reported that technology has improved their experiences by reducing the process of confirming the procedures. In addition, nearly 65% expect business owners to interact with them via mobile devices and other technological platforms.

From the macro perspective, online tourism has benefitted the tourism industry, especially during the Covid- 19 Pandemic. The rapid increase of Free and Independent Travelers (FIT) using Online Travel Agencies (OTAs) and technology applications to plan their own trips has drastically changed the traditional tourism market. Therefore, the world's leading organizations and businesses have convinced many arguments about the development trend of online tourism. For instance, the World Tourism Organization (UNWTO) considers the technological revolution and

the durable influence of social media as a vital component in the rapid development of the tourism industry in the following few decades. Google and Temasek Holdings of Singapore predict that the scale of online travel in Southeast Asia will sharply increase from 21.6 billion USD in 2015 to 89.6 billion USD in 2025 while the online tourism industry in Vietnam will consist of 10%, which is equivalent to 9 billion USD. Customers from the Asia-Pacific and Latin America regions will strongly contribute to this rapid growth.

The significant development of mobile technology and travel service suppliers has led to the expansion of the sharing economy, massively impacting visitors' behaviors in the Southeast Asia region.

1.2.2. In Vietnam

According to data from the Information Security Administration (Ministry of Information and Communications), currently, there are more than 50 million Vietnamese people using the internet, accounting for 53% of the entire population, higher than the average level of the Asia-Pacific region- 46.64%) and in the world (48.2%). However, the domestic online tourism market has been monopolized by most foreign platforms. According to Vietnam E-Commerce Association (VECOM), a substantial proportion of outbound and inbound customers use the services of foreign online travel platforms such as Agoda.com, booking.com, Traveloka.com, Expedia.com (including Trivago.com, hotel.com), etc. Meanwhile, there are only over 10 Vietnamese companies serving online travel businesses such as Ivivu.com, chudu24.com, mytour.vn, tripi.vn, mytour.vn, gotadi .com, vntrip.vn, etc. However, these companies target to distribute their service to the domestic customer market, leading to a limited number of transactions.

Besides, the trend of using services on the internet to make decisions for trips and tourism activities is gradually replacing the functions of the Concierge department at the hotel. According to market research group Euromonitor International, online travel sales in Vietnam will maintain a growth rate of 25% in the period 2020-2025. More than 70% of online travel searches are conducted from mobile phones and other applications such as finding suitable places, booking transportation, and entertainment services, ...

1.3 Online travel service business activities

In recent years, the online tourism service business has appeared and is strongly developed through much theoretical framework. Online travel service business, also known as the internet travel service industry, is defined as the application of information and communication technologies to the tourism industry. In other words, it is the process of digitization of the value chains in the tourism and hospitality management industries... intends to maximize the efficiency of business operations. Besides, the online travel service business is also defined as the competitiveness of a travel agency by taking advantage of the intranet to innovate within the organization, utilizing the extrinsic networks to enhance the partnership's relationship, and using the internet to interact with all its stakeholders.

Nowadays, the concept of online tourism service business has been universally understood as the technological function in tourism industry such as e-commerce, e-marketing, e-finance, e-accounting, ... as well as the online strategy and planning.

1.4 Characteristics of online travel service business

Primarily, speed is the crucial factor in the characteristics of online tourism. For a supplier of goods or services, information about a product can be released concurrently within the production of that product. This action will create a comparative advantage over competitors in attracting customers as well as receiving the customers' feedback faster and more conveniently.

Secondly, for customers, access to information about products and services is conducted faster and easier. Moreover, the transaction process is also minimized due to saving time in agreement, delivery, and payment method, especially with digital goods. In addition, handling an online tourism service can help eliminate communication barriers. For example, in the past, if customers were forced to purchase their service within the administrative period, online tourism service could operate continuously, fully exploiting the 24/7 service without the disruptive for the normal operation travel agency.

Thirdly, business activities of online tourism can be served globally. Nowadays, the Internet has rapidly penetrated all over the world, leading to the drastic shift of digitalization, especially during the social isolation period in the Covid 19 Pandemic. In Vietnamese market, having adapted to some internal and external triggers, enterprise can gain benefits from this change, for instance, fully promote their products to consumers in other countries at low cost and utilized time budget by using the social media platforms. However, as the physical geographical distance between market areas has become increasingly blurred, the evaluation of the elements of the competitive environment has also become much more difficult and complex. The competitive environment, which was already fierce within a country, has become even more fierce when it expands internationally, especially during globalization.

Lastly, online tourism can eliminate the obstacles caused by the processing of the intermediate stages. Companies can directly interact with customers, collect time series data, and accurately analyze the information to serve their business. Besides, the online travel service business is distinguished from other traditional tourism services by detailing the properties and characteristics of the product, for example, planning travel programs, ... with the minimum cost of operation. By posting that information on websites or other social media platforms, enterprises can massively economize their marketing expense through traditional methods. However, the most ambitious challenge for an online travel business is to create "truth from realistic value" among customers through the quality of their services.

2. IMPACTS OF ONLINE TOURISM ON VIETNAM'S TOURISM DEVELOPMENT

2.1. Opportunities

Currently, almost Vietnam's tourism businesses have actively participated in famous, reliable, and reputable foreign OTAs such as agoda.com, booking.com, expedia.com... They have presented an incredible number of fully-qualified tourism products with specific and transparent information on their official website. Thus, Vietnamese tourism businesses, small and medium enterprise, have an equal opportunity to compete with foreign businesses. For instance, Bamboo Airways provides their customers with the beautiful and friendly website display on Agoda. Their systems are continuously upgraded to satisfy their customers' experience, reducing the queuing time in booking, paying and confirmation process.

2.2. Challenge

Besides the advantages, there still exists the massive challenge of the online tourism business, especially for those who do not digitalize their management methods. In fact, the Vietnamese travel agency is dependent on traditional marketing methods, for instance, directly introducing and selling products, ... and has not successfully applied online payment methods replacing conventional payment methods such as wire transfer, cash payment, etc. If businesses do not appropriately fund to invest in IT systems, for example, LAN, WAN, or Intranet, ... leading to unprofessional online marketing, incompatible websites, or wasting the SEO, and SMO efficiency, ... companies will be deficient in their ability to compete in the modern business environment nowadays. In addition, within the traditional transportation market, there is a critical challenge for tourism companies in applying online booking and payment systems to enhance customer interaction as well as orient their purchase intention through online transformation measures.

3. ACTIVITIES SEIZING THE OPPORTUNITIES

3.1. About government management

Currently, the Law on Tourism 2017 has regulated the policies related to electronic transactions in the field of tourism, stipulating that the Government has the responsibility to encourage and support the application of modern science and technology for managing and developing the tourism industry (Article 5). In addition, they must organize and manage activities of training and fostering high-quality tourism human resources; research the application of science and technology in the field of tourism; including guidance on electronic transactions in the tourism industry (Article 73).

On January 25, 2017, the Government issued Decree No. 07/2017/ND-CP prescribing the order and procedures for the pilot issuance of electronic visas to foreigners from 40 countries and territories entering Vietnam. Businesses have proposed to improve this e-visa website access speed to adapt to the increasing visitor traffic capacity.

The Prime Minister issued Directive No. 16/CT-TTg on May 4, 2017, about strengthening the capacity to access the Industrial Revolution 4.0 and mitigating its negative impacts in Vietnam. Tourism is one of the priority economic sectors to strategically develop for the digital transformation phase, especially after the Covid-19 Pandemic, to promote the smart tourism industry in Vietnam.

The Government also issued Decision No. 645/QĐ-TTg dated on May 15, 2020, approving the National E-commerce Development Master Plan for the 2021-2025 period. This decision is creatively supportive to promote and apply widely the application of e-commerce in solving community issues; diminishing the economic distance between developed urban cities and other locations through e-commerce innovation; building a competitive and sustainable online tourism market; orienting to expand the target tourism consumers from the Vietnamese towards the cross-border transactions in other countries.

3.2. About the breakthrough of some businesses

In advance of satisfying the demands of interactions between customers and businesses in the online travel era, many businesses have implemented modern technology solutions and mobile applications such as smart travel application software, 360 technologies, a combination of virtual reality (VR) and augmented reality (AR), applications with real-time on interactive display... In addition, there is a significant explosion of mobile applications that integrate other functions, for instance, online hotel booking integrating with the specific recommendations on travel packages during the departure time, suitable for the individual's demands.

4. PROPOSING ORIENTATIONS TO SOLVE THE PROBLEM OF ONLINE TOURISM

4.1. Enhancing the usefulness of online travel

To increase the customer's intention to use online tourism business services, travel agencies should improve their usefulness by creating a variety of service utilities. In nowadays context, firstly, companies must appropriately diverse product packages, delving into compensating the needs of different customer segmentations. In other words, it is vital to establish the classifications between diverse groups of customers. For instance, product packages should focus on their targeted customers' income, their willingness to desire different experiences, and the preferred forms of travel combined with the programs satisfying their requirements. In addition, tourism products are often highly seasonal, specific to each destination, and often fluctuating. Therefore, it is necessary to design product groups to fully exploit the competitive advantages of this seasonality such as introducing replaceable destinations through the verified tourism website to prevent overwhelming periods during the holiday or extraordinary events.

Secondly, the perceived usefulness of tourism services will heavily depend on the individual's assessment as well as the quality requirements when receiving the service. Indeed, the process of using online travel products is a process consisting of several stages. Associated with each stage is the experience of a group from distinguished services. Companies need to advocate the development of intermediate products and services such as ticket booking, online seat reservation, program design ... so that customers can flexibly make decisions. This improvement will require enterprises to have tight coordination with suppliers, therefore, it is essential to

advance the relationship with transportation businesses such as airlines, road transport companies, ... as well as the verified accommodation service.

4.2. Solution to improve customer's attitude about the online tourism services

Attitude toward services has a direct influence on the customer's purchase intention for online tourism business services. A customer who is well-consulted will be satisfied with the service provided even if they do not have any additional demands. In addition, the process of customer consultation must be comprehensively synchronized through the internal training materials. For instance, when receiving the client's interest in any product, the system must proactively respond, promptly acknowledge those questions, and advise them. The marketing process must be in accordance with their demands on the financial budget and purposes for using travel services. This activity will ensure the employee's professionalism, especially the quality of the after-sales and promotion service, contributing to the increase in the customers' retention rate in the future.

Secondly, for the tourism industry, the after-sales policy is not only a method of guaranteeing the interests of customers after using the service, but also a basis for businesses to improve the quality and maintain relationships with clients. In addition, they need to acquire flexibility for warranty policies and complaint settlement to assure the highest benefits for customers. It is necessary for enterprises to evaluate the feedback from their customers' problems, regardless of whether it is accurate or erroneous, and have certain respect in solving those issues from both the internal and external aspects. For instance, with the type of new customers who have used the service, the Customer Care Department must regularly interact to update the added information without causing inconvenience to them through SMS and email marketing channels.

4.3. Developing a legal framework

In the current digital transformation context, especially due to the impact of the COVID-19 pandemic, the demand for e-transactions has exploded in the administrative, economic, and social environment. Along with the emergence of digital platforms to mediate online transactions, people will require an appropriate legal framework to satisfy their demands with high transparency in online transactions, ensuring that legal institutions must keep up with this inevitable trend.

Hence, firstly, the government should establish a practical guideline on e-commerce in tourism to support businesses in investing in building information technology systems; ensuring fairness in competition with foreign businesses, especially with those operating in the online tourism industry. In addition, the government should implement legal documents regulated about the elements in electronic transactions such as data messages, electronic contracts, and electronic signatures, ... to improve the beliefs of citizens in using online tourism services.

Secondly, identifying the technology level is one of the breakthrough solutions to increase the competitiveness of national tourism. As the government represents a

crucial position in the evolution of E-Tourism, they should digitize the specific information to construct a reliable national tourism database, for instance, the famous destination or recommended hotels, ... as well as integrate the E-Tourism Campaign for implementing the strategic development. In addition, policies maker can enhance the applications of online tourism portals by creating habitual behaviors for tourists, continuously accommodating multiple functions into a single application, and orienting to provide comprehensive information for all types of tourism services nationwide.

4.4. Tourism human resources

The Fourth Industrial Revolution in the context of post-crisis "reconstruction" caused by the COVID-19 pandemic has posed many challenges and new requirements for human resources in the tourism industry. Accordingly, employees in the tourism industry will not only be required to have the sensitivity to product trends, destinations, and tourist psychology but also be equipped with academic knowledge and basic technological skills applied to tourism.

Regarding the current situation in the world and tourism in Vietnam, obviously, tourism businesses are critically competing in the creativity and innovation of digital transformation, applying technology in their ordinary operations. Destinations applied smart tourism technology such as portals, and automatic voiceovers, ... has become an inevitable trend in the tourism industry. Therefore, the fundamental element for tourism human resources to adapt to the strict requirements of employers, besides the professional knowledge, is the technical skills to serve the practical work at companies.

However, in fact, the training of tourism human resources does not respond to the requirements of businesses and society. Whether the individual has the appropriate expertise, firms usually spend a lot of resources on retraining the hard and soft skills to adapt to the organizational culture. In dealing with this problem, it is necessary to strengthen the cooperation and comprehensively maintain the relationship between specialized training institutions and tourism companies so that employers can figure out high-quality candidates fitting into the holistic situation.

In addition, since the tourism environment has been changing rapidly, the educational program should be innovated in content and context to suitably approach the current practices of enterprises. This is considered one of the effective solutions to improve the quality of tourism human resources, satisfying the needs of the online tourism industry.

V. CONCLUSION

The emerging digital economy is forcing tourism agencies to reevaluate how they operate the entire process of their business. Moving into the new millennium, the competitive environment creates a variety of opportunities, but also represents critical challenges for those who do not learn and change to adapt during the current context. There is an emerging infrastructure of networks, which blurs the boundaries between the traditional markets and the digital sectors. The convergence of technologies is

apparent as demonstrated by an example from the online tourism industry in Vietnam. The consideration of Internet technology to be the major ICT provides a clear view of the dramatic changes occurring in the tourism industry.

From the student's perspective, they need to be provided with academic knowledge, technical skills, soft skills, and a lifelong learning attitude. It is recommended that students should proactively participate in additional training courses and programs to enquire about career opportunities and create a frictional experience through the competitive advantage. This is a valuable circumstance for students, a new generation of online tourism human resources to implement meaningful changes, contributing to the construction and development of Vietnam's tourism industry.

FOSTERING GLOBAL CITIZENSHIP AMONG STUDENTS AND DEVELOPING THEIR DIGITAL SKILLS IN THE CONTEXT OF A DIGITAL SOCIETY

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ABSTRACT:

We are in the era of industry 4.0's digital revolution, where technology affects how individuals communicate, learn, and think. Especially for the students, the key value they wish to pursue in this digital society is to improve the digital competence and become global citizens. In this research, we first provide the definitions of global citizenship and digital transformation. The benefits for Vietnamese students are then discussed concerning how digital transformation affects their global citizen goal. By applying the latest digital competency framework, we suggest the skills should be equipped to improve students' digital literacy. Accordingly, governments and organizations should concentrate on the capacity to create and manage relationships and civilized conduct appropriate for digital citizens around the world. Therefore, students should be equipped and improve their (1) digital safety skills, (2) foreign language skills, (3) computer technology skills, (4) self-image on a digital platform, and (5) relationships and behavior. The findings of this study can be applied to improve the quality of students in this 4.0 era.

KEYWORDS: *digital transformation, digital society, digital citizenship, digital capacity.*

1. INTRODUCTION

Digital transformation [1] is not only understood as the application of technological advances such as cloud computing and big data to all activities of organizations and businesses to achieve high efficiency, but also change. It is also a revolution in organizational thinking, bringing an overall and comprehensive change to individuals and organizations in their ways of living, working, and methods based on digital technology.

Global citizens [2] are people who live and work in numerous different nations and may be of more than one nationality. Additionally, this phrase refers to those who have a wide range of information, from the most fundamental to the customs and cultures of numerous nations around the world. Therefore, "global citizens" have the capacity to connect knowledge and growth possibilities in order to produce valuable contributions to the global society. They serve as a representation of human endeavors and improve the planet.

In the current digital transformation context, Vietnam is a pioneer in the national digital transformation plan. In 2020, the Prime Minister issued Decision No. 749/QĐ-TTg [3] approving the "National Digital Transformation Program to 2025" with a

vision and orientation to 2030, Vietnam becoming a digital, stable and prosperous country. Besides, Vietnam is a pioneer in applying new technologies and models. Renovating the operation, management, and administration of the Government through the fact that Vietnam has increased 2 places in the world ranking of e-Government.

Since the younger generation of Vietnamese people was born during a period of rapid technological advancement, they tend to be sensitive, easily adaptable, and open to embracing new technologies. The Vietnamese people also have a culture that is open to new ideas due to their spirit of integration and are open to accepting the progressive and positive values of the outside world.

The biggest obstacle to digital transformation is culture [4], because most individuals want to adopt new ideas as rapidly as possible without realizing that culture is the cornerstone of any thought revolution. More specifically, some people still operate in the same manner and with the same mindset because they are "afraid of change" and "the water comes to the feet to jump." In order to give Vietnamese youth many opportunities to access and learn many cutting-edge values and technologies, it is important to establish a culture of enhancing digital capacity among students. This will send a strong message to the next generation and lay the foundation for them to become global citizens in the digital age.

2. THE EFFORT TO INCREASE VIETNAMESE DIGITAL PROFICIENCY OF STUDENTS

2.1. Digital literacy definition and steps to digital literacy

Digital competence, according to Jan Secker [5], is the capacity to understand how to use digital tools for study and expression and to rationally examine and critically think about the vast amount of data that is available.

However, as defined by UNESCO [6], digital competence is the ability to safely and appropriately access, administer, understand, combine, communicate, evaluate and create information through digital technology to serve services for the unskilled labor market, senior jobs and business start-ups. Digital competence is also understood as computer skills, information technology capabilities, information or communication capabilities.

Vietnamese students need to develop their digital competencies in order to participate responsibly and actively in the present environment (how to utilize technology best, how to secure personal information on digital platforms). Build relationships and civilized behaviors on digital platforms, participate in communities at all levels, and increase empathy through online dialogues.

The government and organizations must establish a clear and suitable roadmap for Vietnamese students in order to enhance the application of digital culture and build and promote digital culture among Vietnamese students.

In order to create an evaluation framework and roadmap for digital competence and digital culture fit for Vietnamese students, the government and organizations should first survey the level of digital literacy among young people today.

Building and developing a framework for assessing digital competency is part of a strategic objective to improve people's fluency in digital languages and digital skills. However, based on the objectives and advancement of the nation and organization, distinct digital competency frameworks will be adopted and developed for various countries and audiences.

It is required to coordinate with relevant parties, ministries and departments sectors to bring out the proper digital competences in order to offer a framework for digital competency that is appropriate for Vietnamese students. To put it into practice, governments and organizations must set goals for activities for students in universities, colleges, and other educational levels in Vietnam in order to provide a measure and appropriate assessment through the successful implementation of the aforementioned competency frameworks.

2.2. Some capacity frameworks in the world

2.2.1. *Europe Digital Competency Framework* [7]

In 2017, with the support of the European Commission, the JRC studied a strategy to promote digital capabilities for Europe. The "DigComp 2.0" project is considered as a tool to promote digital capacity for citizens with 5 competency criteria:

1. Information and data processing capacity through browsing, searching, browsing data, information and digital content; evaluate and manage data, information and digital content.
2. Proficient in information and data through interaction through digital information technology; sharing through digital technologies; participation in citizenship through digital technology; cooperation through digital technology; understanding and observing social etiquette; manage.
3. Content creation through digital content development; integrate and rebuild digital content; copyrights and licenses; program.
4. Safety through device protection; protection of personal data and privacy; protect health and well-being; environmental protection.
5. Problem solving through technical problem solving; identifying technology needs and responses; creative use of digital technologies; digital identity.

2.2.2. *UNESCO Digital Competency Framework* [8]

In 2018, based on the European Five Forces Digital Framework, UNESCO conducted a proposal for a global digital competency framework, of which UNESCO proposed two more areas:

1. Ability to operate digital devices through understanding the operation of hardware and software devices.
2. Career-oriented competencies related through operating specific digital technologies in a particular field and interpreting and manipulating data and digital content for a particular field.

2.3. Proposing improvements to the digital competency framework:

The existing competency frameworks of countries and organizations around the world are generally classified and arranged in a downward direction that emphasizes technical factors in operations and focuses on applying technology to practice through attitude, empathy, critical thinking and problem solving, innovation. However, the above digital competency frameworks do not address the psychological capacity of students.

In the digital age, social networks have become a communication and entertainment tool for young people and are used on a regular basis. Social networking platforms are developed and improved continuously for the purpose of stimulating users to use more time. Therefore, the influence of social networks on human psychology will become more profound over time. Specifically, here are some of the negative effects of social media on psychology.

Online bullying [9] is a type of bullying that takes place on computers, smartphones, laptops, and other electronic devices. Direct bullies may criticize, critique, or make threatening remarks to their victims. Many people tell jokes that are hurtful and extremely upsetting to others since they are not face-to-face. Students and youngsters are typically the victims in this predicament. False information can be widely disseminated on social media platforms if prompt handling procedures are not taken, subjecting victims to intense emotional stress.

FOMO (fear of missing out) [10] is a psychological problem that has only recently emerged. This syndrome is mainly seen in young people with the characteristic that they are always worried about falling behind and being inferior to others in an exaggerated and extreme way. There are many causes of FOMO syndrome, of which frequent social media use is the most common. FOMO syndrome also makes each person lose their own opinions and all decisions are dependent on the majority trend.

To protect their own psychology, students need to understand digital skills through understanding social networks and real life and seek help from experts. In addition, as social networks facilitate the connection of all friends worldwide, students must be able to establish and maintain relationships on these platforms. This gives pupils more opportunities for study and growth as well as exposure to different cultures and aspects of life. But it's important to take the right precautions to avoid fraud and spot dishonest actors on social media.

As a result, in order to improve the quality of the evaluation framework for digital competency, it is necessary to be more aware of social networks and one's own interests as well as to be able to create and maintain relationships on social media.

3. KNOWLEDGE AND ABILITIES THAT RESIDENTS OF THE WORLD REQUIRE IN THE DIGITAL AGE

By applying the latest digital competency framework, we suggest the skills should be equipped to improve students' digital literacy.

3.1. Digital safety skills

Equip skills in dealing with behavioral risks in cyberspace by learning how to deal with cyberbullying, harassment and stalking on digital platforms, and identifying and dealing with cyberbullying. Respond to cyber content risks by understanding harmful user-generated content such as racist, hateful, discriminatory, or abusive content and images. photos, to strengthen themselves, to actively contribute to a healthy online community. At the same time, protect yourself with personal security management practices by being aware and alert to thefts of confidential information and personal data, and how to use secure security measures. Using safe passwords and anti-virus software, learning how to deal with when personal information is exposed online, Facebook account security, and using social networks not to reveal personal data are also necessary skills a user should be equipped with.

3.2. Foreign language skills

Foreign languages are a prerequisite to becoming a global citizen in the digital age, because young people will not be able to work with foreign partners and companies with their mother tongue. Having a background of knowledge of foreign languages makes it easy for students to handle situations arising in different countries. Foreign languages are also the key to help students access vast sources of knowledge, expand relationships through communication in foreign languages, and the process of learning and acquiring different languages also helps students develop. the brain's memory capacity and capacity development in this digital age.

3.3. Computer technology skills

As the globe transitions to the 4.0 technology era, students can now readily access information technology, acquire computer technology fundamentals, and obtain knowledge using laptops. and mobile devices. To be a digital citizen, students must master a certain level of technology use, including the use of laptops, smartphones, and other electronic devices, as well as the ability to access and deeply understand the internet by mastering the skills of online information searching, useful knowledge acquisition, information filtering, and the search for reliable information sources. Understand how to use applications, services, and shopping to meet individual needs.

