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TIỂU BAN 1:
THANH NIÊN VỚI NHỮNG GIẢI PHÁP CÔNG NGHỆ THÚC ĐẨY CHUYỂN ĐỔI SỐ

AGUS: AGRO AROUND US INTERACTIVE PLATFORM FOR THE DEVELOPMENT OF AGRO INDUSTRY

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INFORMATION

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Agriculture, Platform, Investment, Market, Education

ABSTRACT

Due to the introduction of new radiotherapy treatment modalities and increased number of cancer patients, there is a higher possibility for increased workload of radiotherapy machines and higher leakage radiation. Therefore, the aim of this study is to assess workload and use factor for Varian medical linear accelerator at Apeksha hospital, Maharagama, Sri Lanka. The survey was conducted for 8 weeks from 2nd week of July 2022 to 4th week of August 2022 with 6 and 15 MV x-ray energies. All relevant data pertaining to work load and use factor of selected medical linear accelerator were accumulated. The retrieved data from ARIA treatment Management System transferred into Excel spreadsheets. According to the 8 weeks survey of this study, the average number of treatment sessions (Txs), dose delivered to isocenter and number of monitor units delivered per week from 2nd week of July to 4th week of August were 466 Txs, 1240.83 cGy, 262546 MUs; 425 Txs, 1131.75 cGy, 240460 MUs; 454 Txs, 1249.81 cGy, 266891 MUs; 436 Txs, 1346.68 Gy, 298943 MUs; 500 Txs, 1391.31 Gy, 306935 MUs; 450 Txs, 1254.12 Gy, 276488 MUs; 473 Txs, 1414.60 Gy, 302031 MUs and 461 Txs ,1332.45 Gy, 297385 MUs respectively. 62% of dose was delivered by 6 MV photons at isocenter and the remaining was delivered by 15 MV photons. The calculated average weekly workload for both energy photons is 1295.19 Gy. The estimated workload is

higher than the NCRP recommended 1000 Gy per week for linear accelerators up to 10 MV photons and additionally 500 Gy per week for higher energy linear accelerators. The cardinal gantry angle was found out as 0–300. This study recommends to perform at least one-year survey to identify the accurate workload to assess the shielding verification.

1. Background

As a country known as an agricultural country, Indonesia has extraordinary agricultural sector potential. For a long time, Indonesia has always been rich in agricultural products, such as rice, corn, peanuts, sweet potatoes and others. From 2018 to 2021, the agricultural business sector (without forestry and fisheries) had an average contribution of 9.82% to Indonesia's GDP, becoming the largest sub-sector of the agriculture, hunting and agricultural services sectors, the second highest sectors in the business sector. Indonesia's GDP after the processing industry sector (Center for Agricultural Data and Information Systems, Ministry of Agriculture, 2022).

This is inseparable from the vast agricultural land in Indonesia. As an illustration, the rice harvest area in Indonesia in 2022, based on BPS data, is 10.45 million hectares. However, the agricultural sector in Indonesia still has several problems, including increasingly difficult land, capital, modern agricultural technology, fertilizer issues and marketing.

Increasingly difficult land problems in the agricultural sector result from land conversion. The increasingly limited agricultural land is marked by the change in farming activities from farming to non-farming businesses. According to data from the Ministry of Agriculture of the Republic of Indonesia, the conversion of agricultural land reaches 90 thousand to 100 thousand hectares per year (Nasution, 2023).

Construction of housing on agricultural land is one of the reasons for land conversion. This can be understood from the increasing need for housing, which is proportional to the increase in population. Apart from that, establishing factories and infrastructure on agricultural land is also a reason for changes in land function. This is inseparable from the government's program to increase the country's economic growth.

Another problem is capital in the agricultural sector. To carry out agricultural activities, quite a large capital is required. Small-scale farmers are still limited in access to capital sources. Moreover, unpredictable weather, the urgency of

adopting modern agriculture, the high price of fertilizer, and marketing costs are always considerations for agri-business players when starting their agricultural activities.