3.4. Building a self-image on a digital platform

Enhance the social media presence by creating a virtual identity online, creating a personal profile on Facebook, actively matching your interests with posts, sharing meaningful content, understanding the difference between reality and virtuality when using social media, and actively disseminating upbeat and encouraging information to create a positive self-image.

3.5. Skills to build, manage relationships and behavior in a civilized manner suitable for global digital citizens

Building and managing relationships on digital platforms is a matter of little concern in Vietnam. Students need to develop skills through learning the rules about using social networks so as not to hurt others, how to protect themselves psychologically so as not to be affected by social networks. In addition, students need to learn how to recognize people, do good and bad actions on digital platforms, and build and maintain relationships on social networks. At the same time, students need to know how to deal with dangers on social networks. From there, creating a meaningful global citizen.

4. CONCLUSION

In the current industry 4.0, digital transformation and global digital citizenship are of great interest to society. Today's young people in Vietnam were born in a period of great change in technology, this trend creates young people who are sensitive and easily adaptable, ready to adapt and approach new technologies. However, the biggest barrier in digital transformation is culture when most people want to quickly follow new trends but forget that culture is the foundation of any thinking revolution. Therefore, in order to improve the application of digital culture, build and promote digital culture among Vietnamese students, the government and organizations need to have a specific and appropriate roadmap for Vietnamese students through the framework. Digital competence is supplemented with the ability to be aware of social networks and one's own interests as well as the ability to build and manage relationships on social networks.

In addition, the young Vietnamese generation has to develop social skills, learn more foreign languages, and acquire digital safety knowledge so that they can participate in the process of becoming global citizens in the digital age. with the ability to establish oneself on a digital platform, manage connections, and act in a manner that is appropriate for global digital citizens. prepared with technology skills for the 4.0 era.

With these values, the young Vietnamese generation is ready to become global citizens in the digital society. From there, surely the goal of a prosperous Vietnam in 2045 will be brilliantly successful.

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KLEDGEMAN - A GAME-BASED LEARNING FOR EPIDEMIC AND PANDEMIC PREPAREDNESS

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ABSTRACT

After the severe spreading of the COVID-19 pandemic, it is essential to improve human awareness of disease prevention and treatment. Not only the Covid-19 pandemic, people also need to be aware of other diseases, for instance, plague and Ebola. Therefore, an epidemic knowledge educational game, especially for children, is an effective solution to equip them with a good foundation of knowledge in pandemic preventing and overcoming. However, if a game is designed based on other purely educational games, it will fail to gain the children's interest. In this research, we built KledgeMan, a game-based learning for epidemic and pandemic preparedness. In KledgeMan, children can become a superhero to destroy pandemic evil. Thanks to a clear story and nice design, our proposed game can solve the boredom often found in educational games. In addition, KledMan is more attractive and effective than similar games in terms of visuals, plot, sound, built-in content, and ability to illustrate questions. The findings of this study can be used as an effective teaching tool for children to equip them with explicit knowledge of the dangers of each disease.

KEYWORDS: *game-based learning, covid-19 preparedness, awareness, teaching tool, epidemic knowledge.*

I. INTRODUCTION

In this technological era, educating children directly about epidemic issues is essential [1]. However, if we use boring traditional lectures, it will be hard for children to concentrate and remember what they have learned. Moreover, children also need graphic images or models related to their interests that will be easier to access and remember. Educational games [2] are one of the technologies that meet the educational needs of children through computers or smartphones. Especially after the complicated evolution of covid, this model has received more attention because of the importance of equipping knowledge for teenagers.

Educational-related game applications such as applications for learning English, practicing typing et cetera are currently very popular. Research shows that Educational Games are an effective tool for learners that allows them to access information in an intuitive, effortless way and can study in whatever place with just a smartphone or laptop [3]. Therefore, creating an educational game is necessary to help children learn important knowledge about diseases, especially to reduce the risk

of disease outbreaks in the present as well as in the future. In addition, the cost of making an educational game is not a concern.

However, to attract children, the image in the game must be attractive [4]. In addition, the game content must be appropriate for the age group and not be boring. To meet the above problems, we need to design the characters and animations in the game and write the game plot or how the game can work. Hence, the game design is significant, which is a barrier to developing a good training game for children. Therefore, it is necessary to build an educational game with low-cost and fully responsive in terms of images and content. To fill the current research gap, we developed an educational game called KLedgeMan in this research.

II. BACKGROUND AND RELATED WORKS

Even before the strong spread of Covid-19 epidemic, many game models were built to respond to educational applications online.

Educational games are designed and developed to help users improve their knowledge. For example, Quizizz [5] is a game designed and developed for learners to access and answer multiple choice questions. They used a lot of vibrant colors for the background or the titles or the answers. It also has functions such as the option to multiply the current score by two if the answer is correct and so on. However, it is still just a boring question-answer knowledge game, without the illustrations to be interesting enough for children to learn.

Funny question game [6] is a game that provides a treasure trove of unexpected questions with deep knowledge and humorous elements to help you relieve stress. The puzzles have various levels suitable for all ages. Yet, this game was built with simple images, just questions and answers are displayed for users to choose, it also doesn't have any penalty or pressure if you choose wrong, this will cause learners to choose unconsciously without trying to think carefully before making a decision.

Who Wants to Be a Millionaire [7] is a game that was created based on a popular Game Show. Players need to overcome 15 questions in many different fields to win. Besides, the game also gives players the right to help, such as 50:50 to eliminate two wrong options, ask the audience, and consult the team, to help the player to complete the challenge. A rich treasure trove of questions brings an interesting experience to you. Nevertheless, the general idea of these games is often simply answering questions about knowledge without any plot when playing. This leads to children who will not be curious to play until the end of the game.

Dead Cells [8] is a 2D game with a clear plot, the content revolves around a lost cell, always looking to enter many different bodies to lead an adventure just for him. The images in the game are also extremely high quality, which is very attractive to players. However, it does not guarantee age-appropriate content and images because it includes horror scenes. It is very not appropriate for children to play.

It can be seen that the game model in general or educational games in particular is an effective approach to children. However, some games are still not really suitable for

educational needs because games with well-invested plots and images are not suitable for education. In contrast, educational games are often created with simple educational purposes, extremely boring content and images, without a clear plot that do not attract players. Therefore, my research is carried out to combine the above issues to bring an attractive educational game for children.

III. GAME DESIGN AND IMPLEMENTATION

In this study, we built Kledge Man, an attractive educational 2D game. Kledgeman combines elements of content, plot, and images in the closest way. It is very accessible to children. In terms of the game's plot the player will be transformed into a superhero to destroy the viruses which represent villains, causing disease in humans. With content, when playing this game, children will learn how to destroy viruses by answering multiple choice questions through the information of the virus that the game gives. The visuals of the game are based on a game that is associated with many people's childhoods, Mega Man, with animations of a superhero which will attract children. To obtain that target, we do the following:

- Research and create images and animations using virus images representing the monsters the player will have to defeat, as well as characters and backgrounds.
- Search for information about diseases to be able to give the most accurate knowledge to prevent and treat diseases.
- create games with Java programming language to be playable on all platforms.

Figure 3.1 shows an overview of the process in creating KledMan, the plot educational game, which is built entirely in Java Language. Accordingly, images of the objects in the game, we used pixlr to separate the characters' fonts so that they could be drawn on the game without overlapping. Next, we used a lot of split images to be able to animate each character in the game. In the final stage, we build a complete game to provide the application to the users.

In the first step, to make the game smooth, we used an algorithm that calculates cycles so that the game can output 60 frames per second. We then collected images of the necessary objects for the game using online sources. These images represent each character's small actions so that after stitching them together it can make an animation for the object. Each virus object in the game represents an epidemic, Therefore, we wrote the information of this disease so that learners can easily imagine which virus this is to give the most accurate answers to destroy the virus. we have added sounds to the game, including the game's soundtrack, as well as each action and gesture objects in the game have their own sounds.

In Addition, to help the player can control the character that can act in the game, such as running, jumping, shooting, we used Keyboard Event library in Java language in order to allow players to interact with their character.

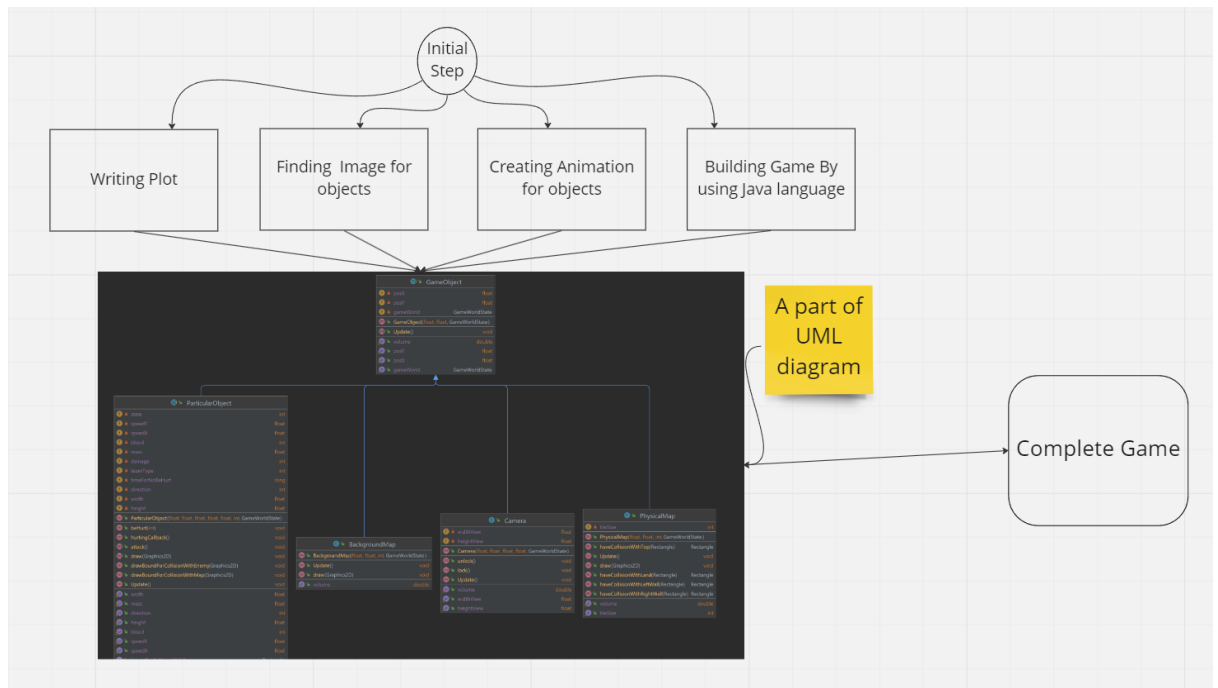


Figure 3.1. An example of KledMan game creating process - UML Diagram

Figure 3.2 shows the game's sound panel, there are two main types of game sounds: background music and character effects.

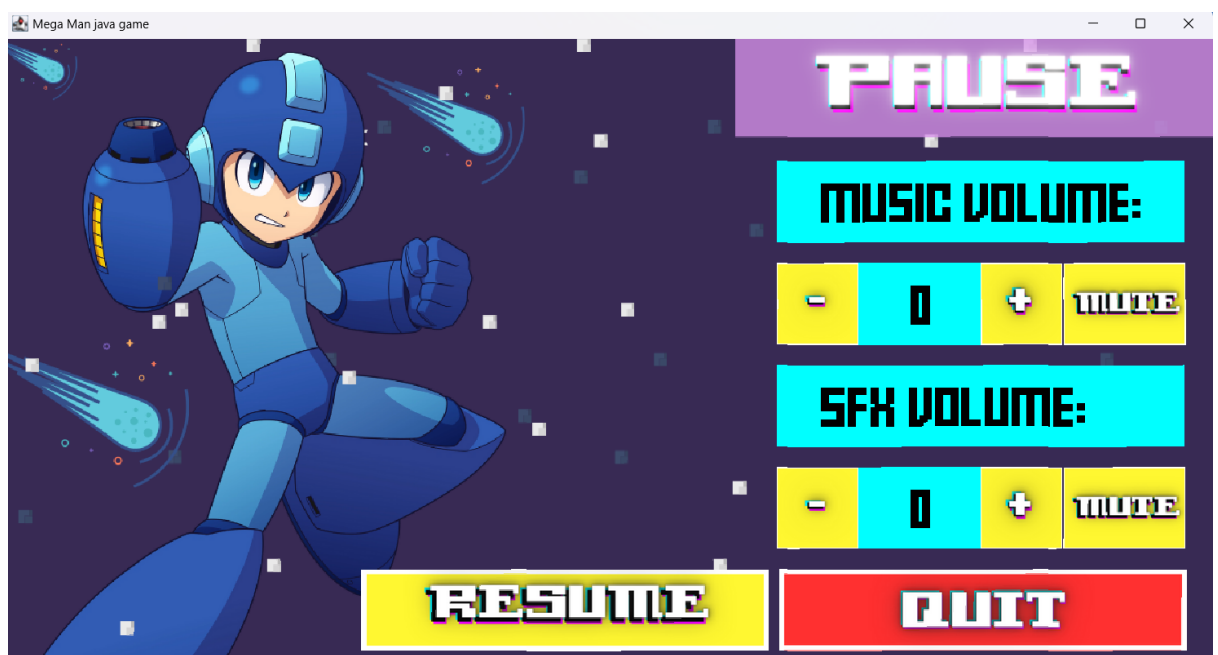


Figure 3.2. Sound manager in pause menu



Figure 3.3 Main character

IV. RESULTS

We have applied the above features to create an educational game KledMan with the goal of engaging children, to educate them about the importance of preventing diseases and the dangers of each epidemic. Figure 3.4 depicts a snapshot of the game when the character is confronted with a virus. Through this application, we also transmit important and detailed content for children to have an overview of information about epidemics, thanks to the convenience of being able to study anytime, anywhere with smartphones or computers, children will not be pressured for time when studying.

To enhance the children's experience, the interface is also an important part. We have designed the interface to be as simple and easy to play as possible. We also arranged layouts such as game rules, settings, and transitions meticulously.

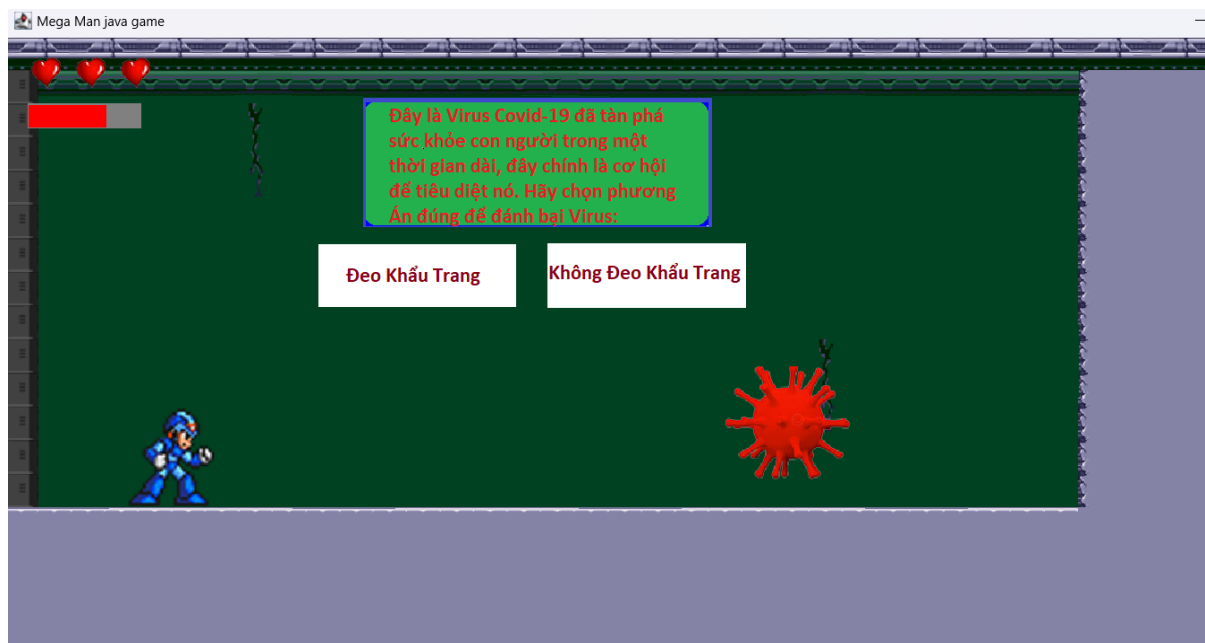


Figure 3.4. Screenshot of the game when fighting a virus.

To evaluate KledMan, we compare our game's features in terms of visuals, plot, sound, built-in content, ability to illustrate questions with other educational games. It can be seen from the result shown in Table 3.1 that KledMan is more attractive and effective than similar games in regard to compared features.

Table 3.1. Comparison results of Kledmen with similar games

Feature	<i>KledMan</i>	Quizizz	Funny question	Who Wants to Be a Millionaire	Dead Cells
Visual	<i>YES</i>	YES	YES	YES	YES
Plot	<i>YES</i>	NO	NO	NO	YES
Sound	<i>YES</i>	YES	YES	YES	YES
Content	<i>YES</i>	YES	YES	YES	NO
illustrate	<i>YES</i>	NO	NO	NO	YES

IV. CONCLUSION AND FUTURE WORKS

By educating the information about the epidemics through the online form whenever, this game will bring efficiency and a certain role in the education of children. Especially through the complicated development of the Covid-19 pandemic, it is essential to equip children with the necessary knowledge. However, most educational games are usually boring, with simple graphics, mostly just question and answer.

In this research, we built KledMan, an educational game with content and images suitable for all ages, especially for children, to solve the boredom often found in educational games thanks to a clear story.

To evaluate the game KledMan, we compared the features with other similar games. The results showed that my product is more attractive than similar games by the combination between educational games and casual games.

The source code of KledMan was published and freely available for download via our GitHub page [9]. In the future, we will implement new improvements to build up the content of this game about not only diseases but also other knowledge surrounding us, to educate in the effectest way.

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IUVTOUR - A LOW-COST VIRTUAL TOUR PLATFORM

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ABSTRACT

During the spreading of the COVID-19 pandemic, people's demand for direct visits and exhibitions is restricted. Therefore, the virtual tour model is an effective solution for users to visit many places, such as universities, museums, and shopping centers, without having to go there. Currently, many virtual tour models have been built and used. However, most existing systems require images to be captured with specialized cameras. This increases the cost, making it very difficult to construct virtual tour systems. In this study, we propose IUVTour - a low-cost, open-source virtual tour platform, to solve those existing problems. Firstly, images of the locations were taken through the Google Street View app on a smartphone. Next, we use SinGAN - an open-source image processing platform, to improve the quality of captured images. Through the Marzipano Tool platform, the virtual tour model has features such as audio narration, video, and relevant display information to enhance the user experience. Comparisons with similar virtual reality platforms demonstrate that IUVTour has lower costs and better performance than previous models. Therefore, the results of this research are expected to be applied to build virtual tour websites for universities, museums, and shopping centers efficiently.

KEYWORDS: *virtual tour, covid-19 preparedness, low-cost system, open-source platform, IUVTour.*

I. Introduction

Nowadays, planning and organizing direct visits to a place such as a school or a museum are effective. However, it needs a lot of budget. Moreover, in the current complicated situation of the Covid-19 epidemic, it is very difficult to ensure the safety of disease prevention for a field trip. The virtual tour model is one of the technologies to meet the demands for visiting and exhibiting via the Internet. Especially during the complicated development of the current COVID-19 epidemic, this model is more known due to the need for sightseeing activities while social distancing. In that situation, several virtual reality tour models have appeared to satisfy the demands of visiting tourist sites, housing models, museums, and school campuses.

For example, domestic and foreign universities have websites about virtual reality tours, such as the University of Information Technology - VNU-HCM and Harvard University. Studies show that Virtual Tour is an effective tool that allows students to tour the campus for free, without effort, and get a broader view of the university they are interested in [1]. Therefore, creating a virtual reality tour website is necessary to

help domestic and foreign students visit the school easily and conveniently, significantly minimizing the risk of disease spread in the community. In addition, costs for organizing tours are reduced considerably.

However, to ensure image quality, most existing virtual tour systems require images to be captured with specialized cameras. In addition, to use some systems, users must pay a monthly cost to maintain. Features such as navigation, effects, offline tours, voice narration, and 360 images created by smartphones are not offered or are offered very limitedly in the free versions. This increases the cost, making it very difficult to build virtual tour systems. Therefore, it is necessary to build a low-cost, open-source virtual tour platform that fully meets the required features.

In this study, we proposed IUVTour - a low-cost, open-source virtual tour platform to solve existing problems.

II. Background and Related works

Even before the outbreak of the Covid-19 pandemic, many virtual tour models were built to meet the needs of visiting tourist attractions, housing models, museums, and campuses.

The Virtual Harvard Tour website [2], accessed from harvard.edu, was designed and developed to allow people worldwide to view the campus. It contains twenty locations inside the university that can be viewed virtually. They used Quick Time Virtual Reality (QTVR) as a virtual guide for the tour. This model used a cylindrical panorama to stitch the image and view its surroundings. It provides a map, text, and voice descriptions for each location. However, the tours are still fragmentary, incomplete, and undetailed, not suitable for students looking for faculties and disciplines related to themselves.

360 UIT [3] is a website that provides actual images of the facilities of the University of Information Technology - VNU-HCM based on Virtual Tour technology. This website has several benefits such as providing campus photos to introduce the school. However, 360 UIT still does not meet the need for detailed information as well as the lack of audio explanations about the school's history, faculty information, and classroom functions.

The Virbela Platform [4] is a 3D-based virtual tour model. This platform allows users to change their avatar, design their own personal image. In addition, it allows users to visit virtual spaces, school models, and organize meetings. Moreover, users can move to other places using the buttons on the computer keyboard. However, the disadvantage of this platform is its expensive cost (\$1000-2000), only supported on computer devices, and users cannot change the interface as well as space and scenery on this platform.

The Marzipano platform [5] is a virtual tour tool providing a 360 degree view to the viewer. The platform supports all browsers available on desktop and mobile devices. In addition, it is free and open source for users. Marzipano uses powerful WebGL technology and JavaScript API. WebGL can manipulate many types of 3D images

such as data visualization, video games, etc. to create complex physics simulations or graphs. Marzipano uses this technology to process the original images and combine them, simulating a 360° space for the user. Besides, JavaScript API is used to enhance user experience by supporting optional functions and applications. In addition, Marzipano's products are compressed as a zip file, small in size, and compact.

It can be seen that the virtual tour model is an effective approach for users when they can visit a place without having to move there. However, some platforms are not really suitable for the needs of users due to their expensive cost or large capacity, and lack of detailed audio explanations. To build current systems, high quality 360 images are required. In addition, the use of artificial intelligence to suggest suitable visiting schedules for users has not yet been focused on development. Therefore, our research is implemented to solve the above problems.

III. IUVTour Design

In this study, we built IUVTour, a low-cost virtual tour platform. IUVTour integrates modern technologies such as virtual reality technology, a simulated environment created by humans using specialized software, to create virtual tour websites. The purpose of this topic is to help users to visit places such as schools, museums, and shopping malls, most realistically, without having to go directly to the location. In addition, the system also integrates voice narration to help users capture information easily, such as information about faculties, disciplines, subjects that the school is teaching, student activities, etc. members in the university. In addition, IUVTour aims to design a friendly interface to provide users the best experience. To achieve that goal, we do the following:

- Research and apply SinGAN technology, which uses artificial intelligence to automatically improve image quality, to have the most realistic 360 images.
- Combine existing virtual reality images and recorded audio recordings to introduce relevant information about the place.
- Create a website using virtual reality technology that users can visit places and interact with.

Figure 1 shows an overview of IUVTour, the low-cost, open-source virtual tour platform we built. Accordingly, the images of the locations after being taken with the Google Street View application on a smartphone will be in 360 image formats. Next, we use SinGAN [8] to improve the quality of captured images. Then, Marzipano will be used to assemble high-quality 360 photos and build a virtual tour system. In the final stage, we will build a website to provide the built systems to the users.

In the first step, after fully collecting location images using the Google Street View application, we apply SinGAN artificial intelligence technology to improve image quality. SinGAN, an unconditional generative model, can be learned from an original image. This model is trained to recognize the internal distribution of patches within the image and generate many high-quality samples with the same content as the original image. SinGAN consists of a pyramid of fully convolutional Generative

Networks (GANs). Each GAN is responsible for learning the patch distribution at a different scale of the image. This allows the creation of new samples of arbitrary sizes and proportions while changing the properties of the image, still retaining the global structure and characteristic texture of the training image. Unlike previous single-image GAN schemes, this model is not limited by the texture of the image and is not conditional (i.e., it is possible to generate samples from noise).

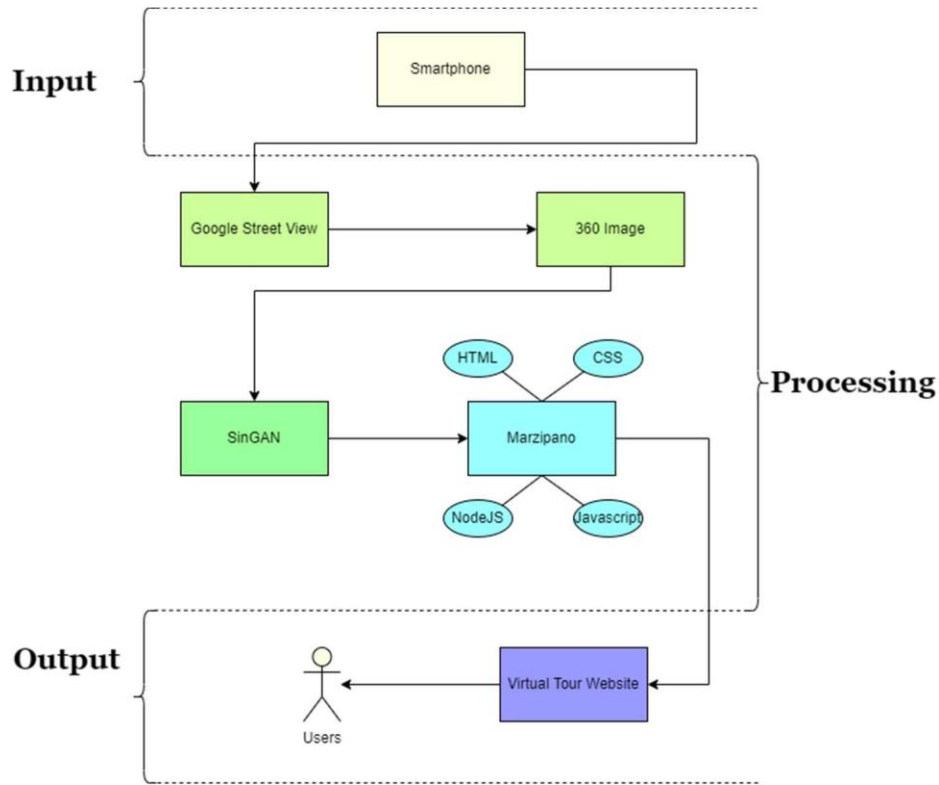


Figure 1. IUVTour overview – Low-cost virtual tour platform.

The sinGAN model increases the image's resolution by a factor of s . The authors train the model on low- resolution images, with the reconstruction loss weight $\alpha = 100$ and the pyramidal scaling factor $r = \sqrt[k]{s}$ for some $k \in \mathbb{N}$. Since small structures tend to repeat proportionally to the scene, at the time of testing, the authors increased the image's resolution by a factor of r and injected it (with noise) into the final generator, G_0 . Repeat this process k times, a high-resolution output is obtained.

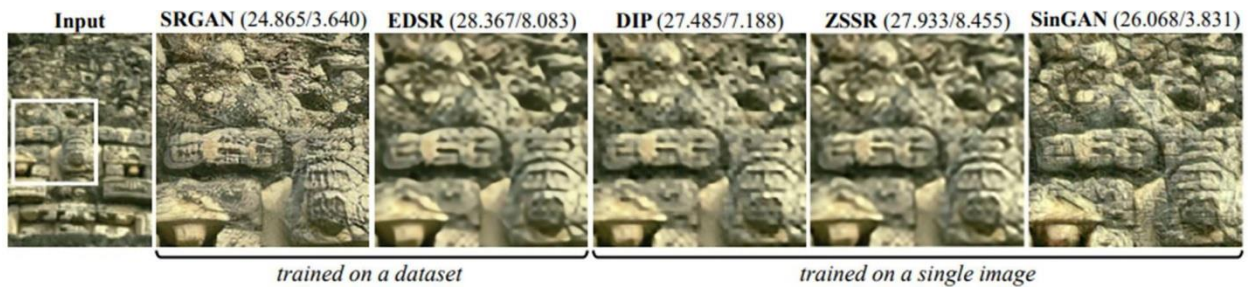


Figure 2. Simulation of image enhancement results using SinGAN.

Figure 2 depicts the result of image enhancement using SinGAN. As can be seen, the

image quality of this reconstruction is superior to current internal methods, as well as external methods that maximize the peak signal-to-noise ratio (PSNR).

After obtaining high quality 360 images of the places, through the Marzipano platform, we gather these photos and build a virtual tour website. CSS, Javascript, and NodeJs are used to add features to the product such as audio narrations about locations, promotional videos, and navigation to enhance the user experience. Final product is a website built to provide virtual tour services to users.

IV. Results

We have applied the IUVTour platform to build the website of the Congress of Ho Chi Minh Youth Union of International University - VNU-HCM with exhibition and visit areas to promote the images of student activities and exemplary students. Figure 3 depicts a screenshot of the virtual tour website of the Congress of Ho Chi Minh Communist Youth Union of International University - VNU-HCM built using the IUVTour platform. In this model, we have applied the above technologies, with images enhanced by SinGAN, then further processed through Marzipano Tool combined with CSS, Javascript [9] and NodeJs [10] to form a virtual reality online exhibition space. Thereby, we convey important and detailed content for viewers to have an overview of the Congress, as well as explain each region most intuitively.

To enhance the user experience, the interface is also an important component. We designed the interface to be simple but highly effective for visitors; the layout is presented meticulously, from the table of contents to the titles. In addition, the audio narration has also been added to provide additional information needed, as well as the navigation of the program outlined earlier.

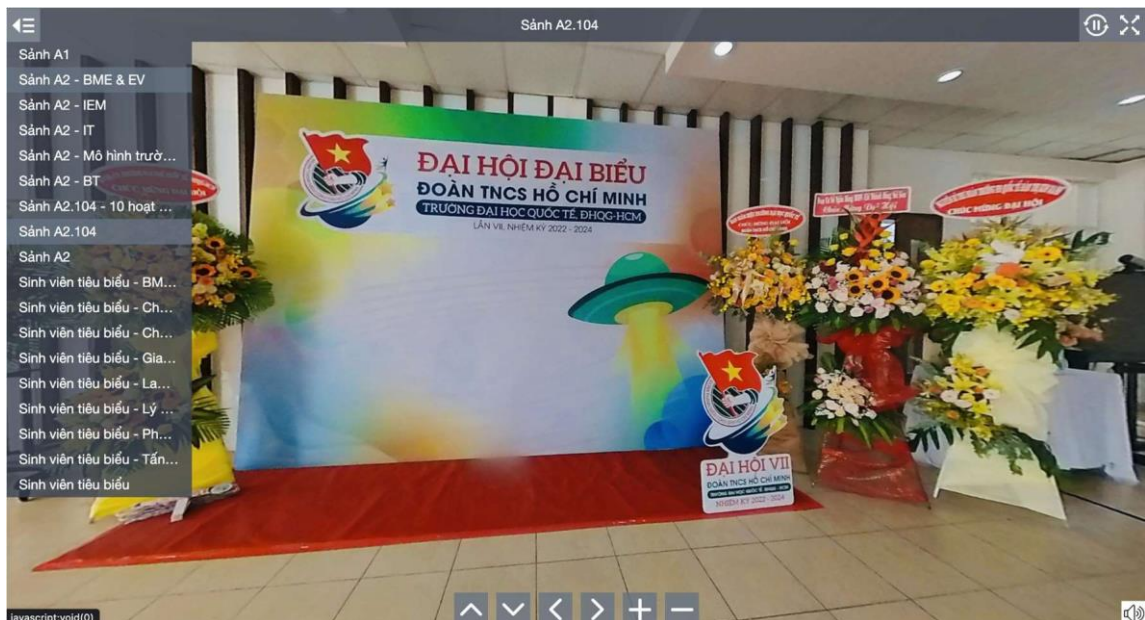


Figure 3. Screenshot of the virtual tour website of the Congress of Ho Chi Minh Communist Youth Union of International University - VNU-HCM built using the IUVTour platform

To evaluate our platform, we compared the features of IUVTour with related virtual tour platforms in navigability, image quality assurance, cost, open source, the ability to support offline tours, sound effects, the ability to create 360 photos by phone easily. It can be seen from the result shown in Table 1 that IUVTour is more efficient than similar platforms in terms of compared features.

Table 1. Performance comparison results of IUVTour with similar platforms.

Feature/Platform	IUVTour	Google Tour Creator	Orbix360	Matterport	My360
Navigability	Yes	No	Yes	Yes	Yes
Image quality assurance	Yes	No	No	Yes	Yes
Fee	No	No	No	Yes	Yes
Open source	Yes	No	No	No	No
Offline tours	Yes	No	No	No	No
Sound effects	Yes	No	Yes	Yes	Yes
Create 360 photos by phone	Yes	No	No	No	No

V. Conclusion and future works

By providing images and information about a place without the need to go to that place, the virtual tour model is trending in many countries around the world, especially during the complicated development of the Covid-19 pandemic. Many virtual tour platforms have been built. However, most of the existing virtual reality systems are not free and require images to be captured with specialized cameras.

In this study, we built IUVTour - a low-cost, open-source virtual tour platform to solve existing problems. IUVTour integrates new technologies such as the artificial intelligence application to improve image quality

- SinGAN, a 360-website building platform - Marzipano. In addition, the IUVTour platform only needs low bandwidth capacity to operate and does not cost too much for users. Besides, the product is applied simple technology, easy to use and adapts

to many different spaces such as museums, schools, tourist attractions.

The IUVTour platform was also used to build the website of the Congress of Ho Chi Minh Communist Youth Union of International University - VNU-HCM with exhibition and visiting areas. The system is built simply with many useful features, fully meeting the demands of users to visit virtual reality at the Congress of the International University - VNU-HCM.

To evaluate the IUVTour platform, we conducted a feature comparison with similar platforms. The results show that our product is more efficient and can be easily used and applied in many different locations.

In the future, we will make new improvements to enhance the visiting schedule suggestion system to make significant use of the information collected from users to recommend the most suitable schedule for the users.

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DIGITAL TRANSFORMATION FROM THE WORLD TO VIETNAM AND THE DIGITAL SKILLS YOUTH UNION OFFICERS NEEDED

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ABSTRACT:

Digital transformation in the industrial 4.0 era is one of the biggest concerns of society. The process of digital transformation has been taking place tremendously not only in Vietnam but also around the world. In this research, we first analyze the effects of digital transformation on the economy. Then, the policies, and stories about digital transformation from developed countries in the world such as Japan, Singapore, and Thailand will be discussed. Learning from their lessons, we analyze resolutions, policies, as well as issues that need to be solved of the digital transformation process in Vietnam. Accordingly, equipping digital skills for the workforce, especially youth union members and young people are necessary and urgent. Based on the model of Youth Union – Student Association activities, skills, digital security tools that a Youth Union - Student Association staff need to be equipped will be provided and specific analysis. Our research will provide a comprehensive view of the digital transformation process, as well as a sense of self-equipment necessary for digital capabilities to meet the requirements of Industry 4.0.

KEYWORD: *Digital transformation, industry 4.0, digital skills, digital tools, digital security*

1. INTRODUCTION

Digital transformation [1] is understood as the application of technological advances in digital technologies such as cloud, big data into all activities of organizations and businesses to achieve high performance and promoting revenue growth and brand.

When we are discussing about digital transformation, it's already happening. It was happening in one way or another, out of spontaneity, practical need, or perhaps by some incentives from the government or some “big tech”.

In the past, with old-fashioned technologies, only large companies with great economic potential could access. Therefore, they are always ahead of the market, at least a few steps.

According to Microsoft's 2017 research in the Asia-Pacific region [2], the impact of digital transformation on GDP was about 6%, in 2019 it was 25% and 60% by 2021.

McKensey's research results [3] indicate that, in 2025, the level of impact of digital transformation on GDP in the US will be about 25%, for Brazil it will be 35%, and in European countries it will be about 36%. From here, it is possible to see the impact of digital transformation for GDP growth is huge.

According to Cisco & IDC's 2020 report on the digital maturity of small and medium enterprises (SMEs) in 14 countries in the Asia Pacific region [4], up to 62% of businesses expected digital transformation to help them create new products, and new services. In which, 56% of businesses realize that competition is changing transformation and digital transformation helps businesses keep pace. This statistic shows the businesses have a clear awareness of the importance of digital transformation.

While Vietnam is just taking the first steps on the road of digital transformation to bring the economy into the digital era, some countries in the world have already come up with specific strategies and action plans with high determination

2. DIGITAL TRANSFORMATION JOURNEY

2.1 In the world

Singapore's digital transformation began with digitization, building a base of data on computer systems in the 1990s. By 2000, 90% of public services were offered online [5].

In 2010, Singapore provided an integrated public service. Breakthrough was in May November 2014 when Prime Minister Lee Hsien Loong launched the nation-building initiative in 10 years with 3 main parts: digital economy, digital government, and digital society.

Another milestone was in May 2017, Singapore established the Main Office Digital Governance and Smart Nation, creating unity, synchronicity, and transparency in direct, operate, and thus speeding the digital transformation journey.

Thailand is seen as a model for digital transformation in the Southeast Asia region [6]. Since 2017, the government has launched an ambitious five-year plan that is a digital transformation for the entire public system, from public management to tourism support, warning of natural disasters and improving the efficiency of agriculture.

(1) Building Integrated Government

(2) Smart operation, using information and information and communications technologies(ICT) and related technologies

(3) Putting people at the center of service delivery

(4) Drive transformation, focus on organizational change through multiple perspectives

Besides that, Thailand supports the portal “Farmer One”, which provides processes agricultural production for businesses such as registration of cultivation, contact source input materials, and advice on the selling price of each type of agricultural product.

Japan is a developed country and also known as the third largest economy in the world. In there, everything such as vending machines, libraries, schools, restaurants

are fully meticulously automated. However, this is just a country of automation and mechanization, not a digital country yet. The evidence is that there are many administrative formalities which can digitize and manage methodically but still work in a manual way.

In 2020, Nikkei newspaper, one of Japan's major newspapers with the headline: “Less than 10% of administrative formalities in Japan can be completed online”[7]. In the previous (period of) statistics, buying a house needed at least more than 20 kinds of papers, declarations, sending children to kindergarten (more than 10 types), and purchasing cars (more than 15 types). Until this moment, the Japanese are still using small signs called Hanko instead of characters when doing administrative procedures because they believe this seal is more secure. However, with the modern technology, this 1000-year-old tradition of seals can be counterfeit completely.

One more example is payment by QR code, cashless payments have already been so popular in China for 4-5 years. However, this only has happened in Japan for 2 recent years with a limited number of users.

The Japanese have realized their lag in digital transformation compared to other countries such as China and Korea, so they have promoted digital transformation. In February 2021, the Japanese cabinet passed bills (draft) on promoting digitization. Right in September of this year, they established a Digital Agency led by a minister for development of government digital transformation issues.

The Covid-19 pandemic once again forced us to have no alternative (no other way): have to digital transformation, as soon as possible, no more delay. And countries around the world are aggressively implementing their digital transformation goals.

2.2 In Vietnam

In developing countries which are the same as Vietnam, digital transformation is one of the key factors for success in this Industry 4.0.

According to World Bank's data [8], the digital sector in Vietnam has increased of 10% per year and can reach more than 200 billion USD by 2045, a huge number compared to the size of Vietnam's GDP, which is nearly 352 billion USD in 2021. On the other hand, the rate of young people in population, smart phones and large Internet coverage are also favorable factors for Vietnam to promote digital transformation.

In 2019, the Politburo issued Resolution No. 52-NQ/TW on a few topics and policies to actively participate in the fourth industrial revolution. In which states the situation, causes of the impact of the fourth industrial revolution increasingly strongly on all areas of economic and social life of the country. However, there are still many institutions, policies limitations and inadequacies; Meanwhile, the structure and quality of human resources have not met the demands of the industrial revolution.

In 2020, the Prime Minister issued Decision No. 749/QĐ-TTg approving “National Digital Transformation Program to 2025” with a vision to 2030 Vietnam will become a digital country which is stable and prosperous, pioneering in experimenting with

new technologies, and new models; to fundamentally and comprehensively renovate the management and administration activities of the Government, production and business activities of enterprises, ways of living and working people's work, develop a safe, humane, and widespread digital environment.

Ho Chi Minh City also has put into operation the Ho Chi Minh City Digital Transformation portal with 3 main sectors which included Digital Government, Digital Economy, and Digital Society. This is also the official channel that synthesizes information related to digital transformation plans and programs, activities, and the city's digital transformation results.

Besides the positive results achieved, the digital transformation process in Vietnam still has many problems and challenges. According to a World Bank report, only 40% of companies in Vietnam said they have enough information technology capacity and media. The World Bank also estimates that the market will have a shortage of up to one million IT engineers in 2023. Although some large enterprises have started to adopt digital transformation technology, but the problem is that most Vietnamese businesses are small and medium scale, and the challenge being raised is how to support the digital transformation of business groups.

Besides, the digital skills of the Vietnamese workforce do not meet the requirements of digital transformation. Also, according to the report of the World Bank, Vietnam is seriously lagging its main competitors in Southeast Asia in workforce digital skills (see Figure 2.1). If we assume that Vietnam's highly skilled workforce will still not be able to meet the skills required of the rapidly progressing digital transformation, the economy could lose up to two million jobs by 2045.

At that time, digital transformation will lead to the change of labor position with digital capital, reducing the overall benefit for the economy and creating significant inequality. This can cause economic and social stress. Therefore, to the process of national digital transformation successfully taken place, equipping digital skills for the workforce is absolutely necessary and urgent.

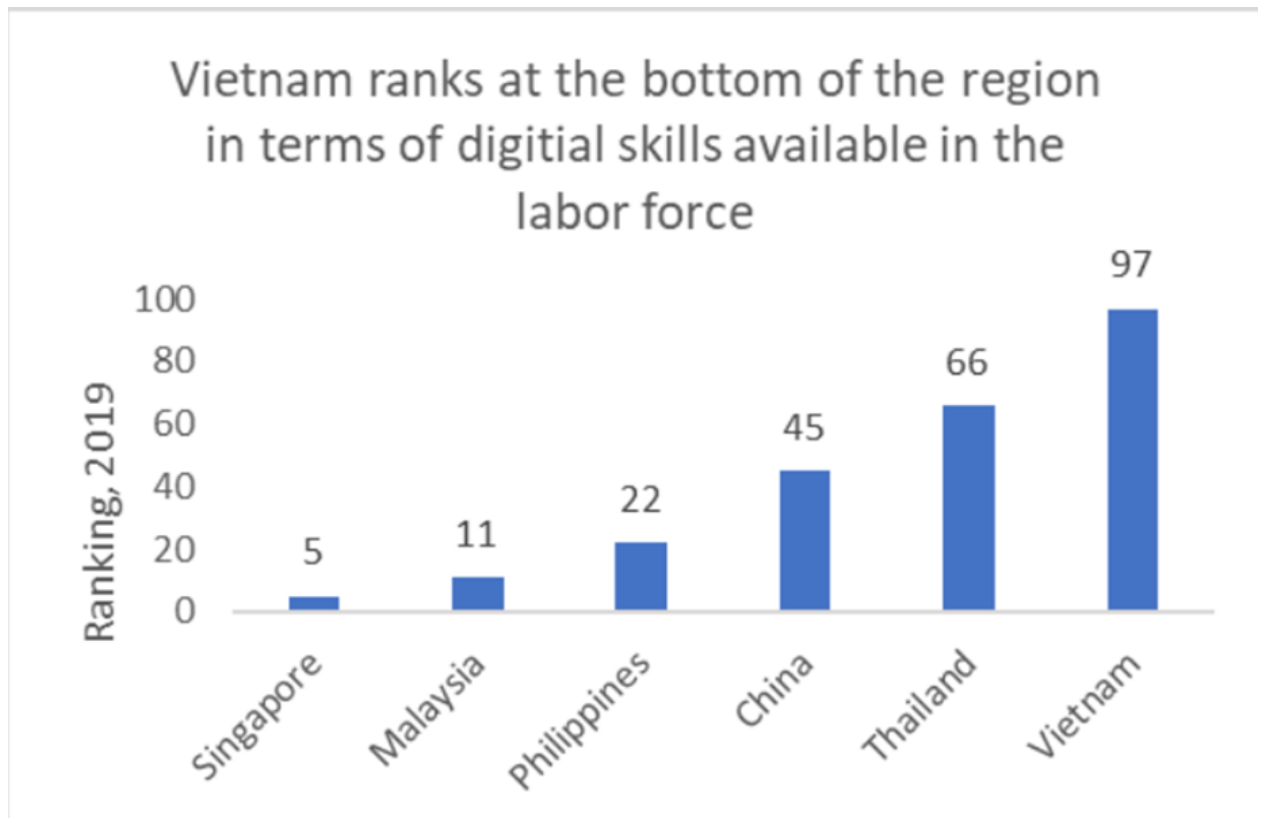


Figure 2.1. Vietnam is seriously lagging behind its main competitors in the region on the digital skills of the workforce [9].

3. THE SKILLS THAT UNION OFFICIALS NEED TO EQUIP

Youth are the core force of the nation, the future masters of the country, are a storm-troop in the construction and defense of the motherland, one of the factors determining the success or failure of innovation. Therefore, the youth, especially the Youth Union officials force must be placed at the center of the training and promotion strategy factors and human resources, meeting the needs of digital transformation capacity, contributing to the success of national digital transformation.

Figure 2.2 depicts the streamlining process of a Youth Union - Student Association activity. Process of activities of a Youth Union - Student Association usually start with the idea of organization. Next, division is carried out to ensure that each work item has staff specific responsibility. After the plan has been approved, communication will be done to widely mobilize union members and young people to attend. Final report will be done after the program is completed. In addition, the management of the group's training points membership is also an important step. Applicable digital skills and tools directly into each step of this process.