This results in the achievement of agricultural production that is less than optimal. As a result, people's interest in farming is reduced. Even in a survey conducted byJakpat, it was found that only 6 out of 100 Generation Z aged 15 - 26 years old wanted to work in the agricultural sector. This problem in the agricultural sector cannot be ignored, considering that agriculture is a fundamental human need.

Therefore, solution actions that can target the problems of the agricultural sector need to be carried out.

2. Purpose

The purpose of this research is empowering farmer groups, increasing the welfareand productivity of farmers by using AGUS, a platform where consumers and producers can communicate directly.

3. Research method

In this study, we have adopted a discourse analytic approach to better understand the current societal meaning- and decision-making processes related to the digitalization of agriculture. In this way, we highlight and acknowledge the central role of societal discourses in shaping policies.

The method in this article uses a literature study, which is a method of collecting data by understanding and studying theories from various literature related to this research. The library materials obtained from various references are explained critically and must be in-depth to support the propositions and ideas. The data collection uses ways to find sources and construct from various sources, for example, books, journals, and research that has been done.

The development concept in this article uses the agile method, which is a methodology in software development based on an iterative process consisting of rules and agreed solutions. This method is also carried out with a structured and organized collaboration system between teams.

4. Literature review

Agriculture

Agriculture is one of the key sectors in the economy of a country where land, plants, and animals are involved in producing food and other foodstuffs such as fuel, fiber, or drugs (Widjaja, 2016). Basically, agriculture only covers five

sectors in general, namely the food crops, forestry, plantations, livestock and fisheries sectors. From these 5 sectors, it can be concluded that agriculture is the activity of managing human biological resources.At times, there is a high level of agricultural potential, but it is because of the lack of knowledge about the market as it meets with prosuden and the consumer as well as the market price, demand and supply, so that farmers can only accept the market price that is generally decided by intermediary traders.

As a result of this event, the high price of the producers and the larger markets was obtained by middlemen in even the worst situation of the producers to earn only that the cost of production was without a penny. Hence, science and technology need to be implemented in order for farmers to know market information.

Agro-Investment

Foreign direct investment that engages in sustainable commercial agriculture can generate significant benefits. Investing to bring hitherto uncultivated land into

5. Agro-Investment

Foreign direct investment that engages in sustainable commercial agriculture can generate significant benefits. Investing to bring hitherto uncultivated land into production can generate jobs and increase local incomes directly and through forward and backward market linkages that attract complementary investment. It can deepen export markets, improve access to technology, inputs, and output markets such as through bulk purchases or sales agreements. Direct investment and new agribusiness ventures can also help to diversify rural economies (Vera, 2009).

Establishing local land use plans to help bring the interests of communities and investors into line, and in a way that is consistent with sustainable resource use, is an essential element in ensuring that the most suitable land is selected for a given purpose. It can also reduce the danger that highly productive or ecologically sensitive land will be diverted to marginal uses, and provide investors with critical information on agro-ecological conditions on a given tract of land, and the status of existing rights to that land.

Digitalization

The digital era is also called the information era, where information has become a fundamental necessity and a new commodity. Such an era is fudged by the development of information technology that accelerates and increases accuracy in record-keeping and data processing into information.

Marketing activities are undertaken to sustain and sustain an effort (Mufti, etc., 2018). The activity also includes product recognition strategies and attracts consumers to purchase and continue to use products offered on short intervals. The promotion of sales is a marketer's business to promote and influence other consumers or traders to be attracted to the sale of consumer goods (Ayunda, 2010). One of the innovations in launching the marketing process is that the switch USES e-commerce. McLeod Pearson (2008), says that electronics or e-commerce is the use of communications and computers to carry out such business processes as using a web browser to buy and sell products. E-commerce in marketing will have a very high impact on efficient marketing systems because its marketing uses Internet media that unfettered consumers can access.

6. Result and discussion

Agriculture is the bedrock of the national economy, and the rural economy is an integral part of the modern economic system. AGUS is an essential part and strategic direction of the agricultural vitalization strategy. AGUS is a website-based platform that makes it easier for the public to access and engage with the Agro- industry, from being a direct intermediary between producers and consumers to creating economic cooperation. With the slogan 'Agro Around Us' this platform provides services to the public anywhere and anytime so that it is very efficient and effective for use by various groups of people. This platform service is divided into 3 sectors, namely A-Ket, a service for buying and selling agro-industrial products, A- Invest, an opportunity for the public to invest in the agro-industry and A-EFarm, as a means of paying for the Agro community.