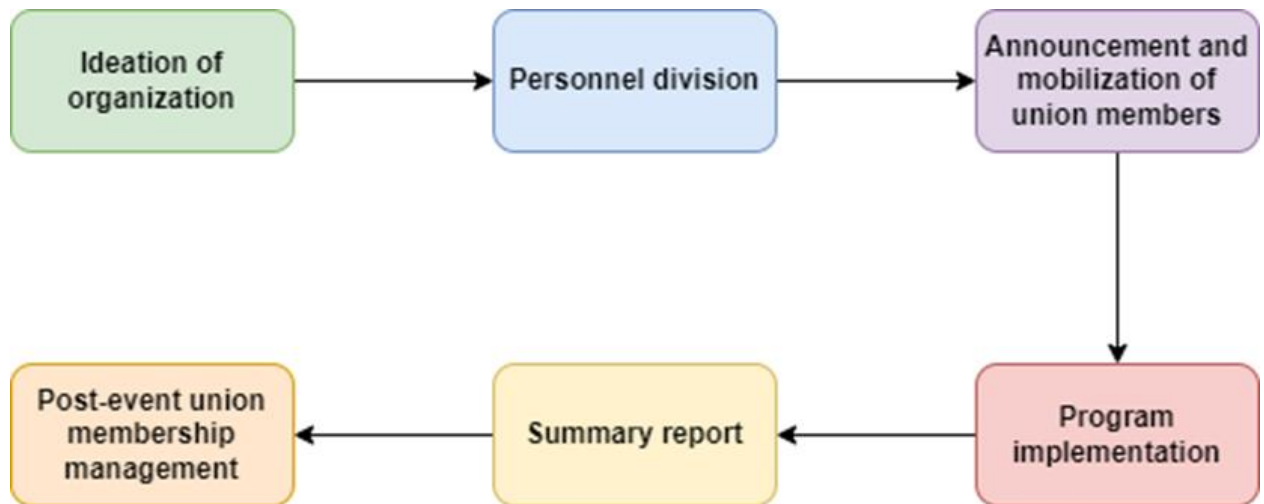


Figure 2.2: Streamlined process of Youth Union - Student Association activities

3.1 Brainstorm organization ideas

The idea of organization is the main idea throughout the program. From that idea, the organization unit will continue to grow into other small work items such as construction planning, script design, communication plans, logistics to closely follow the topic and to highlight that idea.

At this step, staff of the Youth Union - Student Association can use traditional tools such as Microsoft Word or Google Docs to draft ideas and plans. Collaboration and sharing features Microsoft Word or Google Docs documents can help many people participate in processing, speeding up work. Accordingly, Microsoft Word and Google Docs all have collaboration features because Microsoft 365 now has put Word up cloud. However, Google Docs is superior in this respect for several reasons. By Google Docs has been integrated into Drive, users can easily track the sharing of documents text files.

In addition, for plotting ideas, Diagrams.net is a very effective tool. It can operate both on website platforms and on computer software, Diagrams.net is a free tool to create flowcharts, design database schemas, circuit diagrams and diagrams though. The software is developed with lots of pre-made blocks and shapes different, suitable for many industries and many users. Users only finding, selecting, and dragging elements available in the toolbar and placing them in place they want. In addition, Diagrams.net has a potential template library available so that users can get started faster without having to start drawing all over again.

3.2 Division of personnel

Working in groups helps union members to practice more communication skills, interact with people around, and increase the possibility of cooperation to create effective work. When many people work together to do one thing, it will be effective higher than a personal working. Although the role of teamwork cannot be denied. However, the problem of personnel division and work management is always a dilemma for many organizations. Trello, the online assistant tool for planning, time

management, and organization efficiently, and it is a software that can be used to solve problems work sharing. The outstanding features of Trello's features are as follows:

- Support to arrange and manage work clearly according to position, status of start work.
- Summarize and divide the work for each member of the team including specific job description, time, completion status.
- Support teamwork with the feature which allows team members can ask for each other's help when performing tasks.
- Simple to use, flexible and free. Users only need to pay the fee if any demand for advanced features.

3.3 Notice, mobilize union members

For the activity to attract the attention and participation of many union members, communication activities are very important. Google Forms, a background app web is used to create forms for data collection purposes, which can help members register for activities, manage attendance lists, and take surveys after the program. Besides that, the media team needs to take advantage of channels such as Fan page, group meetings via Facebook or email to send program registration information to members with a fast and efficient way.

To design media publications, beside of using traditional graphic tools like Photoshop, Canva can be used as an effective tool. Released in 2013, Canva is an online publishing and design tool with a mission to empower for people around the world to design anything and publish it anywhere. Do not need to know many design skills such as specialized software such as Photoshop, AI, designing steps on Canva are simple and quick. In addition, Canva is also equipped with a huge database, completely free with a variety of design templates divided by categories like poster, CV, logo, Facebook post, Instagram post, videos, presentations, invitations, infographics that users can use freely. Design publications can be saved in many different formats like JPG, PNG, PDF.

3.4 Program execution

When executing the program, online game organizers can be used to diversify activities, create excitement for union members, youth. Kahoot and Quizizz are two long-standing and widely used applications for the form of games with questions inquiry is designed online. The strength of these software is the process of organizing and joining the game can be done quickly by using a web browser or software on phone without having to create complicated accounts. Nevertheless, the software is also equipped with a library of question sets available for each topic, multi-language, guaranteed game editor made in the easiest and most convenient way.

3.5 Final report

After each activity, a final report is needed to present the results of the activity completed, from which it is possible to assess the actual situation, new directions suitable, and learn from experience for future activities. At this step, staff of the Youth Union - Student Association can use Microsoft Word or Google Docs like the "Organization idea" step. In addition, Microsoft Excel or Google Sheets can be used for statistics and analysis data, analysis of responses of union members and youth participating in the event. Besides that, Google Drive, a file storage, and synchronization service created by Google that helps people Users can store files in the cloud, share files, and edit documents, documents, spreadsheet, which can be used to store plans, reports, statistics, pictures of event effectively

3.6 Management of union members after the event

Manage union members after the event, especially updating the list and calculating the training points for members is very important. Currently, some units have applied information technology in building a system of recording and evaluating training points for union members, student. Besides, in early 2022, the Central Committee of Ho Chi Minh Youth Union has put into use the professional management software for union members [10] compatible with Vietnam Youth Application, with many outstanding features. Software will be design in the form of a website. To use the software, each level of the delegation will be assigned Direct superiors create organizations and grant accounts to access and perform business activities member affairs under the handling competence. Group business management software Members deployed synchronously to all levels of the union will help digitize all data of the union members across the country, fully and properly implementing professional procedures in union work members, promoting digital transformation in union work and youth movements.

3.7 Digital safety skills

As society gradually transforms digitally, our lives gradually depend on it into technology, this is a trend and inevitable. When data is collected and storage by cloud, the more concerns about computer network security. Evidence is that more and more attacks on computer networks cause a lot of damage harmful. There is no need for the system to be hacked, just the system to fail and stop working for a while then we've seen the damage. A good example is the case system failure on December 9, 2021, of Amazon Web Services, a subsidiary of Amazon provides leading cloud services for businesses and organizations on-demand software services. The company's customers cover a wide range of industries industry and the federal government. Amazon Web Services has a problem that causes the service to deliver Amazon's products were stopped, causing great economic losses. Other web services also not accessible like Netflix, Disney Plus. Many people even reported that they could not open the smart door to enter the house, could not charge the electric car, could not use robot vacuum cleaner, not using the refrigerator for nine hours. Obviously, if the hacker attacks attack on modern information technology systems, the consequences will be enormous.

Therefore, there must be solutions to protect information technology systems against hacker. For example, increasing the automation of security systems by using applications of machine learning, artificial intelligence to automatically analyze and prevent suspicions attack. To do that, it is necessary to collect a large enough attack database, thereby analyzing the characteristics of the attacks, giving prevention solutions. In addition, it is necessary to provide connection standards and device standards to ensure security. Besides that, can apply data distribution model, combined with blockchain to avoid data concentrated, vulnerable to attack.

On the part of union members, young people, to be protected on social networks, all Users should hide important information such as phone number, date of birth on Facebook to only me. Absolutely this information should not be made public. Besides that, a strong password must be set. A strong password is a password with a length of 10 characters, including uppercase, lowercase letters, numbers, and special characters. Absolutely do not use the date of birth, full name as password. In addition, when friends text to ask for urgent money transfer, it is best should call video call to confirm. When the Facebook account is unfortunately taken over, Users must change their password immediately, log out on all devices, notify everyone people as possible about being hacked Facebook. If not fortunately, victims should immediately report to their parents, teachers, Youth Union, school, and police to act, as well as warn other users.

4. SUMMARIZE

In industry 4.0, digital transformation is a matter of social concern. The process of digital transformation is also taking place strongly in Vietnam and around the world. The positive role of digital transformation in the economies of countries cannot be denied. Soon or late, advanced countries like Japan, Singapore, and Thailand, they already have their own digital transformation policies, leaving many valuable lessons treat. As a developing country, the issue of digital transformation is one of the factors for Vietnam to succeed in this Industry 4.0. “Digital transformation of countries by 2025” with a vision in 2030 Vietnam becomes a digital country, which is stability and prosperity were adopted, demonstrating Vietnam's determination in digital transformation career. However, the alarming situation is the digital skill of worker force of Vietnam has not yet met the requirements of the new situation. Therefore, the equipped digital skills for the workforce, especially Youth Union - Student Association officials, is absolutely necessary and urgent.

Editing tools (Microsoft Word and Google Docs), charting (Diagrams.net), task management (Trello), form creation (Google Form), groups on Facebook, design software (Canva), online quiz tools (Kahoot and Quizizz), and online data storage system (Google Drive), can be used effective at each stage of the Youth Union - Student Association activities in order to improve the efficiency of the work job. In addition, the membership management system can also be used to improve quality membership management.

With the spirit of "Where needs, where is hard, Youth always attend", youth, the core is the force of cadres of the Youth Union - Student Association, will be the pioneer arrows, playing an important part in the success of national digital transformation. The whole society works together, surely the goal of a prosperous Vietnam in 2045 will be a great success.

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THE URGENCY OF DIGITAL LITERACY IN REALIZING A DIGITALLY TRANSFORMED SOCIETY

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University of Jember

I. INTRODUCTION

The industrial revolution 4.0, characterized by the rapid development of technology and information, impacts the ease and abundance of various information resources obtained digitally and is not limited, as well as the increase of internet users. In the last few years, internet users in South East Asia have rapidly increased. In 2019-2021, internet users increased by 23%. By 2022, as many as 440 million people in Southeast Asia have access to the internet. With such a large number, internet penetration in Southeast Asia has reached around 70% (Ganbold, 2022). The youth make a big contribution to this number, they are very connected on the internet, especially on social media. Focus group interviews in Cambodia, Indonesia, Malaysia, and Thailand conducted by UNICEF in 2020, found that many young people use more than one social media account for entertainment, communication and education. Some of them are not only consumers but also content creators. Furthermore, the Covid-19 pandemic also catalyzed digital activities because many people had to switch to online alternatives, for example, new digital e-commerce consumers in Indonesia increased by 37% during the pandemic. In addition, due to school closures for a long period, educational activities have also shifted to an online form, especially in urban areas. As a result, children are more exposed to various digital content and products which then makes them also an important segment in the realm of online consumers.

On the other hand, the growth in internet usage has not been followed by an increase in digital literacy skills. The definition of digital literacy is not only a set of skills to access the internet and find, manage, and edit digital information; join in communication, and otherwise engage with online information and communication networks. Digital literacy is also the ability to use and evaluate digital resources, tools, and services correctly and apply them to lifelong learning processes to become effective communication mastery skills (Bhatt et al., 2015), for expression and social activities (Martin & Grudziecki, 2006), and solving life problems and schoolwork or lectures (Kenton & Blummer, 2010).

According to Wan Ng, there are three main dimensions of core competence or multi-literacy in digital literacy. The first is related to technical capabilities, namely the operational mastery of technology. The second is associated with cognitive mastery, including information literacy skills, critical thinking (critical literacy), photo-visual, audio, gestural, spatial, and linguistics. Third, the social-emotional dimension includes social-emotional literacy (Ng, 2012). All these competencies are essential quality that makes an individual capable of living, learning, working, and participating in a digital society.

II. Research Methods

This research uses descriptive qualitative research methods. According to Creswell, qualitative research methods are research methods based on the existence of social problems. The process that must be passed by researchers in conducting qualitative research includes library studies and literature studies (Creswell & Poth, 2016). In qualitative research, there are five strategies that can be used, namely ethnography, grounded theory, case studies, phenomenology, and narrative. Of the five research strategies, the strategy that researchers used in this study was phenomenology. The use of phenomenological research strategies is intended so that the problems that are the main focus of this research can be investigated in depth, covering the various activities of each individual group involved in it as a unit (Creswell & Poth, 2016). Data collection in this study was carried out by selecting and collecting data on digital literacy and the factors that influence the urgency of implementation.

III. Results

3.1 The Impact of Digitalization on Society

Don Tapscott states that the world has changed towards digitalization, where the world economy has shifted from an industrial society based on steel, vehicles, and roads, towards a new economic society shaped by silicon, computers, and networks (Tapscott, 1996). This digitalization phenomenon occurs in almost all sectors of human life, from the business sector, public and government affairs, education, health, and socio-politics. In the health sector, for instance, AI-enabled frontier technologies are helping to save lives, diagnose diseases and extend life expectancy. In education, virtual learning environments and distance learning have opened up programs to students who would otherwise be excluded. Public services are also becoming more accessible and accountable through blockchain-powered systems and less bureaucratically burdensome as a result of AI assistance. Big data can also support more responsive and accurate policies and programs.

However, this transformation brought debate among experts regarding the opportunities and challenges that lie behind it. It is undebatable that technological development has brought financial inclusion, access to trade and public services, and enhance connectivity, but those yet to be connected remain cut off from the benefits of this new era and remain further behind. Furthermore, as digitalization has disrupted society ever more profoundly, concern is growing about how it is affecting issues such as jobs, wages, inequality, resource efficiency, and security. Thus, there is still a lot of debate regarding whether the advantages of digitalization overwhelm the disadvantages or vice versa.

In sum, digitalization has advanced, and it is barely possible to imagine what daily life would look like without all the used technology. But on the other hand, the development of digital life brings several negative impacts with it. To balance the opportunities and challenges of increasingly massive and fast digitalization, the community is also required to be able to empower and spread social responsibility for all the impacts caused by digital technology.

3.2 The Urgency of Digital Literacy in the Era of Disruption

The ability to read, write, and do basic arithmetic has traditionally been used as an indicator of knowledge and the ability to communicate and, in turn, a predictor of success. However, nowadays traditionally held literacy skills do not suffice (Jose, 2016). In connection with today's digitalization era, digital literacy is the next literacy capital after the old literacy. Digital literacy is a gradual skill of living in the digital era that is indispensable for every individual (Kist, 2013). It certainly needs to be possessed to be able to survive the challenges in the current era. As technology continues to become more and more ingrained in daily life, the importance of learning digital literacy skills is becoming increasingly apparent, as it encompasses the skills required to use technology safely, effectively, and responsibly.

In this digital era, technological developments have accelerated the flow of information and transfers between devices connected to the internet in just an instant. Whether it's appropriate information or not worth studying. For this reason, the individual's ability to sort, choose, and understand information and communicate becomes something that every individual needs. In other words, the urgency of digital literacy in life is very helpful, where humans can be sensitive in obtaining information and communicating in everyday life. In addition, digital literacy plays an essential role in helping someone think creatively and innovatively to analyze critically and solve problems related to digital sensitivity. People who have good digital literacy will be able to select and sort information circulating on the internet because today's virtual world is increasingly filled with fake news, hate speech, radicalism, fraudulent practices, and terrorism. Thus, society can be responsible for how to use technology to interact with the surrounding environment. This proves that digital literacy is an urgent matter and needs to be owned by each individual immediately.

3.3 Digitally Transformed Society Through Digital Literacy

In most developed countries, digital transformation is faster than previously planned due to the Covid-19 pandemic. This requires the community to be able to adapt to all the changes it brings. This massive change that has brought both opportunities and challenges must be in line with the optimization of digital literacy in order to achieve a digitally transformed society. Digital literacy referred to here, includes digital skills, digital culture, digital ethics, and digital safety.

Digital skills are the skill to create information, evaluate and navigate information using digital technology effectively and critically, such as the ability to use social media, create spreadsheets, prepare presentation materials, and others. Nowadays digital devices cannot be separated from daily life. For instance, students use digital devices not only for online lectures and preparing presentation materials and assignments from school but also for various purposes such as running an online business, looking for job vacancies, as well as reading news and entertainment outside of hours, learning by watching movies or listening to music. This is also done by those who work as employees because they need digital devices to speed up communication with work partners, as well as to prepare materials for meetings and reports.

Technology and the internet have also changed and shaped the way we interact as humans, known as Digital Culture. Currently, people's lifestyles are very close to digital cultures such as online shopping, digital payments, and online ticket bookings, including distance learning and working from home. Even children carried out many online activities, which then interfere with their quality of life. This resulted to research from psychologists in the US stating that the range of gadget use for children has been set for ages 10-12 which is ideally only 2 hours a day. In addition, children could also use their gadgets to watch movies, including films that are not appropriate for their age because there is no supervision and sanctions. Even if there is a ban, it is only an appeal from the government as well as an attempt to block certain sites so that they can no longer be accessed. However, this effort is less effective because they can still easily access any site they are looking for. This illustrates that in the era of digitalization, technology is considered to be able to give us everything we want to do. It can greatly facilitate our work and tasks but it can also bring a bad influence.

In order to minimize the downside of digital culture, digital ethics is needed. Digital ethics is a person's ability to judge whether digital governance is good or bad. Digital ethics can be formulated as the individual's ability to realize, model, adapt, rationalize, consider and develop digital ethical governance in everyday life. That using digital media should be directed at an ethical intention, attitude, and behavior for the common good to improve the quality of humanity (Kominfo, 2020). If we understand the importance of being ethical in digital communication, we will not be trapped in useless content such as hoaxes, pornography, or verbal bullying.

In addition, things that deserve attention also include digital safety (cybersecurity). An activity to protect information from the occurrence of criminal acts (cybercrime) against digital resources. Usually, cybercrime occurs because someone wants to interfere with the confidentiality, integrity, and availability of an information system. Therefore, knowledge of digital safety is very necessary because data written on the digital devices that we use can be easily hijacked or manipulated by irresponsible people.

Concisely, building digital literacy through the four pillars above will accelerate a digitally transformed society. Moreover, several ways should be done, in order to optimize digital literacy in the community, namely: providing public facilities that support digital literacy, procurement of training and digital literacy activity, socializing the correct use of the internet as well as the law related to Information Technology and Electronic Transaction.

IV. Conclusion

The industrial revolution 4.0, characterized by the rapid development of technology and information, impacts the ease and abundance of various information resources obtained digitally and is not limited, and the increasing use of the internet. This phenomenon has brought changes in almost all sectors of human life, from the business sector, public and government affairs, education, health, and socio-politics. But on the other hand, the development of digital life brings several negative impacts

with it. To balance the opportunities and challenges of increasingly massive and fast digitalization, the community is also required to be able to empower and spread social responsibility for all the impacts caused by digital technology.

This is in line with the urgency of increasing digital literacy skills. Digital literacy plays an essential role in helping someone think creatively and innovatively to analyze critically and solve problems related to digital sensitivity. People who have good digital literacy will be able to select and sort information circulating on the internet because today's virtual world is increasingly filled with fake news, hate speech, radicalism, fraudulent practices, and terrorism. Thus, society can be responsible for how to use technology to interact with the surrounding environment.

Based on the above overviews, it can be seen that a digitally transformed society can be achieved through the implementation of four pillars in digital literacy, namely: digital skills, digital culture, digital ethic, and digital safety. Subsequently, several steps could be done in order to do so, it includes providing public facilities that support digital literacy, procurement of training and digital literacy activity, socializing the correct use of the internet as well as the law related to Information Technology and Electronic Transaction.

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“FACTORS AFFECTING CUSTOMERS SATISFACTION USING E – LOGISTICS IN HO CHI MINH CITY”

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ABSTRACT

Since the Covid-19 pandemic and the development of the industrial revolution 4.0, these are considered to be factors promoting social development, especially e-logistics services. In recent years, the general trend of consumer behaviour is online shopping, which requires businesses to have a large enough investment in e-commerce logistics services to meet the needs of customers. The research topic is carried out through two steps: qualitative research by group discussion and formal research by quantitative method with a survey of 440 people who have used e-logistics services. of logistics enterprises in the city area. HCM. Using quantitative, qualitative, analytical, comparative and methods, refer to domestic and foreign studies, comment on the limitations of previous research topics to clarify more the author's of view on the group's research model.

KEYWORDS: *Consumer behavior, e-logistbehaviourices, e-commerce, EFA, CFA, SEM.*

I. INTRODUCTION

The next 2 years from 2020 to 2021 can be considered as difficult years for the world in general and Vietnam in particular due to the impact of the Covid-19 epidemic. However, e-commerce is one of the few industries that is being promoted. Along with the rapid development of e-commerce, as information on supply and demand becomes increasingly easier to grasp, the way goods are transmitted from supply to demand. are also increasingly modified to be more suitable. That's when logistics in e-commerce with high-tech applications was promoted. Besides, with the Government's promulgation of " *Decision 200/QĐ-TTg dated February TTG, 2017 on the Action Plan to improve competitiveness and develop logistics services in Vietnam to 2025* ", as well as The appearance of large logistics enterprises such as: DHL Express, Fedx, Viettel Post, ... shows that e-commerce logistics services are a new development trend in the future. Grasping the novelty as well as the change of the current social situation, the authors decided to choose the topic "***Factors affecting customer satisfaction using e-commerce logistics services in Ho Chi Minh City***" with the purpose oto research and evaluateting customer satisfaction in using e-logistics services. From there, suggestions to help businesses develop business strategies in the current context.

II. RESEARCH METHODS

2.1. Research hypothesis

Today, the term logistics is mentioned a lot in the field of business administration. However, to define what logdefining, requires understanding the nature and operation of logistics.

The concept of logistics related to business was born in the 1950s, is the activity of transporting, storing and supplying goods. In business, logistics can be understood as the concentration of both internal and external resources, including the transition from "manufacturer", through many stages and the destination is "end consumer" (Nguyen Y. Nhi et al., 2022).

In Vietnam, there are still not many studies on the field of " E-commerce Logistics " , although in the world there are many practical experiences on this issue such as: Elizabeth Ruth Davis (2006), Siber Akıl & Mustafa Cahit Urgan (2006). 2018), Waseem Ul-Hameed and associates (2019), AK MahbubulHye and associates (2020),.... In this study, the research team will focus on the B2C research model, thereby clarifying the interaction between e-logistics services and consumer responses. This transaction model brings great benefits to the transaction parties, customers can easily access the retailer's website or application to track and receive goods and services directly from the supplier. , on the contrary, the supplier can deliver the content they want to transmit to the customer through the available digital platforms.

2.2. Data collection and analysis:

2.2.1. Data collection

The author group has chosen a specific non-probability sampling method here as a convenient sampling method, that is, the authors choose the subjects that can be sampled for the survey. The advantage of this method is that it is easy to reach the target audience. Besides, the disadvantage of this sampling method is that it cannot determine the error in sampling. But the authors still choose because of time limit and research conditions

Estimating the sample coefficient, the authors choose to determine the sample according to 02 formulas:

- Formula 1: Based on the study of expected sample size of Hair et al. (2010) for factor analysis to discover good EFA, the sample size should be at least 05 times the number of observed variables analyzed and the size The more commonly accepted sample should follow the ratio of 10:1 ie the sample size is 10 times the number of variables, some researchers even suggest a ratio of 20:1. And researchers should not perform factor analysis on samples of less than 50 subjects. In the construction of the scale, the authors have determined that the total number of observed variables in the study is 21 variables, so the sample size must be greater than or equal to 105 samples.
- Formula 2: In order to calculate the number of samples to be representative and generalizable to the population, to make the research meaningful and scientifically valid, the research team relied on the formula for calculating the representative sample. When the number of units in the population is known, the population proportion is p , the permissible error is K and the critical value corresponding to 95% confidence, the sample size (n) is calculated according to the following formula:

$$n = \left[\frac{1}{N} + \frac{N-1}{N} * \frac{1}{p*(1-p)} \left(\frac{K}{C} \right)^2 \right]^{-1}$$

2.2.2. Data Analysis Methods

In order to test the accuracy and objectivity of the research hypothesis, the authors did the following steps:

- Descriptive statistics of research data;
- Method of analyzing reliability coefficient Cronbach's Alpha;
- Exploratory Factor Analysis (EFA) method;
- Confirmatory factor analysis method CFA;
- Theoretical model testing – SEM;
- Test the difference of the research model.

2.3. Research hypothesis:

From the theoretical basis of previous empirical studies, based on the characteristics of e-commerce logistics services in the Ho Chi Minh City market , the research team makes the following hypotheses:

H1: Operational quality has a positive impact on customer satisfaction when using E - logistics services;

H2: Customer relationship quality has a positive impact on customer satisfaction when using E - logistics services;

H3: Customer relationship quality has a positive impact on the performance quality of E - logistics service providers;

H4: Information quality and security have a positive impact on customer satisfaction when using E-logistics services.

III. RESEARCH RESULTS

3.1.1. Conformity testing and monads:

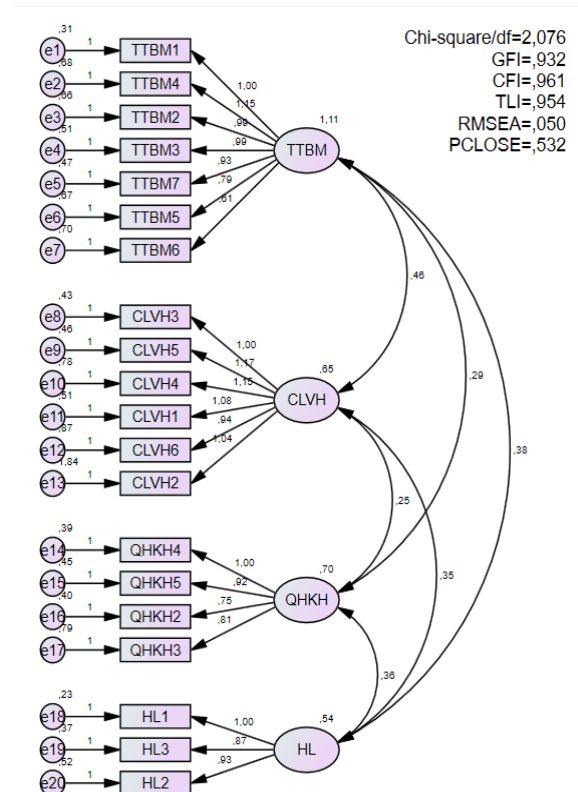


Figure 3.1: CFA results for the normalized critical model

Source: Results from research data analysis, 2022

The official research sample has a size of 440, through the results of assessing the relevance of the CFA analysis for each factor in the research model, the test value Chi-square/df = 2,076 (< 3); both TLI and CFI are greater than 0.9. Besides, the GFI index reached 0.932 (> 0.8), the RMSEA index $0.050 < 0.08$ and the Sig test value. of the model $0.000 < 0.05$, so we can conclude at the 95% confidence level that this model is suitable for CFA analysis, the scales used for the factors in the model are compatible with the survey data. In fact, there is no correlation between measurement errors so monism is achieved.

3.2. Analysis of linear structural model SEM:

Table 3.1: SEM analysis parameters

Rating Indicators	Value
CMIN/df	2.106
TLI	0.953
CFI	0.959
GFI	0.931
RMSEA	0.050

Rating Indicators	Value
The test Sig value is suitable	0.000

Source: Results from research data analysis, 2022

Based on the results of SEM analysis, we can see that the results of the fit assessment of the model are satisfactory, the index CMIN/df = 2,106 (<3), the TLI index = 0.953 and the CFI = 0.959 (>0.9), GFI index = 0.931 (>0.8), RMSEA=0.050 (<0.08), P-value of relevance = 0.00 (<0.05) should be at 95% confidence of the authors. concluded that the data fit the analytical SEM model, the interpretative results are reliable to use.

Table 3.2: SEM . linear structure test results

Relationship	Normalized regression coefficient	Unnormalized regression coefficients	SE	CR	P
Strategic ← Planning	0.387	0.402	0.059	6,823	0.00
HLTTBM ← _	0.182	0.126	0.038	3.313	0.00
HL ← CLVH	0.351	0.319	0.057	5.586	0.00
of Planning ← and Investment	0.392	0.343	0.048	7,159	0.00

Source: Results from research data analysis, 2022

Operational quality of e-logistics service providers has both a direct impact on customer satisfaction and an indirect impact through the quality of relationships with customers. The positive and direct impact between operational quality and customer satisfaction is quite strong. The next finding of this study is that operational quality not only has a direct impact on customer satisfaction, but it also has an indirect impact through service provider relationship quality with customers. The next result of the study is that customer relationship quality has a positive impact on employee motivation. That is, in the city market . Ho Chi Minh City service providers improve service quality in the customer relationship will increase the feeling of satisfaction for service users . In addition, the relationship between security information system quality and service user satisfaction not strong compared to other factors.

3.3. Testing the research estimation model using Bootstrap:

Table 3.3: Estimation results by Bootstrap with N = 1000

Correlate	Estimates	SE	SE-SE	Medium	Bias	SE-Bias	CR
CLVH of → QHKH	0.387	0.066	0.001	0.386	-0.001	0.002	-0.5

TTBM →HL	0.182	0.062	0.001	0.178	-0.003	0.002	-1.5
CLVH →HL	0.503	0.075	0.002	0.35	0 000	0.002	0.0 _
QHKH →HL	0.382	0.072	0.002	0.395	0.003	0.002	1.5

Note : SE: standard deviation; SE-SE: standard deviation of standard deviation; Bias: bias; SE-Bias: standard deviation of the bias.

Source: Results from research data analysis, 2022

With 1000 samples estimated by Bootstrap method (N=1000 samples), now Mean column is the regression coefficient value in Bootstrap estimate and Bias column is calculated by Mean column minus Estimate column. We see that the deviation between the sample (n = 440) and the population (N = 1000) is very small. Also the CR (bias) column is calculated by dividing the Bias cot by the SE-Bias column. The absolute value of CR is smaller than 2, so it can be said that the bias is very small, not statistically significant at the 95% confidence level. Thus, we can conclude that the estimates in the model can be trusted.

IV. PROPOSED SOLUTIONS

When building an evaluation model and providing solutions, the authors want to overcome the urgent problems that the group mentioned earlier, helping service businesses in the field of logistics to have a objectively look at the factors affecting consumer satisfaction and take the most appropriate measures, thereby improving and improving the quality of e-commerce logistics services in Ho Chi Minh City .

- (1) Enterprises need to improve *information technology* and *security* to improve convenience for customers.
- (2) Enterprises promote the *quality of e-logistics operations* by improving the physical features of the service, the way of distribution, determining the form, time and location of other services of the service; strictly control the stages of transportation, to avoid damage, breakdown, deterioration of goods quality in order to increase customer satisfaction.
- (3) Improve the *quality of customer relationships* using e-logistics services, effectively implement and apply marketing tools, create a loyal customer base .
- (4) Employee training should be carried out, practice training sessions and dissemination of new knowledge should be carried out, regular testing and focus should be on developing working skills to achieve a combination of *quality customer relations* and customer satisfaction. *operational quality of the e-logistics service provider* .

V. LIMITATIONS AND DIRECTIONS FOR RESEARCH:

In the developing digital age, the trend of improving convenience and safety for consumers plays a key role. Therefore, the analysis of factors affecting customer satisfaction using e-logistics services will contribute to providing the most overview of the main factors affecting research behavior. . In addition, the study has the following limitations:

- Firstly , the research paper of the group of authors is only encapsulated in the city area. Ho Chi Minh City with the non-probability sampling method and the sample size is still quite small compared to the number of users using e-commerce logistics services, so the generalization is not high ;
- Second , some concepts that the authors have not been able to clarify specifically because the issue of e-logistics services is still new and has not been widely researched in the country, and important scientific information is not available. Most of them appear in foreign research papers, so the group has not been able to fully research them ;
- Thirdly , during the implementation of the research project, there are many factors affecting e-logistics services that the team cannot afford to include in the research paper. On the other hand, the self-construction of the scale also has many shortcomings due to the author's limited ability based on the subjective opinions of customers, not on the opinions of e-logistics service enterprises .

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THE GLOBAL IMPACT OF COVID 19

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“No matter how hard the past, we can always begin again” is one teaching from Buddha that resonates deeply with me. The COVID pandemic, as we know, has been a very difficult past and has taken a lot of lives. I lost my family member to COVID, and I believe many of us share the same misfortune. Fortunately, we can always begin again. We live, we write new pages for our lives and, we also write for the lives of many taken away by the pandemic.

First of all, let us be grateful to all frontline workers: doctors and nurses, and most importantly, our government for their support. Following the Ministry of health portal, the total medical staff participated in anti-epidemic support in Ho Chi Minh City and the southern provinces nearly 24 thousand people; an estimated 2,300 health workers were infected, including 02 nurses and 01 doctor who died during the pandemic. It is impossible to record all the hardships, struggles and sacrifices of the frontline forces to protect the people's lives and health. Especially, we have witnessed the noble and beautiful gestures, the sacrifices, the enthusiastic hearts, the shining kindness... of the team of doctors, medical staff and medical staff, doctors across the country, they not only had kind hearts but also intelligence, strong willpower, endurance, especially when the war was very tough. Those people forgot the danger to treat infected compatriots and comrades, especially in the early stages of fighting the epidemic, the vaccine was still not enough. These people have put aside their private happiness and peaceful life to enter the epidemic center. Those people have forgotten their sleep, their meals, their days and months, forgot the heat of the protective suits in the middle of the hot summer, forgot the fear and obsession when witnessing life and death moments... But in return, they felt warm, happy, and confident when each patient recovered... And those people, no matter how strong, they shed tears when the seriously ill patients passed away... The health sector has been affirming its position, role and responsibility before the life and health of the people. In a short time, we deployed dozens of field hospitals, hundreds of medical stations to collect and treat patients, reduce severe transfer, reduce mortality, while under normal conditions will take a lot of time to implement. We appreciate what we have done as best we can under very difficult conditions.

1/ COVID has devastated the entire human race, physically and mentally.

Physically, Covid patients suffered from fever, cold, cough, bone pain, breathing problems and for some, even death. WHO estimates that 43,166 Vietnamese people died from COVID. This is not just a number, this is 43,166 people, 43,166 loved ones, 43,166 neighbors, someone we once spent time with, someone we once cherished wonderful moments together

with. Adding to the devastation, vaccines were not yet available, and were not in time for those in need.

Mentally, many people suffered a mental crisis, and post-traumatic stress disorder (PTSD) because every day, they had to see and hear, with their own eyes and ears, countless people died. The psychological changes, the lifestyle changes have left many unemployed. Following the General Statistics Office, there were up to 0.9 million people lost their jobs; 5.1 million people have to take a break or suspend production and business; 5.7 million people have their working hours cut or forced to take time off, rotating leave and 13.7 million workers have their income reduced out of a total of 16.9 million people affected by the epidemic. It effected directly their lives. Lots of people could not continue to work and live in the central economic zones, therefore, they chose to return to their hometown. Leads to the loss of labor resources, lack of human resources. That leads to a worse social life of each person.

2/ Equally adversely affected is our economy, our global economy.

According to the National institute for finance in Viet Nam, it has four aspects of international economy and trade that are directly negatively affected.

First, Global supply chains are disrupted, and the global circulation of goods, services and labor is no longer the same. Modern products often incorporate critical components or sophisticated materials that require specialized technological skills to make. It is very difficult for a single firm to possess the breadth of capabilities necessary to produce everything by itself. For instance, in Viet Nam, to be able to make a complete car, it takes 40,000 parts, but 90% has to be imported from abroad. Faced with the risks from the pandemic, as well as the limitation of technology, most large and small businesses have halted operations. As a result, more than 1.4 million Vietnamese were unemployed in 2021. nearly 60,000 businesses around the country closed. According to Vietnam news, it is estimated that there are about nearly 60,000 businesses around the country closed because of the covid-19. Shipping companies have faced a lot of difficulties during this time because they couldn't dock as well as exchange goods and import and export goods. They were floating at sea for **a few** months resulting in a heavy impact on the supply chain and circulation of goods.

Second, not only have the global supply chains been disrupted, but the consumption of people and society, the tourism and service industries have also been affected. In 2019, Vietnam welcomed 18 million international tourists, but during the quarantine time, being able to go out on the street was a luxury and an impossibility. The food service and entertainment industries have had to suspend operations because of directive 16. We were only allowed to go out to buy necessities and food if we were in a green area but we had to wait for our turn. The entertainment service industries such as bars, cafes, ... were completely closed to prevent the epidemic in the most effective way. This led to a clear gap between supply and demand. Merchandise was completely discontinued and cost a lot of money. The tourism industry was

completely frozen, unable to open to welcome domestic and foreign tourists. According to statistics, the aviation industry has suffered the third largest loss of all industries.

Third, the raging Covid-19 pandemic and complicated developments have reduced the enthusiasm of investors and entrepreneurs, leading them to hesitate to step up production and business activities, which had a strong impact on business growth, economy, trade and investment. As we have seen, the prolonged pandemic had eroded the strength of many domestic enterprises, most of which were newly established enterprises under 5 years, small scale, focusing mainly in the field of commerce trade and services, continuously affected by recent outbreaks of epidemics, leading to business suspension and dissolution. There could be many reasons leading to the decision to withdraw from enterprises, due to Covid-19, due to broken output, too high operating costs, or it might be due to changes in business lines and strategies... There are two things that cause investors' concerns: Uncertainty caused by Covid-19, especially in the context that the world has not yet been able to accurately assess the level of danger, when to control it. Next, the negative impact of measures to prevent the pandemic. These two factors have a huge impact on the global economy, from supply chain disruptions, changes in consumer spending and traveling habits, leading to production stagnation, rising unemployment, and the risk of bankruptcy, debt, bankruptcy of the business and the risk aversion, even panic of financial investors.

Fourth, the relationship and level of cooperation in economy, trade and investment among partners around the world has been stalled. The fact that countries in turn blockade and restrict travel had also reduced the ability of international cooperation and coordination in responding to the pandemic. In the context of slowing global economic growth, the epidemic that appeared in early 2020 created a resonance of factors that led to profound fluctuations in the global financial and commodity markets. The world financial markets fluctuate strongly, despite large-scale emergency stimulus measures by European, American, Asian and Australian banks. Most of the major economies entered a recession.

3/ Fortunately, during the peak of the pandemic, the Vietnamese government has provided us with unwavering and tremendous support. They provided food and partially financial support for individuals as well as companies that had policies for employees, supporting each other during this time. Under the pressure of the pandemic, we have also seen that the efforts of the government have been very difficult and arduous when it comes to solving problems for the people as well as the economy of our country. The Prime Minister has encouraged and encouraged people during the difficult time of the pandemic, we have brought into practice the best cultural values of the nation that have been promoted and spread like the spirit of the future, kindness, beautiful lifestyle. Soldiers helped people distribute food and students, volunteers who were not afraid of difficulties and dangers, supported people. Also, we have applied "5K" but now "5K + technology + vaccine" effectively; free vaccines have also been delivered to people and vaccinated in time...

It can be seen that the consequences caused by the pandemic are extremely devastating, but not because of that, our country succumbs. The naturalist Charles Darwin, one of the greatest minds of mankind, once said that "in nature, it is not the strongest that will last, nor the most intelligent, but the most improvised". Therefore, we should adapt our thinking to today's modern times as well as to the post-COVID lifestyle. We have been, are and will be going up, constantly progressing, developing. And when the spiritual "resistance" of each individual, and broadly the whole nation, is healthy, millions of hearts are united and determined.

By overcoming difficulties, spreading human values, and cultivating kindness, surely nothing is impossible.

FORECASTING HUMAN RESOURCES AND JOB DEMAND, ORIENTING STUDENTS IN CHOOSING A MAJOR, CHOOSING A CAREER, SETTING UP A CAREER

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Application of digital transformation in the fields of: Artificial intelligence, business administration, digital marketing, sharing economy, logistics and supply chain, finance and banking, accounting,... related to forecasting human resources and job demand, orienting students in choosing a major, choosing a career, setting up a career.

A shift in job markets

A few years ago, there was a lot of talk about new technologies and how the world would change dramatically around the year 2022. Many intriguing predictions about how all of the upcoming changes would affect our lives were made. The reality is that we are living through a technological revolution that has previously only been seen in science fiction.

Whereas Generation X desired stability and acquiring goods, Millennials want to experience, which is not necessarily connected to owning more things. Generation Z - who I believe are almost the students today - however, was born in the digital age. These are young people who do all kinds of things all at the same time. It's not for nothing that they represent the technological future of the labor market. The students are driving this trend.

People are increasingly using private transportation apps and preferring to rent rather than buy a home. As science innovates, technology develops, and new demands emerge in the world, the logic of the job market will always be aligned. That is why there is so much discussion about innovation companies, and what they really do is adapt to what the public wants. So, re-thinking about this, companies like Airbnb and Uber were not just a lucky guess. This is must because of the digital transformation.

Digital Business Transformation is disrupting businesses in every industry by breaking down barriers between people, businesses, and things. By breaking these barriers, they are able to create new products, and services and find more efficient ways of doing business. These innovations are happening across organizations of all types, in every industry: ranging from digital marketing, business administration, finance and banking, and accounting to logistics and supply chain applications. However, they all share a common theme:

- The ability to transform processes & business models,
- Empower workforce efficiency and innovation,

- Personalize customer/ citizen experiences.

To do this, companies need digitalized that is outcome driven and enabled by technology.

Following this trend, many new jobs are being created to meet the future demand for human resources. There are professional jobs that may disappear or be newly created and in high demand in the coming years.

- Software developers & Data analyst: They are, and will still be for a long time, valued professionals in the market.
- Innovation manager: responsible for rethinking the strategies of a company.
- Paid traffic manager: creating and managing paid media campaigns, such as Google Ads and Facebook Ads.
- Social media analyst: plan, create and analyze profile posts on social media.
- Walker/ Talker: who spend time listening and talking with elderly customers through online platforms.
- Creators - Digital influencers: very successful due to the fact that people today want to connect more with real people, not with brands.
- Online teacher: very idea and potential. Break geographical boundaries, work at home, flexible time and save lots of money travelling. And maybe, teach for people outside one's country.

So, the biggest insight for the years to come is thinking about careers that deal with creativity and relationship. This is because those are functions that artificial intelligence cannot reproduce well with precision.

We can find salespeople, designers, and creators, also known as digital influencers. These ones are professionals who started to explore the opportunities new channels have to offer, such as YouTube, and discovered a way to profit by producing new content. The same is true for bloggers and digital producers who disseminate information and engage in debate about new topics of interest to a specific audience.

The way in which we share knowledge is also evolving. More and more teachers, experts and educational institutions are relying on the internet to deliver long-distance instruction. The advantage of this model is the possibility of a high range of people being impacted by that content, regardless of the day and time.

Choosing a job & Setting up a career

As students, many of us really understand the trend, and we know what we need to do to set up our career. Some of new generation workers have their own standards, or criteria, to choose a job.

One of my friends, he chooses a job based on its future potential, which can help him truly keep up with the change of time. I ask another friend of mine, she chooses her job based on the demand of society, and her abilities - is she really able to keep up with the technology used in that field?

So, in order to be able to work for the job of our choice, each of us has begun to prepare for ourselves from an early age. It is not difficult to see that many recruiters nowadays expect employees to be able to quickly grasp technology. In other words, they want to hire young people because of their technological proficiency. MOS Office, SAP softwares, or Power BI are common names mentioned on the job descriptions.

Knowing these tools and setting a strong foundation for our future, I must admit that students now have flexibility to choose any job to do, possibly more than one at the same time, and can easily switch to another if one is unsuitable.

Therefore, from the perspective of students, digital transformation is not only a change in every aspects of human life that promotes and enhances the role of the new generation in using technology, but it is also a springboard to open up innovative opportunities for today's students.

GLOBAL IMPACTS OF COVID-19 ON ECONOMIC - SOCIAL, DEVELOPMENT TRENDS IN DIGITAL TRANSFORMATION AND DIGITAL TECHNOLOGY IN VIETNAM AND WORLD

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1. QUESTION:

An epidemic of acute respiratory infections caused by a new strain of Corona virus (Covid-19) appeared in December 2019 and on January 31, 2020, the World Health Organization (WHO) declared a health status. global emergency. Up to now, the epidemic has been basically extinguished with the efforts of the entire Party, people and army, and we have succeeded in spreading the vaccine to all parts of the country.

In general, the epidemic has affected on a global scale, disrupting the supply chains of many world products and goods, and stalling in production and business. In fact, the Covid 19 epidemic has severely affected the development of most countries in the world in many aspects, including the development in digital transformation and digital technology, a growing trend. development that was very popular and drastic at the time before the outbreak of Covid. However, Covid 19 is also a wonderful wind that can lift the steps for countries that know how to face and capitalize on the challenges it brings.

Facing those opportunities and challenges, at a time when the country has basically stabilized before the pandemic, we need to look back on what we have done to promote the good points and re-screen the bad ones as well. such as giving directions for socio-economic development as well as continuing to carry out digital transformation in the post-Covid time. Therefore, the implementation of the research project "Global impact of covid-19 on socio-economic, development trends in digital transformation and digital technology in Vietnam and in the world" is meaningful. theoretically and practically, is an important source of material to provide scientific and practical arguments for policy making.

2. THE GLOBAL IMPACT OF COVID-19 TO THE ECONOMY - SOCIAL:

2.1. Impact of Covid 19 on the world economy:

IMF (World Economic Outlook, October 2020) forecasts world economic growth at only -4.4% in 2020; in which, economic growth in developed countries is -5.8%; China grew by 1.9% - the only major economy expected to post positive growth; while in emerging and developing countries it is -3.3%.

The Organization for Economic Co-operation and Development (OECD, September 2020) forecasts world economic growth at -4.5% (2020) as the global recession is not as deep as expected and will return to around 5% growth in 2021.

The World Bank (World Bank Global Economic Prospects, June 2020) forecasts that the world economic growth will be at -5.2% in 2020. In which, many major economies will

experience negative growth this year. 2020: The US will be at -6.1%, the European Union at -9.1%, Japan at -6.1%...

The Covid-19 pandemic has had a huge impact on trade and investment activities of countries around the world. Social distancing in many countries has caused a decline in the value of exports and imports of goods and services, accompanied by a decrease in income, a decrease in consumption and a stagnation of import and export activities. The global production structure is highly centralized, with some major centers in the world supplying inputs, playing an important role in the value chain and global production network such as China, Japan, and Korea. , the US ... was heavily impacted by the Covid-19 pandemic. As a result, the supply and demand of goods on a global scale also stagnated and the world trade volume of goods decreased significantly right from the first months of 2020 and continued to decline deeply in the following months. UNCTAD forecasts that the impact of the Covid-19 pandemic will cause total global FDI to drop sharply. The total value of global FDI in 2020 is forecast to decrease by about 40% compared to 2019 (down from \$1.54 trillion to about \$924 million). This is the first time FDI inflows have fallen below \$1 trillion since 2005. Global FDI is forecast to fall another 5 to 10 percent in 2021 and only begin to recover in 2022, according to the Labor Organization. According to the International Labor Organization (ILO), in the second quarter of 2020, total global working hours decreased by 14%, equivalent to about 400 million full-time workers .

Responding to the risk of recession, many key economies have announced emergency fiscal relief packages and implemented loosening monetary policy to prevent the decline caused by the Covid-19 pandemic and stimulate the economy. , support growth. The US is the economy that has announced large financial relief packages with a total value of economic stimulus packages of nearly 3 trillion USD, the largest in the world (of which, the package includes 2.2 trillion USD), respectively. 13% of GDP. However, if comparing the economic size of the economic stimulus packages, Japan is the country that announced the economic stimulus package with the largest scale/GDP in the world with 21.1% of GDP. Besides Japan, China and South Korea are the two countries with large economic stimulus packages in Asia with the rates of 3.8% of GDP and 2.2% of GDP, respectively. In Europe, Spain and Italy have announced economic stimulus packages with the size of 7.3% of GDP and 5.7% of GDP, respectively.