7. Services

A-Ket

A-Ket is one of the services owned by the AGUS platform to make it easy for the public as consumers to buy various agro products directly from the producers. This service is considered capable of cutting various costs and time that usually occur with a product before it reaches consumers. So, it can be presented to the public at a more affordable price (BKP, 2018). On the other hand, the efficiency of communication between producers and consumers can provide better food quality due to a shortened buying and selling process.

This service also comes with a pre-order feature. This feature aims to provide food certainty to the community and at the same time provide business continuity to partners. The pre-order feature also helps partners with risk analysis and more detailed supply-demand analysis. So this service can create benefits for both parties.

The presence of this service can certainly work together with government agencies, one of which is in Indonesia, the Food Security Agency (BKP) to supervise and control food production in various regions to create food safety.

A-Invest

Agriculture investment is an investment service feature where individuals or organizations provide funds or capital to support agricultural activities carried out by farmer partners. Through this website platform, people can provide capital by choosing partners. Just like buying stocks, investors can choose partners according to their wishes. Farmer partners can also input land descriptions, details of the agricultural needs they need, and other information. When an investor is interested in a partner, the platform will provide an investment nominal that the investor can purchase.

In agricultural investment, the investment will impact the harvests produced by farmers or partner agricultural entities. The harvest results will be shared between investors and farmer partners according to previously agreed agreements. The distribution of this harvest can be done based on a certain percentage of the total harvest or based on a predetermined profit scheme. Agricultural investment aims to provide multiple benefits, namely providing financial support to farmers or local agricultural entities to increase their agricultural production, while investors can get a return on investment from the crops they produce. This is also one way to support local agriculture, improve the welfare of farmers, and promote food security in an area.

A-Efarm

On the AGUS platform, there is an A-EFarm service that aims to empower farming communities through increasing understanding, and sharing experience, and also opening opportunities for young people to have work experience in agriculture through the Appreciation program. In the agro-edu sector, 2 sub-services are being developed:

A. Sharing With Us

The sharing with us feature is a sub-feature that allows agro- entrepreneurs to be able to discuss among themselves on the samepage. The following are some of the functions of the sharing with us features:

- Increasing relations between farmer entrepreneurs.

- As a place for discussion and exchange of experiences for agricultural entrepreneurs. For example, farmers can share their newly discovered farming experiences/processes and disseminate them to other farmers.
- The sharing with us feature allows farmers to create statuses, upload posts,and create experience blogs.

B. Agro-Apprenticeship

One of the most important hurdles for farming is generational renewal. If innovative, energetic, and passionate young people are not attracted to the agricultural sector, producing enough food for a growing population will be impossible. The Agro-Appreciation feature is a sub-feature that connects farmers with apprentices who are interested in working in agriculture. In this feature, the Earn While You Learn system is developed, thus encouraging and opening up great opportunities for the younger generation to continue to develop agricultural businesses. This Appreciation activity is primarily beneficial for the younger generation who cannot afford to continue their undergraduate studiesdue to funding constraints to maintain job inclusiveness and open up job vacancies.

Agro-Learn

The Agro-Learn feature is a sub-feature that provides online information and training to farmers regarding agricultural science. This aims to empower and improve the skills and knowledge of farmers. We believe that the most important thing in a community is the form of sustainability of the community itself. One way to ensure community sustainability is by providing training features.

Ad Hoc Training

The examples include live streaming e-commerce, key talent training, live streaming e-commerce training for first secretaries and officials fielded in villages, and cross-border e-commerce key talent training.

Special Talents Fostering

Special Talents Fostering was established to fosterentrepreneurship in e-commerce, which is much encouraged to support sidelines with local poverty alleviation.

Talent pool and business incubation

This program aims to nurture talents with managerial capacity and operational skills, attracting rural youth to form a highly competent group of pragmatic talents.