2.2. Impact of Covid 19 on Vietnam:

The global economy fell into a serious recession, leading to Vietnam's economy with a large openness and extensive international integration, which has been suffering from many impacts, seriously affecting all economic sectors. - social, causing disruption of supply chains and trade flows, stagnation of production, business and service activities; has directly affected the import and export industries, aviation, tourism, accommodation services, catering, healthcare, education, labor and employment; many businesses went bankrupt, dissolved, suspended operations, downsized, GDP in the first quarter of 2020 only increased by 3.82%,

which is the lowest level in the last 10 years; This has had a significant impact on state budget revenues.

Some typical impacts include:

- Impact on economic growth: According to the Report of the Ministry of Planning and Investment in 2020, it is expected that 08/12 targets will meet or exceed the Resolution of the National Assembly. Only 04/12 targets did not meet the plan and all are important indicators, reflecting the difficult situation of the economy in 2020, including the growth rate of gross domestic product (GDP).). Specifically: GDP in the first 9 months of 2020 reached 2.12% and the whole year 2020 is estimated to reach 2-3%, much lower than the plan of 6.8% and 7 percent compared to 2019's increase. 0.02%. During the outbreak of the Covid-19 epidemic in China in early February, our country's agricultural and aquatic products were clearly affected because this is the main export market of Vietnam's agricultural and aquatic products. Specifically: In February 2020, the value of seafood exports to China decreased by 57.21% over the same period; vegetables and fruits decreased by 24.79%; cashew nuts down 69.26%; coffee decreased by 14.34%; tea decreased by 78.39%...;

- Impact on inflation: The impact of the Covid-19 epidemic has made the prices of many commodities tend to fluctuate differently from usual in recent times. In January 2020, when the Covid-19 epidemic showed signs of increasing rapidly in China, the prices of Vietnamese goods still increased sharply in most commodity groups, Vietnam's inflation increased by 1.23% compared to the previous year. December 2019, the highest increase in January since 2014, mainly due to high consumer demand during Tet holiday, typically the high price increase of three groups of food - food services. , housing - construction materials and traffic. However, in February 2020, inflation decreased by 0.17% compared to January 2020, due to the outbreak and spread of the Covid-19 epidemic in many countries, affecting domestic consumption demand and growth prospects. world economy declines;

- Impact on import and export: Export and import growth in 2020 under the impact of the Covid-19 epidemic is much lower than in previous years, in the 10 months of 2020 the export growth rate has decreased. to 4.7%, much lower than the growth rate of 2019 of 8.1% and the average growth rate of the whole period of 2015 - 2019 of 12%; imports grew by 0.4%, lower than the import growth rate of 7% in 2019 and the average growth rate of the previous 5 years was 11.5%;

- Impact on state budget revenue: Due to the impact of the Covid-19 epidemic, the accumulated state budget revenue in the first 10 months of 2020 reached VND 1,137.3 trillion, equaling 75.2% of the estimate, down 10.3 % over the same period in 2019. After 10 years with a positive growth rate of state budget balance in 10 months, in 2020 the revenue growth rate will be negative, ie the scale of state budget revenue in 10 months of 2020 will be lower. 10.3% compared to 2019.

Against this backdrop, the Government has had timely policies to gradually support businesses and people to overcome the difficulties of the Covid-19 pandemic. The broad and

synchronized policy responses to deal with the Covid-19 epidemic include: (i) Stimulating the economy; (ii) Supporting business, employment and income; (iii) Growth model restructuring... Although Vietnam has relatively good control over the epidemic, the effects on the economy are relatively limited. However, Vietnam's economy still has some problems such as: The economic growth model is still mainly in breadth, the process of changing the growth model is still slow. Economic growth also depends heavily on investment, including foreign investment; Vietnam's economy is an open but highly open economy, highly dependent on world economic fluctuations, especially China and Korea; The economy's productivity and efficiency are still low, the economy uses outdated technology, and its competitiveness is weak, leading to vulnerability to external events, including epidemics; Enterprises in the economy are small, have poor resilience, have not yet linked, and have not yet created value chains, leading to businesses often being negatively affected by specific volatile factors. especially the big fluctuations from the outside such as the Covid-19 epidemic in 2020.

2.3. Socio-economic stabilization solutions after Covid:

2.3.1. Make full use of investment sources, especially foreign investment sources:

This growth rate of recovery will depend mainly on public investment, like any economy in crisis. This is a better opportunity than in the past decade, for us to perfect the network of modern transport infrastructure connecting the whole country. Transport infrastructure is not only road, air, but also waterway. Let's go a little bit back to the experience of neighboring China as it spent decades of economic reform to complete a modern transport network before taking off to take the second economic star, in terms of size. , of the world.

We Vietnam, in more than three decades of renovation, actually have not forgotten this, but high decisive action does not seem to be enough. Many worries, such as the public debt ratio, also make walking slow, but "if you don't go, there's no way".

Deputy Minister of Industry and Trade Tran Quoc Khanh once expressed concern about the story that the international route of products of the Cuu Long River Delta must go through Ho Chi Minh City while the traffic system here is congested. The rich agricultural products in the Cuu Long River Delta, therefore, never "lift their heads" because they have to go through these "bottlenecks". The Cuu Long River Delta needs a seaport system commensurate with the region's development potential, planning roads, waterways, and logistics associated with seaports.

As one of the fastest growing economies in ASEAN, we have a very long "waiting list" in terms of infrastructure. The World Bank expects Vietnam to spend \$25 billion a year on infrastructure over the next five years, with about 20% of that capital coming from the private sector. Previously, the private sector accounted for only about 10% of total infrastructure investment.

Leveraging private capital including foreign investment to create a system of supporting industries, high technology, digital economic infrastructure for export and domestic consumption is a practical and wise step. on the post-pandemic recovery agenda.

However, the agenda will lose its sustainability and become less convincing, if it does not target a green economy, full of challenges in the development roadmap.

2.3.2. Digital economy:

Although hard infrastructure is still lacking, Vietnam's communication or soft infrastructure has made tremendous progress over the past decade, enough to create momentum for the digital economy dream to become a reality. To serve the digital economy, Vietnam is rushing to complete large data warehouses on population and administrative and legal procedures. The COVID-19 pandemic of the past two years shows how essential big data and the digital economy are to national development.

Changing the whole system to digitize is a huge challenge. The first challenge is from the training system, from vocational schools to universities and research institutes. If the higher education system and colleges do not rush to innovate, the digitization megaproject will face great difficulty in terms of human resources.

In addition, digitization has been an effective assistant tool for detecting deception and market manipulation by some. With digitization, it is not easy for manipulators to "mock" the basics of business ethics. The law is the "backbone" that keeps the economy moving forward. The "cashless" programs that have been enacted by the Government, if implemented as planned, will help increase "transparency and transparency" in the national finance and taxation.

2.3.3. Actively completing the infrastructure system:

After a major illness like the COVID-19 pandemic, there is nothing greater than the hope of recovery.

The completed works, although behind schedule, still create "new vitality" in the people. Those are also important links in strongly revitalizing the economy. After any economic crisis, rebuilding must focus resources on infrastructure, because only infrastructure can serve the majority of the people the most." The spirit is the whole country. develop infrastructure, including transport infrastructure. Wherever traffic goes, space will develop and land value will increase," Prime Minister Pham Minh Chinh said. He believes that it is necessary to do things with focus, focus, "do it wherever you go", and not give up halfway like some recent traffic projects across the country in the past.

2.3.4. Increase spending on social security and job support for workers:

It is necessary to review and have appropriate support policies for people in difficult circumstances due to the impact of the epidemic, especially to strengthen direct support for vulnerable groups such as informal workers and the unemployed. Karma; Support housing rental costs for employees working in enterprises in economic zones, industrial parks and export processing zones; Providing preferential loans to employees through the Bank for Social Policies;... The implementation of support needs to be more flexible to ensure that the support money is transferred quickly and timely to the target groups. enjoy.

Besides, it is also necessary to have a policy to support training and retraining of employees; Improve the efficiency of labor supply and demand connection; Improve the capacity of employment service centers, high-quality vocational schools, etc. to contribute to supporting job creation for workers.

2.3.5. Support to restore production and business activities of enterprises, cooperatives and business households:

Support the recovery of production and business activities of enterprises (especially small and micro enterprises), cooperatives, and business households by continuing to implement tax exemption, tax reduction and family policies. tax deadlines, fees, charges, debt restructuring policies; Manage appropriate credit growth, continue to restructure debt, keep the debt group unchanged; Continue to reduce operating costs of commercial banks to have room to reduce lending interest rates, especially in priority sectors and fields; Having appropriate support policies for a number of priority industries and fields such as production and processing of agriculture, forestry, fishery, processing industry, manufacturing, transportation services, tourism, and start-up promotion. , create, develop industrial parks, high-tech parks, export sustainably.

3. IMPACT OF COVID 19 ON DEVELOPMENT TRENDS IN DIGITAL TRANSFORMATION AND DIGITAL TECHNOLOGY:

3.1. Current status of digital transformation in Vietnam:

According to research conducted by Microsoft in the Asia-Pacific region, before and after the outbreak of the COVID-19 pandemic, 74% of business leaders believe that innovation is imperative and plays an important role in their ability to thrive. enterprise resilience.

Up to 98% of businesses pioneering innovation believe that innovation is the key to quickly responding to market challenges and opportunities.

Digital transformation is promoted in the State apparatus. Specifically, the Ministry of Industry and Trade has implemented in many online trade promotion conferences. Helping Vietnamese businesses' brands to reach partners and export markets effectively right at "home."

With the audience being large-scale enterprises and diverse customers, digital transformation is reflected through many factors. Many businesses have built a unified customer management system through mobile applications. Thereby, helping customers to integrate and manage information when transacting in many different services such as paying family bills, electricity bills, shopping or resort services, etc.

However, Vietnamese enterprises in general, especially small and medium enterprises, are still not properly aware of the role of digital transformation in the fourth industrial revolution. Specifically, according to VCCI, currently Vietnam's small and medium-sized enterprises account for about 97% of the total number of enterprises, the level of science, technology and innovation is still low, with 80% to 90% of the machines used in the manufacturing industries. Vietnamese enterprises are imported, nearly 80% of which are old technologies from the 1980s and 1990s.

In April, Cisco announced the report "Digital Development Index of Small and Medium Enterprises in Asia - Pacific", covering more than 1,340 enterprises in the region in general and 50 enterprises in Vietnam. In particular, In Vietnam, small and medium enterprises are facing barriers in digital transformation such as lack of digital skills and human resources (17%), lack of strong enough information technology platform to enable digital transformation (16.7%), lack of digital mindset or digital culture challenges in business (15.7%)...

However, the report also shows that Vietnamese small and medium enterprises are investing in cloud technology (18%), cybersecurity (12.7%), upgrading software and hardware to move change number (10.7%).

According to Forrester's 2016 analysis report, of those surveyed, only 11% succeeded in digital transformation.

3.2. Digital transformation trends in the post-Covid 19 era:

3.2.1. Cloud computing:

Cloud computing features data maintenance, storage, management, processing, analysis, and security by exploiting Internet-based servers. Thanks to this technology, businesses can easily:

- ✓ Testing and developing websites and applications
- ✓ Big Data analysis and operation
- ✓ Store website data through Cloud Server
- ✓ Easily share data through platforms such as Google Drive, Dropbox, Shutterstock...

Thereby helping businesses streamline processes, optimize costs and improve customer experience.

In addition, this technology helps to adjust to the requirements of the business, only paying for the services that need to be used. Therefore, it will help businesses save costs in the digital transformation process of their business.

Along with that, groups of employees can collaborate in parallel, and are given access to the same remote data, making it easier for businesses to adapt when working remotely during the pandemic.

3.2.2. IOT digital transformation trend:

In this day and age, the phrase "IoT" is no longer a strange concept. It basically refers to a network of physical objects integrated with sensors, software and other technologies with the goal of connecting and exchanging data with devices and systems over the internet.

Due to its many benefits, IoT is considered one of the digital transformation technologies used by many Vietnamese businesses in their business digital transformation process. This technology provides detailed, transparent visibility into the company's goods and activities. Companies that integrate IoT may be able to more closely manage the operations of their businesses. Meanwhile, the specific data, insights, and analytics provided by IoT technology enable businesses to achieve key digital transformation goals such as operational efficiency, increased agility, and increased flexibility. better customer service.

3.2.3. Application of robots in the field of manufacturing:

Robotics is also one of the major digital transformation technologies in 2021. According to a survey, one in four businesses use intelligent robots in their operations. This percentage is estimated to increase to a third in the next two years, indicating a bright future for this technology.

The use of robots has developed over time, many Vietnamese businesses have applied robots in many fields such as logistics, engineering, medicine, etc. Digital transformation by robots will basically help businesses reduce costs, improve the quality of the working environment. Ensure product uniformity and quality, minimize errors in the production process. Therefore, it helps each business to increase flexibility and enhance the reputation of the brand in the market.

3.2.4. VR virtual reality technology:

VR technology creates a computer-generated virtual world. This technology helps users step into the virtual environment, become a part of it. It gives users a virtual visual experience with the ability to interact through other senses such as hearing, smell and touch.

This technology has now been applied by Vietnamese enterprises in the fields of medicine, tourism, real estate, engineering, etc.

With the tourism industry, this technology overcomes common difficulties such as not being able to arrange time, preparing a lot of luggage or worrying about the quality of accommodation. With just a few technological devices, customers can travel to tourist destinations around the world quickly. Especially when the epidemic occurs, this technology also helps tourism businesses to revive and find new development paths. For engineering and architecture industries, this technology allows them to have a visual image of the finished product, minimizing errors.

4. CONCLUSION:

During the outbreak of the Covid-19 epidemic with the general crisis of the whole world, Vietnam has seized the opportunity and made strong strides in many fields. Although there are still many difficulties and challenges, with high determination, fierce spirit, speed and timeliness, we have achieved proud achievements. However, there are still many things that need to be learned from experience and we also need to modify and update the general knowledge of the world to be able to set out for ourselves economic development policies - social stability in the long run. Along with that, digital technology will also be a potential trend now and in the future. In such a general situation, each of us needs to join hands to contribute to a rich and strong Vietnam.

GLOBALLY INTEGRATED CITIZEN

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People are becoming more and more integrated into this 4.0 world. We have more opportunities to develop ourselves. We are no longer just citizens of one country but have become citizens of the world. Each of us was born with the mission of perfecting ourselves and realizing our dreams. Our goals also have another important mission: to make our country more and more developed, more integrated, and more citizen-like. Global citizens are people who come from many different lands and territories, have different skin colors, and different colors of flags, but together they share in the noble ideal that is to dedicate themselves to society, creating good and sustainable values for life. From those noble goals and ideals, we will form a spirit of solidarity, love, and help each other, regardless of language, ethnicity, or not for any benefit. Without integration, it will be difficult for people to reach out to the international environment. Integrating global citizens helps people have more opportunities to study and work in more developed countries, thus contributing to their contribution to the world. for mankind.

We all know that Vietnam is gradually integrating into the international environment with the concept of a global citizen. "Global citizens" simply mean people who can study anywhere, live anywhere and work in any country. They can have one or more nationalities without barriers. about the boundaries, geography, as well as culture of countries in their perception. Global citizens are people who integrate but not dissolve; they integrate to absorb human civilization but still retain the distinctive characteristics of their homeland and country. It can be described by the English phrase: "Study anywhere, Live anywhere, Work anywhere". People with the qualities of "global citizens" often have good jobs, high incomes, and a rich life due to their experience of global cultural and social values.

Technological innovation, digital transformation, and supply chain diversification are the keys to improving the adaptability of the Vietnamese economy to major fluctuations in the world and regional economies, ensuring operational stability. production activities, effectively participating in the global value chain. Therefore, Generation Z is the first generation that has been exposed to the Internet since childhood and has good English, so the world from their perspective is really "flatter". With the strong globalization process and the impact of the Industrial Revolution 4.0, Generation Z, in my opinion, really has the opportunity to become "global citizens" if enlightened by a quality education. create well.

In the digital society era, if people do not integrate, it will be difficult for people to reach out to the international environment. The integration of global citizens helps people have more opportunities to study and work in foreign countries. develop more and contribute to

humanity. Integration and development not only bring people closer together, but they also help the relationship between countries improve more than ever. When we integrate, we will absorb many useful things for ourselves. From that valuable knowledge, we will contribute better things to life.

Therefore, with an objective perspective in the era of social technology development, especially for the student generation, in addition to doing well at school, it is necessary to have other skills to be able to compete with international youth and develop. such as: presentation skills, teamwork, and integration ability. Only with integration can they access information, knowledge, and technology from the world to return to contribute to the country. According to a survey by the World Economic Forum in 2019, the ranking of skills of university students and workers to meet job requirements in Vietnam is among the lowest in the world. Vietnam's ranking is above 110 and lower than both Laos and Cambodia. This shows how far apart skills are needed to work today. In terms of training, there are currently very few universities in Vietnam positioned to train "global citizens". For example, university training is mainly in Vietnamese, thus hindering access to global knowledge. To train "global citizens", Swinburne University (Australia) identifies 3G for global citizens, including: Global Knowledge—learn the most up-to-date knowledge in the world; Global Skills—learn technical and soft skills to learn and follow international standards; and Global Employment—work related to international. Currently, it is difficult to find a high-paying job that is not related to "global employment". But it is certain that Vietnamese students have the opportunity to work internationally, which is an opportunity created for Vietnam in the context of the Industrial Revolution. 4.0. Why? Firstly, in terms of capacity, the ability to grasp science of Vietnamese students is currently at the top of the world. The results of the PISA survey, conducted by the OECD for many years, have announced that the science and math competence of high school students in Vietnam is in the top 10 to 20 in the world, higher than that of the UK, the US, and Australia. Our children are learning too much. It also has the good side of training their thinking. However, this is a very good platform to access knowledge and skills related to the Industrial Revolution. 4.0. Another skill is the "key" to English. Although about 20% of students have improved English, nearly 80% of students who graduate from school are not able to use English. In addition, students, even those with very high IELTS, B2, PTE, etc., do not mean that they can use English. Because English also needs an environment and content expressed from global knowledge and skills acquired. Secondly, in terms of English, the English training at high schools for many years, plus the access to movies, television channels, and international newspapers, as much as Vietnam has helped improve English proficiency, has helped the whole change. About 20%-30% of students with very good English can access global knowledge. Third, the world is getting "flat," so students can learn international standard programs right from Vietnam and update their knowledge globally at a reasonable cost. Going to college is no longer the only way to get a college education. Many sites like Coursera, Udemy, and others provide the most up-to-date knowledge in the world in an easy and convenient way for learners.

Besides that, each student needs to be aware of the importance and strive to cultivate for themselves the necessary knowledge about global cultural and social experiences. It is worth noting that anyone with goals and efforts can become a global citizen if enlightened by good training methods. The first is the need for global knowledge, which is essential for adapting to an international environment. To work anywhere in the world, students need to be equipped with the latest knowledge. Keeping up with new technological developments and applying them in the workplace is the key to success in any field. Knowledge is constantly changing. You will be left behind in only 2-3 years without updating. Learning during university will quickly become outdated, and global citizens need to be able to learn new things continuously, considering learning as a lifelong favorite process to update new knowledge for work. Previously, to do this, you needed to go to developed countries to study and work. However, the world is becoming more and more flat so that students can learn international standard programs right from Vietnam and continuously update their knowledge globally at a reasonable cost. Global knowledge is related to a global mindset. Global citizens with global knowledge will tend to be interested in social issues that are of concern to the whole world, not just what is happening locally. From there, they have the ability to apply global experience to handle emerging issues locally and connect with the world. For example, the problems that the whole world is facing, such as disease, waste, climate instability, terrorism, and global trade, require skill. Knowledge is knowledge, and skills are the ability to apply and practice. Currently, skills are divided into two groups: professional skills and soft skills, which are ways of living, working, and studying in a global environment. Regarding the ability to know, Vietnamese students are very good at knowing. The results of the PISA survey, conducted by the OECD for many years, have announced that Vietnamese students' science and math abilities are at the top 10 to 20 levels in the world. However, according to a survey by the World Economic Forum, the ranking of skills of university students and workers to meet job requirements is among the lowest today. Vietnam's ranking is above 110, which is lower than Laos and Cambodia, which are considered less developed than us. This shows how big a gap there is between "knowing" and "requiring skills". Education in Vietnam currently lacks activities to enhance skills for students. Therefore, when they graduate from school, it takes them a long time to get used to working. This is why graduates and low-income Vietnamese workers find it difficult to join the international workforce because of a lack of work skills. An important skill is English. The ability to communicate in English is the number one important condition. Many Vietnamese students today are very good at English and can take the English test to IELTS 6.0 or 7.0. However, the ability to use English is a completely different matter. This is related to knowledge and skills, and these skills need further practice and training. A skill is something that is not learned to know but only formed by practice. Our Uncle Ho once said, "Practice gives birth to understanding." Graduates need professional skills and soft skills to be able to work in an international environment. Finally, global employment means that, with global skills and knowledge, graduates will have the ability to work around the world. This is the goal to be achieved in an increasingly flat and globally equipped world with knowledge and skills. The growth of the Internet and IOT devices creates opportunities

for working globally without having to travel to another country to work. For example, FPT Software is currently creating 18,000 jobs in Vietnam for global companies in developed countries such as the United Kingdom, the United States, and Australia... The development of the Internet could allow us to sit in one place. Many countries can work with many other countries in a multitude of professions ranging from technology, commerce, law, doctors, etc. This is an opportunity only brought about by the impact of globalization and the industrial revolution. 4.0.

Not everything is always easy. Being a global citizen also brings difficulties. Generation Z has the right to demand the most up-to-date knowledge in the world. However, a disadvantage for students and students of Vietnam is that the knowledge being transmitted at universities is not yet global and has not been updated. This is reflected in the fact that the international rankings of study programs at Vietnamese universities are still not high and many are very low. The advantage is that there is now more international training participation in order to bring international knowledge to learners at a more reasonable cost than studying abroad. A concerning issue in today's reality is how much "knowing" of science exists among high school students all over the world, as well as the skills required to live, work, and study in an international setting. My students' global school is rated so poorly. According to The Economist, soft skills related to how to study and work are considered to be increasingly important, especially in the era of the Industrial Revolution 4.0. The study and work skills employers need will involve a positive attitude, problem-solving abilities, teamwork, communication, critical and creative thinking, and emotional intelligence development. Contact is a skill that has not been paid attention to in training.

However, in today's society, there are still many people who are not aware of the importance of integrating and becoming global citizens. There are people who are demanding, following the Western lifestyle but losing the beauty of the national culture, etc. These people need to be criticized and criticized. We can choose our own way of living and thinking, but the responsibility of preserving the national cultural identity is shared. Be a smart global citizen, integrating but not dissolving, without losing your self-worth. We are living in the current integration period. We need to try to learn, improve ourselves, and absorb the cultural quintessence of humanity. Always be proud of your homeland, your country. Integrate but not dissolve. Everyone needs to know how to balance world-class development with preserving national cultural identity for the country to develop more and more sustainably. The future of the country is in our hands. Let's strive for a rich, beautiful, civilized, prosperous, and imbued with national identity.

In short, with an overall view, we can see that current students' views on becoming global citizens in a digital society are essential. Each student is a small part of society and contributes their efforts to help the country innovate and develop to a new height on par with the powers of the five continents.

OF BECOMING THE GLOBAL CITIZEN IN THE DIGITAL SOCIETY

Le Dieu Anh

Tan Tao University

I/ INTRODUCTION / SUMMARY

Becoming the true global citizen has always been the vision for every countries lately. Especially with the development of digital world, this desire has hit even harder than ever.

This is just as true for students of other nationalities, who learn in an enhanced Vietnamese cultural and linguistic context as for Vietnamese, who are developing awareness of their own language and heritage. The benefit of learning multiple languages and the cognitive agility that this engenders makes the education goals nowadays have to be unique and accessible easily.

Students now require four elements as they move through schooling to the workplace. These are often referred to as the four C's: critical thinking, creativity, communication, and collaboration. Any schooling worth its salt will develop high levels of knowledge, but at the same time strongly develop these skills. In the acquisition of these factors, students are future-proofed and enabled to move seamlessly between institutions and cultures whilst remaining connected to their own culture.

They do not challenge their intrinsic identity, but their approach in taking their place in the world, with enhanced values and a strong foundation of nationality and culture. It is how these four factors are delivered, and by whom, that matters.

All research points towards wellbeing as a foundational plank in the success of children. Students learn best when they are happy, respected, and listened to. An environment that recognises their worth and provides them with a safe culture to express their ideas brings about confident, expressive learners. Classroom time with these essential elements embedded provides a platform for the development of independent learners who are intrinsically motivated.

Independent learning is key, and providing what we call head space allows for the exploration of ideas. Homework, or independent study, of course has its place, but not as a time-filler. It is a key opportunity for students to explore their own understanding and to develop ideas, not just for marks and grades but for the joy of consolidating understanding.

II/ BODY PART

The escalating speed of technological development, particularly the pervasive accessibility of the Internet and the rise of social media in the twenty-first century, creates unprecedented opportunities for empowerment and connectedness to individuals and communities. It has also brought challenges and changes to the concept of citizenship and how it is enacted. Especially,

the phenomenal growth of the Internet revolutionizes people's sociopolitical and civic engagement, engendering a more self-actualized form of citizenship (Bennett 2008), and directly influencing the process of democratization (Ferdinand 2000) and the processes of social and political decision-making. Therefore by enquiry-based learning and acquiring self-knowledge can solve these global problems in digital world.

1.The Enquiry-based learning:

It is for this reason that enquiry-based learning is gaining such traction. Students generally enjoy working together creatively, piecing together complementary strands of knowledge into themes, and sharing thoughts and opinions on the topic. The critical thinking element of the four C's comes in the evaluation of the significance of knowledge, not just in the knowledge itself. It is not what young people know but what they do with what they know that matters most. It provides meaningful context to learning and activities based around that learning.

Much work has been done by Cambridge Assessment International Examinations to develop partnerships in Vietnamese public and private schools and with universities here in Vietnam. This is to be applauded. The programme is robust and widely-respected within schools for its ability to develop expansive thinking and rigour.

In addition, universities appreciate its approach to help students develop the necessary critical thinking skills and collaboration that underpin university education. At this current stage of Vietnam's development, many of these courses will be delivered by teachers who have yet to gain the necessary experience or track record of success. Of course, this will come. But parents seeking this path for their children need to assess this carefully in advance.

Vietnamese students who graduate from a Cambridge International A-Level curriculum have their qualifications recognised by some of the world's leading tertiary education institutions. Many top universities throughout the world give credits to students who study A-Levels, meaning that they are recognising the validity and rigour of the courses when compared to university degrees embarked upon by students who often have not gone through this demanding educational journey.

Because of the development of critical thinking skills, students will be more able to make decisions about the trajectory of their own university courses and careers. It is this aspect of responsibility-taking that enables students to get the most out of these university years. Many international schools like BVIS have provided students with significant consultancy from the University Guidance Counsellor to guide students and their parents through the demands of the university application process.

2. The Acquiring self-knowledge

Appreciating the interests, achievements, and direction of each student, the University Guidance Counsellor at international schools like BVIS can offer the best support in a way

that outsourcing to a consultant service, who does not know the individual students and parents, cannot.

The four factors mentioned, in our view, lead to a fifth and highly significant C-word, and that is confidence. Any great school will invest heavily in facilities that support the pedagogical approach. Budgets are not infinite and careful consideration must inevitably be given to provide maximum benefit.

It is for this reason that facilities which support STEAM (for the delivery of cross-curricular science, technology, design, maths, and the performing arts) are key features for helping students make sense of their learning and to transform their learning beyond just the traditional, into contexts that bring meaning and pleasure to learning.

For a student to keep a deep sense of pride in who they are as Vietnamese citizens and take their place in a fast-moving and swiftly changing global environment requires agility of mind and heart, coupled with a deep self-knowledge and respect. We firmly believe that at The British Vietnamese International School, the combination of excellent teaching, right pedagogy, and enhanced facilities provide students with just the right environment to thrive.

III/ CONCLUSION

These 5 things are the key factors of becoming and staying the true global citizen in digital society with Respect which ARE DIE for:

1. 1st R = Respect to ourselves and others
2. A- Agency: refers to the individual capacity to make autonomous decisions on economic, civic, political or cultural matters within a global and interconnected society.
- 3.R-Rights: refers to the rights individuals have in a global and interconnected society and includes, but are not limited to, human rights, environmental rights, cultural rights, digital rights, and so on.
4. Empathy: emphasises the relationships among individuals and groups fostered as a result of a global society, and includes aspects such as cooperation, collaboration, conflict resolution, communication and empathy.
5. D-Duties: refers to the responsibilities individuals have in a global and interconnected society in relation not only to other individuals but also towards other groups, countries and societies.
6. I- Identities: focuses on the individual and social identities that are forged in a global and interconnected society and includes aspects such as cultural identity, religious diversity, freedom of expression, inclusion, multiculturalism, etc.

7. E-Engagement: encompasses the awareness of global issues and challenges as well as an active involvement and participation on their solutions in order to transform local and global realities.

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RESEARCH ON POLICY, LAW, E-GOVERNMENT AND DATA DIGITIZATION

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E-government is the government applying information and communication technology to increase the operational efficiency of State agencies to better serve people and businesses.

People and businesses are provided with information by state management agencies, provide faster and more convenient services through online public services, minimize businesses and people must go directly to government agencies when carrying out administrative procedures.

Broadband telecommunications infrastructure, the foundation for the implementation of e-government construction is deployed to 100% of villages and villages.

The province's data sharing integration platform (LGSP), which is connected and connected to the National system, serves to send and receive electronic documents connecting 4 levels of government from the central to the commune level.

Modern and synchronous electronic one-stop system is deployed from the provincial level to the district and commune levels. Online public service portals serve people and businesses anytime, anywhere, saving time, cost, publicity, transparency.

The Software System of Document Management and Work Records (TD-Office) is implemented synchronously from the provincial level to the commune level, serving the operation and handling of work on the electronic environment.

Up to now, 100% of departments, departments, provincial-level departments, people's committees of districts and communes have operated and handled work on the TD-Office system; and there are many positive changes, fundamental changes, moving from the form of paperwork to the administration and handling of work on the electronic environment in state agencies; electronic documents gradually replace paper documents, estimated to save annual costs for the issuance of paper documents of departments, departments, branches, people's committees of districts and communes over VND 30 billion; The time for sending and receiving documents from the province to the commune is only in seconds. The rate of sending and receiving electronic documents of state agencies in the province has reached over 97%.

The application of digital signatures is interested and promoted for use in agencies and units, up to now 100% of administrative agencies and leaders from the provincial level to the commune level have been granted digital certificates for the signing of documents and the implementation of transactions on the electronic environment.

Online video conferencing system; IT application in handling and operating work; public services up to level 3 and level 4 are effective in resolving administrative procedures

for people and businesses, in the leadership and administration of all levels, especially in emergency situations such as disease prevention, floods, natural disasters. Especially, during the implementation of social distancing and prevention of COVID-19 epidemic.

However, in addition to the results achieved, there are still shortcomings and limitations that are: The process of implementing IT application projects often lasts over the years, leading to a lack of synchronization; Human resources are lacking and weak; Some IT applications are spontaneous according to the mission requirements of each industry, each unit, leading to difficulties in integrating and sharing data; The connection with the information system of ministries and central branches still faces many difficulties; Some units have not effectively exploited existing infrastructure, IT and telecommunication applications.

Along with the new dynamics and potential of the provincial economy – identified as a new growth pole in the North and North Central regions in resolution No. 58 NQ/TW dated August 5, 2020 of the Politburo on construction and development of Thanh Hoa province to 2030, Vision to 2045 – In the coming period, Thanh Hoa TT&T industry will strive together with industries and levels to take IT development to a new level; use IT to solve the problems of people and businesses of Thanh Hoa province.

Application of digital transformation in socio-economic fields

National digital transformation until 2025, oriented to 2030" newly approved by the Prime Minister is a document that is both strategic and action plan for ministries, sectors, localities, organizations and enterprises based on which to implement digital transformation in the operation of agencies, my unit.

Emphasizing the view that people are at the center of digital transformation, the program clearly defines, areas with social impact, daily relevance to people, changing perceptions fastest, bringing efficiency, helping to save costs should be prioritized digital transformation first, these include: Health, Education, Finance - Banking, Agriculture, Transportation and Logistics, Energy, Natural Resources and Environment, Industrial Production.

Digital transformation in the health sector will focus on tasks such as: Developing a platform to support remote medical examination and treatment to support people to be examined and treated remotely, helping to reduce the load of medical facilities, limiting crowd contact, reducing the risk of cross-infection; 100% of medical facilities have remote medical examination and treatment departments; promote digital transformation of the health sector.

The tasks and solutions that will be focused on transforming the number of education sectors in Vietnam are: developing platforms to support remote teaching and learning, thoroughly applying digital technology in management, teaching and learning; digitize documents and syllabuses; build a platform to share teaching and learning resources in both in-person and online forms. Developing technology for education, towards personalized

training. 100% of educational institutions implement remote teaching and learning, which tests the training program allows students to learn online at least 20% of the program content. Apply digital technology to assign homework and check students' preparations before class.

Digital transformation in commercial banks to provide digital banking services towards the development of a variety of distribution channels, innovation, process automation, promoting cooperation with financial technology (Fintech) companies and payment intermediaries in building the banking and financial services ecosystem. This is aimed at promoting the universalization of national finance, bringing financial services and banks closer to those in remote areas that are not yet accessible or not yet served by banks based on the innovation of technology such as mobile payments, peer-to-peer lending.

Digital transformation in agriculture must be based on data. Focus on building big data systems of the industry such as land, crops, livestock, fisheries. Build an integrated network of aerial and ground observation and monitoring for agricultural activities. Promote the provision of information on the environment, weather, land quality for farmers to improve crop productivity and quality, support the sharing of agricultural equipment through digital platforms. In particular, we will consider testing the initiative "Every farmer is a trader, each cooperative is a digital technology application enterprise" with the goal of each farmer being oriented, training in the application of digital technology in production, supply, distribution, forecasting (price, Seasonal...) agricultural products, promoting the development of e-commerce.

Implementing digital transformation in the field of transport and logistics, will focus on developing smart transport systems, focusing on urban transport systems, highways and highways. Transform logistics infrastructure such as seaports, inland waterway ports, hip cargo, railways, logistics ...

Digital transformation in the energy sector prioritizes the focus for the electricity sector towards maximizing and automating networks for efficient power supply. Connect digital power meters to improve bill speed and accuracy, identify network failures faster, assist users in how to save energy, and detect power losses and losses.

Implementing digital transformation in the field of Natural Resources and Environment, the preferred solution is to build comprehensive information systems and large databases to effectively manage the natural resources and environment sectors. Specifically, the national land database; databases on other fields (national geography; natural resources and environment monitoring; biodiversity; waste sources; remote sensing; sea and islands; climate change; statues - hydrology; geology - minerals ...).

Digital transformation in the field of industrial production will be implemented in the direction of focusing on the development of pillars: building smart strategies and organizational structures, building smart factories, smart operations, creating smart products, building data services and developing digital skills for workers.

The current student perspective on becoming a global citizen in a digital society

Returning to the concept of global citizenship, we all know that Vietnam is gradually integrating into the international environment. "Global Citizenship" is a fairly common term used to refer to people who can work anywhere in the world, overcoming language, cultural, geographical differences,... To contribute value to society.

the years I have been trying to find out relevant information and attend seminars to prepare my children for a good environment for them to develop global citizenship qualities. I think a good start will definitely give my child a solid foundation to stand up for himself in a multicultural environment. Here are some of the qualities and skills needed for our children to become true global citizens:

- A foreign language is a prerequisite if you want your child to become a global citizen, because they won't be able to work in another country if they only know their mother tongue.
- The world is entering the era of technology 4.0 so we need to take a shortcut to open up many opportunities for our children later. Currently, access to information technology is no longer too difficult, I see that most schools are equipped with modern computers so that they can easily hone their knowledge of technology.
- If foreign language and technological skills are a necessary condition, independence skills are a sufficient condition. I do not deny that there are now many parents who over-protect their children, causing them to lack initiative and assertiveness in life. Let us be independent from an early age, only by standing on our own two feet will they have the courage to face the waves out there.
- One of the most important global citizenship qualities we need to learn is the responsibility and ethics of a citizen to have. We need to be aware of what the responsibility of citizens to do so as not to lose our national identity. Without their own value system, they are more likely to lose themselves and lose their ability to position themselves.

According to The Economist, soft skills related to the way of learning and working are considered increasingly important especially in the era of the Industrial Revolution 4.0. The learning and work skills that employers need will be related to positive attitudes, problem-solving abilities, teamwork, communication, critical and creative thinking, and emotional intelligence development are skills that have not been paid attention to training.

LEVELS OF SOCIAL RESPONSIBILITY DISCLOSURE (CSR) OF LISTED COMPANIES IN VIETNAM BEFORE COVID19 – PROPOSED SOLUTIONS TO IMPLEMENT POST-PANDEMIC CSR WITH DIGITAL TRANSFORMATION

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ABSTRACT

The study analyzes the current state of social responsibility disclosure of 271 listed companies in Vietnam before the Covid-19 pandemic (2013-2019) and the relationship between the factors of governance, ownership, especially Score and corporate finance to CSR of enterprises through the development of indicators based on four aspects of environment, human resources, product- customer and community. After performing the winsor2 transform, regression analysis and solving defects from OLS, FEM, REM and GLS models, the results show the Board members' education, foreign ownership, size, and size. firm, age of operation, audit unit and growth potential are positively related to CSR implementation, while the variables state ownership and financial leverage showed a statistically significant negative correlation with CSR. In addition, the research results also show that the current situation of CSR information disclosure of Vietnamese listed companies before Covid19 is increasingly focused, in which two indicators on disclosure of human resources and products/ customers are the two most published indicators. From this result, the author proposes a set of solutions to implement CSR better after the pandemic, especially the application of digital transformation in building an APP to evaluate the set of CSR disclosure criteria to help stakeholders grasp timely status of CSR activities of enterprises.

Key: Limited Company, CSR, Việt Nam, Covid 19 pandemic

1. Introduction:

1.1. Overview:

Stemming from that fact, the author conducts the research with the desire to be able to build a common set of indicators on social responsibility disclosure suitable for the overall Vietnamese market before the Covid-19 pandemic. 19 after referring to the set of criteria from the GRI4 standard – the latest version and the highest international standard in sustainability reporting released by the Global Sustainable Development Standards Board (GSSB) ; guidance on environmental and social information disclosure issued by the State Securities Commission in collaboration with IFC; Circular 155/2015/TT-BTC; ISO 26000 standard; the actual survey used to interview businesses was developed by MayBank Kim Eng Vietnam Co., Ltd on ESG issues; Branco and Rodrigues (2008). In addition, the study also helps businesses to recognize the impact of factors related to corporate governance, ownership, characteristics and finance on CSR disclosure, thereby proposing solutions. legislation, policies as well as the next approaches for the state, businesses and stakeholders

when participating in CSR implementation in Vietnam in the post-Covid-19 era.

1.2. Objectives of the study

From the reasons presented, the author carried out the study with the following objectives:

- (1) Develop a set of common assessment indicators on the level of CSR disclosure.
- (2) Calculating and measuring the governance, ownership, characteristics, financial and CSR aspects of the companies within the research scope; then use this result to test the relationship between them.
- (3) Proposing appropriate solutions and policies for the development of CSR in Vietnam after the Covid-19 pandemic

Theoretical foundations and research methods

1.3. Theory:

1.3.1. Carroll theory and Wayner Visser theory:

The theory of sustainable development by Archie Carroll with the goal of studying the response of businesses to different needs in society through many stages of development. In it, Archie Carroll developed CSR into a pyramid model in the order of levels including economic, legal, ethical and philanthropic responsibility (1991). Accordingly, the economic responsibility located at the bottom of the pyramid represents the goal of creating profit value as the core engine for all business activities. Located on the bottom of the tower, the legal responsibility represents the business's compliance with the law, honesty and transparency in service provision, product quality assurance, and customer safety. goods and workers. At the next level, ethical responsibility represents standards that reflect the company's concern for reasonable behavior in the practice of social responsibility, without violating the ethical rules that parties stakeholders as shareholders, consumers, employees, society respect and protect. Finally, at the top of the pyramid is philanthropic responsibility, which shows the commitment of businesses to promote social progress and development through charitable activities and programs to enhance welfare, quality of life in society (Trevino and Nelson, 1999).

Although bringing great contributions, the Carroll tower model is only suitable for developed countries, but in Vietnam and other developing countries, this model needs to be restructured to match the differences. economic, social and cultural conditions (Thao Lam Ngoc, 2019).

Therefore, to show the correlation of businesses with social needs in developing countries, the Pyramid of CSR model of Wayne Visser (2008) was born. In this model, Wayne Visser still uses the same 4 layers of responsibility as Carroll, but with an orderly rearrangement, in which the most important layer is still the economic responsibility layer, while the next layers are next. are philanthropic, legal, and ethical, respectively. The reason for this difference is due to the difference in the level of economic development, whereby in developing countries most of the small and medium-sized enterprises are focused on seeking profits to develop business development and they see CSR as a wasted investment and refuse to practice this. The second reason is that the problems related to the legal structure in developing countries in general and Vietnam in particular are still incomplete, there are still many limitations that make CSR practice unreal. impact in developing countries such as Vietnam.

1.3.2. Agency theory

The theory of sustainable development by Archie Carroll with the goal of studying the response of businesses to different needs in society through many stages of development. In it, Archie Carroll developed CSR into a pyramid model in the order of levels including economic, legal, ethical and philanthropic responsibility (1991). Accordingly, the economic responsibility located at the bottom of the pyramid represents the goal of creating profit value as the core engine for all business activities. Located on the bottom of the tower, the legal responsibility represents the business's compliance with the law, honesty and transparency in service provision, product quality assurance, and customer safety. goods and workers. At the next level, ethical responsibility represents standards that reflect the company's concern for reasonable behavior in the practice of social responsibility, without violating the ethical rules that parties stakeholders as shareholders, consumers, employees, society respect and protect. Finally, at the top of the pyramid is philanthropic responsibility, which shows the commitment of businesses to promote social progress and development through charitable activities and programs to enhance welfare, quality of life in society (Trevino and Nelson, 1999).

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2.1.3. Stakeholder theory:

Stakeholder theory refers to the relationship between company activities and policies and stakeholders directly and indirectly affected by those activities and policies (Friedman, 1970) such as government, shareholders, creditors, employees, customers and the community because they are individuals/organizations that have a significant influence on the company's operating system, human resources, revenue, profit, etc. (Post et al., 2002). Therefore, to be able to maintain a stable growth rate, it is extremely important to take care of the interests of stakeholders (Van der La, 2009).

Discussing the relationship between social responsibility disclosure (CSR) and corporate stakeholders, Roberts (1992) uses stakeholder theory to explain social responsibility disclosure. Accordingly, the results show that the degree of social responsibility disclosure (CSR) has a significant impact on the interests of stakeholders and

on the economic performance of enterprises. In addition, Snider et al. (2003) also stated that stakeholder theory conveys a valuable framework for assessing social responsibility disclosure (CSR) through social activities. Reported

1.4. Method:

1.4.1. Research process and data:

In the research process, the author conducts a detailed analysis of annual reports and sustainability reports of enterprises in each industry group to consider the level and frequency of CSR disclosure practices in different regions. listed enterprises. In which, the secondary data source is manually collected by the author by reading and considering for each factor that appears in accordance with the scale built by the author. Regarding the data source of financial indicators, the profile of the enterprise's board of directors and the source of market data is compiled by the author from information or reports on the websites of each enterprise, information from the stock exchanges. securities or websites such as vietstock, fiinpro, scafef, etc.

After construction, the data set of the study includes 271 listed companies classified into 10 different industry groups based on the Global Industry Classification Standard (GICS) developed by Morgan Stanley. Capital International (MSCI) and Standard & Poor's in 1999 are currently being applied by the Ho Chi Minh Stock Exchange.

The data set of enterprises is collected based on the following criteria: (1) Companies whose shares are listed on two Ho Chi Minh Stock Exchanges. Ho Chi Minh City (HOSE), Ho Chi Minh City Stock Exchange. Hanoi (HNX); (2) Companies that are active and not delisted during the study period from 2013-2019.

After being collected based on the criteria mentioned above, the data set of the article includes 1,897 observations.

Table 1. Summary of companies classified by industry group

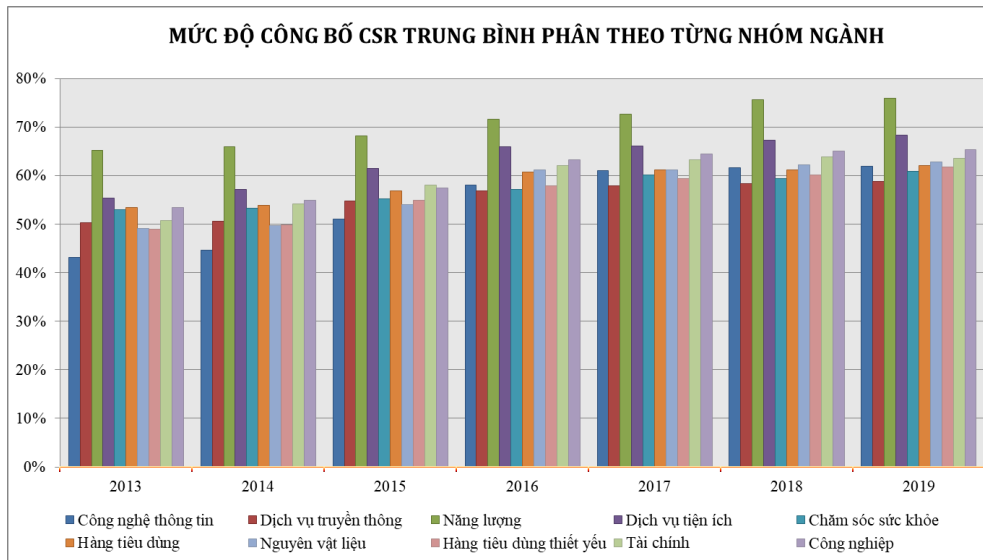
STT	Industry	Amount	Percentage
1	IT	7	2.58%
2	Communication service	9	3.32%
3	Energy	10	3.69%
4	Medical	18	6.64%
5	Utilize	26	9.59%
6	Material	32	11.81%
7	Essential consumer goods	37	13.65%
8	Consumers goods	42	15.51%
9	Finance	43	15.87%
10	Industry	47	17.34%
Tổng		271	100%

Source: Author's own compilation

1.4.2. Modal:

In addition, as shown in Figure 1, we also see that there are clear differences in CSR information disclosure between industry groups. In particular, CSR and component indicators are published more in groups of industries with activities that directly affect aspects of the environment - society such as activities of the energy industry, utility services, and technology. industry (Deegan and Gordon, 1996). Meanwhile, for industries that operate with little direct impact on the social environment, the level of information disclosure in indicators on social environment will be lower, such as the information technology and service industries. Communication and finance lead to total CSR results with differences in value across industry groups (Wisuttorn Jitaree,2015).

Figure 1: Average CSR disclosure by industry group



3.2. Analysis of regression results by GLS method:

After testing the defects from the models, the author uses the GLS method to overcome the phenomenon of variable variance and autocorrelation to ensure that the obtained model is unbiased and efficient. The running results for each model in turn are shown in **Table 4**.

Table 4: Regression results by GLS method

Data	CSR	ENV	HUM	PRO	COM
Constant	0.3630*** (14.38)	-0.0226 (-0.42)	0.5260*** (25.85)	0.6326*** (62.73)	0.0480 (1.23)
BSIZE	-0.0022 (-1.52)	-0.0058** (-2.01)	-0.0010 (-0.86)	0.0002 (0.41)	-0.0030 (-1.07)
BINDEPE	-0.0034 (-0.34)	-0.0170 (-0.85)	-0.0075 (-1.17)	-0.0001 (-0.03)	0.0046 (0.24)
POL	- 0.0118*** (-2.62)	-0.0179** (-1.98)	-0.0065* (-1.74)	0.0005 (0.26)	- 0.0243*** (-3.16)
FDSHIP	0.0052 (0.50)	-0.0125 (-0.57)	0.0035 (0.47)	-0.0014 (-0.41)	0.0376* (0.76)

BEDU	0.0200** (2.24)	0.0368** (2.12)	0.0044 (0.71)	0.0027 (0.86)	0.0253 (1.61)
OWNSTA	- 0.0324*** (-3.21)	- 0.0672*** (-3.10)	-0.0044 (-0.59)	- 0.0222*** (-5.17)	-0.0152 (-0.93)
OWNFOR	0.0519*** (2.71)	-0.0158 (-0.50)	0.0060 (0.37)	0.0232*** (3.19)	0.0285 (0.98)
FSIZE	0.0157*** (7.50)	0.0428*** (9.80)	0.0103*** (5.87)	0.0079*** (8.63)	0.0236*** (6.72)
BOLD	0.0016*** (5.33)	0.0039*** (5.73)	0.0001 (5.87)	0.0005*** (3.57)	0.0025*** (5.42)
AUD	0.0141* (1.95)	0.0066 (0.49)	-0.0022 (-0.38)	0.0052* (1.92)	0.0192* (1.74)
ROA	-0.0222* (-1.66)	-0.0155 (-0.57)	-0.0060 (-0.59)	0.0024 (0.91)	-0.0317 (-1.10)
Q	0.0062* (1.72)	0.0128* (1.87)	0.0006 (0.24)	0.0013 (0.93)	0.0195*** (2.58)
DEBT	- 0.0662*** (-5.72)	- 0.1490*** (-6.14)	- 0.0365*** (-4.64)	- 0.0138*** (-3.49)	- 0.1330*** (-6.12)
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000

Source: Analysis from

Stata 14.0 Note: The symbols (*) (**) (***) represent the significance levels of 10%, 5%, 1%.

3.2. Discussing the results of the study:

3.2.1. Board size:

According to the table of regression results, board size (BSIZE) shows a positive impact

on CSR and related aspects. This is explained as the existence of many members in the Board of Directors, including diversity in ethnicity, personality, working point of view, etc., thereby increasing the quality of opinions and diverse perspectives on many aspects of the problem to better perform advisory and supervisory functions for businesses (Dalton et al., 1999) and to strengthen the implementation of an increased quality CSR disclosure to the public (Akhtaruddin et al., 2009).

3.2.2. Independent members of the Board of Directors:

Like board size, independent board members show a non-statistically significant positive correlation with CSR disclosure and its aspects except for product-customer disclosure. This result shows that the existence of an independent member on the Board of Directors is an important factor to help the connection between the enterprise and stakeholders outside the enterprise better because they do not have any binding relationship with the enterprise and thus ensure a mechanism to monitor and evaluate the management behavior of managers, develop optimal risk management policies in the enterprise (Lorenzo et al., 2009). This result is consistent with the results of Patelli and Prencipe (2007), Amran et al (2013), Ngo et al (2017).

3.2.3. The Chairman of the Board of Directors has political connections:

The political relationship between the Chairman of the Board of Directors shows a negative correlation for the CSR index and its indicators except for HUM. This shows that when there is a political connection of the Chairman of the Board of Directors, the level of disclosure of corporate social responsibility information will be reduced, especially information related to the environment, resource management, human resources and community. This result is similar to the studies of Leuz and Oberholzer-Gee (2006), Belal et al (2015) and Li et al (2015).

3.2.4. Female members of the Board of Directors:

Female members of the Board of Directors: Female members of the Board of Directors:
Female members of the Board of Directors: Female members of the Board of Directors:
Female members of the Board of Directors: Female members of the Board of Directors:
Female members of the Board of Directors:

3.2.5. Education level of members of the Board of Directors:

The educational level of the members of the Board of Directors shows a positive correlation for the CSR index and the component indicators, in which the indicator of product - customer information shows a statistically significant positive correlation. 1% and the target on the community is 5%. This result shows that when a board member has a high level of education, it will promote the level of corporate social responsibility disclosure, especially on environmental issues, consistent with Sutton's research. and Moore (1985), Nina Smith (2006) and Ujunwa (2012).

State ownership:

For the group of ownership variables, the state ownership factor shows a negative correlation for CSR and the indicator components PRO and COM. This result is explained that the existence of state ownership does not bring positive value for corporate social responsibility (CSR) information disclosure because there is a problem of inseparability between ownership rights and ownership rights. ownership and control between the state and enterprises, thereby limiting the ability of the board to effectively monitor the effectiveness of the board (Jiang and Habib, 2009).

3.2.6. Foreign ownership

Contrary to the state ownership factor, the foreign ownership factor shows a 5% statistically significant positive correlation with the level of implementation of social responsibility disclosure (CSR) and other indicators. environmental, product – customer and community goals at 1%. This result is consistent with the comments of Haniffa and Cooke (2005), Barako (2007) when it is said that the existence of foreign ownership in the corporate structure will make the level of corporate social responsibility disclosure. (CSR) becomes higher, more transparent and clear.

3.2.7. Enterprise size:

Firm size factor shows the strongest correlation for CSR and component indicators. In which, in all indicators, this factor shows a positive correlation with statistical significance of 1%. This result is consistent with the studies of Cowen et al (1987); Meek, Roberts and Gray (1995); Ghazalo, Rettab et al (2009); Andrikopoulous (2014) the larger the size of the

enterprise, the more businesses will tend to disclose their social responsibility information in order to signal to stakeholders inside and outside the business such as employees, customers and investors about their performance level.

3.2.8. Business hours of operation:

Similar to the Business hours of operation of firm size, the duration of business shows a statistically significant positive correlation of 1% for the level of social responsibility disclosure (CSR) and other indicators. relate to . This result is also consistent with the research hypothesis of the author and the research results of Roberts (1992); Suchman (1995); Santos (2011) the longer the business is in operation, the higher the responsibility for implementing social responsibility disclosure will be because CSR is a useful tool for businesses to communicate values and important platforms. long- term importance that the company makes to contribute to society.

3.2.9. Auditing Unit:

The factor of the audit unit shows a statistically significant positive correlation of 1% with the CSR index and the component indicators, respectively. This result is consistent with the research results of Fargher et al (2001), Archambault (2003) and Bhayani (2012) that companies audited by Big4 will show a high degree of CSR disclosure. than companies not audited by Big4. Because large auditing firms like Big4 tend to invest more time in auditing financial information from businesses, on the other hand, to protect their reputation, they will also require businesses to present a complete presentation. sufficiently and comprehensively about the transactions as well as the activities arising during the period of the enterprise to review and give the most appropriate audit opinion (Phuong Nguyen Thi Bich, 2013).

3.2.10. Yielding:

Return factor (ROA) showed a positive correlation with no statistical significance with CSR. This result shows the agreement with the studies of Haniffa and Cooke (2005); Luethge and Han (2012) when the company's business profit is higher, the enterprise will have more funds for social activities, thereby leading to higher value CSR information disclosure. While contrary to the results of Inchausti (1997); Belkaoui and Kapik (1989) exist a negative relationship between profitability and CSR.

3.2.11. Market value:

Similar to the rate of return factor, the market value factor shows a statistically significant positive correlation of 1% for CSR and its indicators. This suggests that firms with high market valuation will exhibit good growth potential and will therefore implement better CSR disclosure to attract outside investors. invest more in enterprises than those with low market value, giving priority to improving organizational structure and building enterprises (Setyorini and Ishak, 2012).

3.2.12. Financial leverage:

Unlike the two factors in the same group, the financial leverage factor exhibits a statistically significant negative correlation of 1% for CSR and its components. This result is similar to the results in the study of Maskun (2013), the higher the corporate debt, the lower the level of corporate social responsibility disclosure because of adverse information sources related to the enterprise tends to be concealed to avoid affecting the source of investment capital as well as the business performance of the enterprise.

4. Conclusion and recommendations:

4.1. Conclusion:

Although the results show the level of social responsibility disclosure of 271 listed companies in Vietnam before the Covid-19 pandemic (2013-2019) only an average of 59.15% (table 4.3). However, the awareness level of enterprises has changed significantly over the years, whereby enterprises tend to publish more and more issues related to the environment, human resources, products and communities. in annual reports and sustainability reports (increased from 14.02% in 2013 to 74.91% in 2019), especially in businesses that have a direct impact on CSR and each CSR indicator.

4.2. Recommendations:

For the governments

Firstly, the Governments needs to standardize the requirements for the disclosure of corporate social responsibility information, and it is necessary to develop a common set of evaluation criteria such as a set of indicators or a common scale for all businesses. enterprises according to each industry group so that they can compare and evaluate the level of information

disclosure between enterprises and between industry groups.

Second, the state needs to develop a system of regulations on CSR disclosure, which should include in the Law specific regulations on environmental management, pollution control, food safety assurance, quality supply, and environmental protection. service quality, etc. as a mandatory regulation and with sanctions to deal with clear violations.

For Businesses:

First, corporate managers need to raise awareness of the impacts and benefits of social responsibility disclosure, and the nature of the problem.

Secondly, enterprises need to build an effective ownership structure for enterprises, in which it is necessary to increase the percentage of ownership from foreign shareholders to increase the level of CSR disclosure.

Third, enterprises need to choose the right reputable audit unit to increase the level of CSR disclosure.

Fourthly, businesses need to build an optimal financial structure with prioritizing the use of capital in the business before deciding to borrow or issue shares.

Sixth, for many businesses operating in specific fields that directly affect the environment and social life such as oil and gas, steel, food production, it is necessary to set up a CSR department to monitor, inspect the compliance and observance of state regulations in the treatment of emission and discharge systems, as well as properly licensed business activities that do not harm the ecosystem and living environment.

Finally, after the Covid-19 pandemic as well as the recent digitization trend, in order to help stakeholders keep up with information and learn more deeply about the issues and responsibilities of implementing CSR of enterprises. With the desire to put it into practice, in the future, the author is conducting research on an application APP that can integrate this set of indicators with relevant information about the business (appendix) for the SSC to easily track. and evaluation, businesses can look at their current CSR performance and that of other businesses to better adjust their operational strategies, and investors interested in CSR can know which businesses have potential to invest and develop.

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ECONOMIC RECOVERY AFTER COVID-19

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The world economy in the first 9 months of the year continued the recovery trend, although the growth rate was not as positive as the forecasts at the beginning of the year as it still faced strong outbreaks of the Delta variant. The economic recovery momentum is uneven among countries and regions of the world, depending on the ability to control the epidemic, vaccination rates and the level and effectiveness of the support packages. The latest report of organizations such as IMF, Wb, OECD, ADB ... forecast global economic growth in 2021 of about 5.6-6%, slightly down from the forecast at the beginning of the year; A rapid recovery in developed economies that have achieved high vaccination rates will offset slowing growth in emerging and developing economies, which have lower rates of vaccine coverage and still face epidemics. Currently, the date of the end of the pandemic has not yet been determined; therefore, most countries are tending to "live with Covid", control the epidemic and recover and develop socio-economic. For Vietnam, the economy in the end of 2021 clearly reflected the heavy effects of the pandemic. GDP growth in this time was estimated to decrease by -6.17%; in 9 months, GDP only increased by 1.42% over the same period last year, the lowest 9-month growth rate since the opening of the economy to date. Although the epidemic is gradually being controlled along with the faster progress of vaccine coverage, along with the adjustment of the epidemic prevention strategy to help more balance between ensuring people's health and recovery and socio-economic development; the agricultural, import-export sectors increased quite well and macroeconomic stability was ensured; but Vietnam is still facing a series of difficulties and challenges. Therefore, Science, technology and innovation become the most important input factors of modern production forces, the key determine the speed and quality of development of countries. The process of digitization and digital transformation takes place strongly globally, with the digital economy, smart manufacturing, digital society, etc. new morphology of consumption, lifestyle. The World Economic Forum (WEF) forecasts that by 2022, the digital economy will account for 60% of the world's GDP. Many forecasts say that the next 5-10 years are a very important period of digital transformation, and only in the next 2-3 years, the rapid popularization of 5G technology will create more very far-reaching breakthroughs in the scale and speed of information, globalization trends, the development of states, the correlation of strength and relations of nations. With the advantage of the latter, going straight into new areas of the digital economy, Vietnam has the opportunity to take advantage of the Fourth Industrial Revolution to break through, from a middle-income country to a high-income country, by transforming the growth model from growth based on integrated factor productivity (TFP). to knowledge-based growth.

Recognizing this opportunity, over the past time, our Party and State have led and directed all levels and sectors to promote the application, development of science, technology and innovation, research, grasp, improve access capacity and actively participate in the Fourth Industrial Revolution. Vietnam has not only become the most successful country in controlling and repelling the pandemic, but also makes good use of this opportunity to implement national digital transformation. In the past period, we have witnessed a great change in the application of technology to the activities of government agencies, especially the health and education sectors. Enterprises have actively applied technology, changed the way and model of operation to adapt and develop. Vietnam is one of the few countries developing the most information technology applications in covid prevention. There have been nearly 1,000 individuals from dozens of technology companies, together building more than 20 applications to serve people, society, serving the authorities. However, the immediate challenges are not easy to overcome. The Covid-19 pandemic has impacted and affected many aspects of the economy, causing great damage in many industries and fields. The economic growth rate in 2020 did not meet the set plan due to the great impact and influence, in addition to the forecast of the Covid-19 pandemic, leading to the average growth of 5 years 2016 - 2020 not meeting the set target. In particular, many industries and fields are heavily affected; the number of businesses shutting down increased sharply. The resilience of the economy is not very solid; competitiveness and autonomy are limited. Development of synchronous and modern infrastructure has not met the requirements. Therefore, the Party and the State have a firm belief that, with the consensus and cooperation of the community of more than 100 million Vietnamese at home and abroad, with the companionship of 5.3 million Overseas Vietnamese are growing stronger, of which 500,000 intellectuals, Experts in many key fields such as informatics, telecommunications, electronics, new materials, machine manufacturing, biology ... , we can completely turn "danger" into "muscle" and realize the goals and aspirations of the nation.

THE COVID-19 EPIDEMIC HAS BROUGHT UNPRECEDENTED CHALLENGES TO VIETNAM IN PARTICULAR AND TO THE WORLD IN GENERAL

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The Covid-19 epidemic has brought unprecedented challenges to Vietnam in particular and to the world in general. According to ADB, IMF, FitchRatings, Research and Analysis by PwC, Vietnam is one of the few countries that will continue to grow in 2020. In addition, in 2020 Vietnam ranks 22/60th in terms of digital speed. and 48th out of 60 countries with the fastest digital economy transformation in the world. From the perspective of our students, in the digital economy development space, Vietnam has many opportunities for breakthrough development. Vietnam has realized the following advantages:

One is that data is an invaluable resource in the digital economy, through the mass convergence of new technologies such as Big Data, Cloud Computing, AI.

The second is the new digital technology that brings great impact to fields such as information technology, communication, transportation, health, etc.

Third, technology has put consumers in the central position, through which consumers become more entitled, they are free to share and propose ideas.

From the above, from the student's perspective, it can be seen that Vietnam has relied on the understanding of the advantages of digital transformation and digital technology, and has constantly promoted the policy of creating a legal environment to promote the establishment of the Government. electronic coating.

Regarding policies, laws, and e-government governance in the Digital Economy - Digital Society, ministries, branches and localities have made great efforts and achieved many good results during the implementation process. building the e-Government, the electronic information system was put into operation, gradually improving the transparency and responsibility of the staff. In addition, we still have to acknowledge the fact that Vietnam is only modestly ranked in this area in this area, there are still many places where the construction and implementation of e-Government tasks are still very slow and even only formalistic. Therefore, the first optimal solution is to clearly define the roadmap and more specific tasks, thereby linking the application of information technology with the reform of administrative procedures and working methods, especially. It is necessary to promote the role of information sharing and take action more clearly for the people.

It can be said that argument shifting is the combination of digital technology in many different fields to bring about positive effects, the benefits that it brings is a commercial revolution, and at the same time, it also changes the world. transform business models and take e-commerce development to the next level. Specifically, services such as Grap - the most popular convenient ride-hailing application in Southeast Asia today, is a type of digital technology application that has achieved amazing achievements. Although Grap does not

own any cars, through the service designed on the app, it has given consumers a lot of tools that are both cheap and convenient.

Since then, if students and students can correctly apply the resources in the digital technology, the career orientation problem will have more ways of implementation. Through today's career-oriented websites, choosing a career is no longer a strange thing, just by going online, students can find out a lot of information related to the profession, thereby making informed decisions. more accurate, more balanced decisions in the division of human resources.

Today's global citizens enjoy a global education that combines foreign languages, knowledge and skills in information technology, and an objective understanding of the natural and social world. in terms of thinking capable of analyzing and synthesizing towards promoting the development of human society.

Thus, for our students - who have inherited a good education, the awareness of becoming a global citizen is an important part of the responsibility. Thereby, Vietnamese students should have the following skills:

Firstly, develop the ability to be creative, work independently, work as a team, think critically, and integrate in multicultural environments.

Second, not afraid of the challenges in the 4.0 technology era, actively learning non-stop to survive, adapt and live together.

Third, it is dynamic, has wide relationships, and is international in nature. From there learn more about the customs and culture of different countries.

Fourth, understand the knowledge of integration, grasp the views, policies and laws related to migration, human rights and freedoms of different countries in order to protect themselves and keep them safe. maintain the qualities and traditions of the Vietnamese people.

RESEARCH THE IMPACT OF COVID-19 ON THE DIGITAL ECONOMY - DIGITAL SOCIETY IN VIETNAM

Vo Thi Kim Nhi

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The first word

First of all, I would like to sincerely thank the organizers for creating all conditions for students across the country to participate in the scientific forum. The topic of "Digital economy - digital society" I would also like to thank the board of directors of Nguyen Tat Thanh University, where I am studying. We have provided opportunities and support to our students.

Commitment.

I would like to commit to the essay below, which is done by me and consulted from teachers and all accurate information from the press to social networks. If you quote or refer to the article, you will quote the source clearly and accurately. I promise!

I. Overview

- COVID-19 pandemic begins in Wuhan - China, exactly on November 17, 2019 so far (2 years and 7 months) The pandemic has raging the world. With somany times the world has to struggle to fight the pandemic and affect thedigital economy and the world's digital society. There's also Vietnam! So what is the digital economy? What is a digital society? How influential is it? Which covid-19 pandemic makes photos and causes so much damage?

II. What is the digital economy?

According to the Oxford Digital Economy Collaboration group, the digital economy is understood to be an economy that operates primarily based on digital technology, especially electronic transactions conducted through theInternet. The digital economy covers all sectors and economies. (industry, agriculture, services; production, distribution, circulation of goods, transportation, logistics, banking and finance, ...) Digital technology is applied.

In essence, we can see that these are organizational models and the mode of operation of the economy based on the application of digital technology. We can easily see every day the manifestations of digital technology appearing anywhere in life such as e-commerce sites, online advertising or applicationson eating, transportation, delivery,... also integrate digital technology to meet convenient needs for customers. But on a more macro level, the digital economy also makes a significant contribution to the integration of Vietnameseenterprises enter the global technology chain and create great economic values that promote the development of the country.

III. What is a digital society?

The concept of digital society. Digital transformation in society aims to forma digital society. The digital society, in a broad sense, embraces all human activities. The main driver of the digital society is digital technology, based on the rapid growth of information and data, it changes every aspect of the social organization, from the government, the economy to the people. The digital society, in a narrow sense, consists of digital citizens and digital culture. In this sense, the digital society, along with digital government and the digital

economy forms the three pillars of a digital nation.

IV. The impact of covid-19 on the world and vietnam

A. For the world

Impact on the economy

Experts say covid-19 outbreak is creating two major challenges:

- + Uncertainty caused by Covid-19, especially in the context that the world has not been able to accurately assess the level of danger, the time to control the epidemic.
- + Negative impact from measures to prevent pandemics.

These two factors have a huge impact on the global economy, from supply chain disruptions, supply and demand relations, to the reduction of demand, changes in consumers' spending and travel habits, leading to stagnant production, increased unemployment, leading to the risk of default, bankruptcy of the business and the psychological fear of risk, even panic of financial investors.

In the context of the slowing global economy growth, the epidemic appeared in early 2020 creating a resonance factors that lead to far-reaching fluctuations in global commodity and financial markets

Impact on society.

- + The Covid-19 epidemic has been and will continue to cause a series of bankruptcies in each country, as well as globally.
- + This is followed by a reduction in total social and family demand. increase unemployment, put strong pressure on the work of ensuring welfare income and employment on both national and international scales. Against this backdrop, many countries have launched multibillion-dollar bailouts to help businesses and workers overcome the immediate difficulties...
- + In addition, the impact of the employment crisis on some labor groups will be uneven and increase inequality. Those affected include those who are less protected and do low-paid jobs, especially young and elderly workers.

B. Impact on Vietnam

1. Impact on the socio-economic.

+ According to economists, the COVID-19 epidemic has a very strong impact, even seriously affecting Vietnam's socio-economic because its impact is multi-dimensional on all sectors of the socio-economic economy

+ With 3 main impacts on growth, investment and trade, disruption of important production value chains, the decline in consumption has a major impact on services and tourism. Specifically, the impact on each field is as follows: 1 International trade.

2. The economic slowdown as well as the temporary closure of China's borders It also disrupts the country's trade relations with the world, including Vietnam. The stalled import and export situation causes import and export taxes.

3. According to the General Department of Customs, in February, the revenue from import and export activities reached VND 23,700 billion, down more than VND 2,300 billion compared to January, the average daily revenue in the first two months of this year is about VND 1,308 billion, VND 150 billion less than the same period in 2019.

* Lê Quân, 2020,

<https://baodautu.vn/fitch-solutions-du-bao-ung-pho-Covid-19-gdp-viet-namchi-tang-63-nam->

[2020-d116702.html](#) accessed February 26, 2020

4. In addition, machinery, equipment and spare parts had an import value of \$2.5billion, down nearly 4 percent from January. Iron and steel imports of all kinds also decreased by nearly 9%. output, only reached 900,000 tons. In 2020, the assigned budget revenue of customs is VND 338,000 billion, so each month must collect nearly VND 28,200 billion.

5. The tourism industry.

+ It can be said that the tourism industry is the industry most seriously affected by the number of visitors from abroad. as well as domestic travel will be restricted due to concerns about the spread of covid-19. According to the General Department of Tourism Vietnam's tourism industry is estimated to lose "between \$6 billion and \$7 billion" in the first two quarters of the year by Chinese tourists alone, it will be reduced by 90-100%.

*Anh Minh, 2020,

<https://vnexpress.net/kinh-doanh/moi-ngay-giam-150-ty-dong-thue-xuat-nhap-khau-viCovid-19-4062296.html> accessed March 1, 2022