Implementation stage

Conceptualization

The AGUS platform was conceived after conducting thorough market research to understand the agricultural sector's needs. This initial phase involved creating a detailed business plan that outlined the platform's objectives and revenue model.

Platform Development

A dedicated web development team was hired to create the AGUS platform. The website was designed with user-friendliness, responsiveness, and security in mind. Additionally, the team considered the development of a mobile application to accommodate mobile-based transactions.

Partner Onboarding

AGUS invited farmers and agro-industry producers to join the platform. They received guidance on how to list their products effectively. Simultaneously, efforts were made to attract potential investors by highlighting the advantages of agricultural investment through AGUS.

Platform Testing

A beta version of AGUS was launched to a select audience for rigorous testing. Feedback was collected and analyzed to refine the platform. Quality assurance measures were implemented to eliminate bugs and enhance security.

Marketing and Promotion

AGUS developed a comprehensive digital marketing strategy that leveraged social media, email marketing, and online advertising channels. Strategic partnerships were established with agricultural organizations and governmental agencies to promote the platform.

Launch

AGUS was officially launched following successful testing and marketing efforts. An engaging launch event was organized to generate excitement and attract early users.

User Support and Education

A robust customer support system was set up to address user queries promptly. Educational resources, including guides and tutorials, were created to empower users to make the most of the platform.

Monitoring and Improvement

Advanced analytics tools were integrated to monitor user behavior, track sales, and gather data for continuous enhancement. A systematic feedback loop was established to encourage users to provide insights and suggestions for ongoing improvements.

Legal and Regulatory Compliance

Legal experts were consulted to ensure AGUS complied with local and international laws and regulations. Stringent measures were taken to prioritize data security and user privacy, fostering trust among users.

Scaling and Expansion

As AGUS gained popularity, strategic considerations were made to expand the platform regionally or even internationally. Continuous feature enhancements were implemented based on user feedback and emerging market trends.

Impact Assessment

Ongoing assessments were conducted to measure the social and economic impact of AGUS on farmers, investors, and the broader agro-industry. Sustainability measures were prioritized to ensure the long-term viability of AGUS's operations. This narrative-style representation outlines the step-by-step journey of AGUS, from its conceptualization to its transformation into a platform that connects agriculture and investment, all while maintaining a strong user-centric focus.

Conclusion

The AGUS platform emerges as a pioneering force in Indonesia's agricultural sector, providing a timely solution to the sector's pressing challenges. With its holistic approach through services like A-Ket, A-Invest, and A-EFarm, AGUS is orchestrating a transformative shift by fostering direct interactions between producers and consumers, promoting agricultural investment, and enhancing farmers' community through training, learning, and apprecintenship programme.

By addressing issues like land conversion, capital access, and market knowledge, AGUS is poised to enhance agricultural productivity, uplift farmer livelihoods, and bolster food security, cementing its role as a catalyst for positive change in Indonesia's agricultural landscape. In essence, AGUS epitomizes the transformative power of digital innovation, promising a brighter, more sustainable future for Indonesia's agriculture and its stakeholders.

The implementation of AGUS followed a well-structured life cycle, starting from conceptualization and market research to full-scale development, testing, and launch. The platform prioritizes user-friendliness, security, and efficiency, ensuring that it meets the diverse needs of its users.

Through strategic marketing efforts and collaborations with agricultural organizations and government agencies, AGUS has successfully gained traction in the agricultural landscape. The platform's commitment to user support and education ensures that users can maximize its benefits.

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ARTIFICIAL INTELLIGENCE: PIONEERING THE FUTURE LANDSCAPE OF DIGITAL TRANSFORMATION

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INFORMATION

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Digital Transformation, Artificial Intelligence, Innovation, Opportunities, Challenge

ABSTRACT

In an ever-evolving landscape of technology, the convergence of both Artificial Intelligence (AI) and digital transformation are revolutionizing various industries, propelling organizations towards unprecedented avenues of growth and innovation. This research paper intricately examines AI's profound role in digital transformation trajectory. By harnessing AI's cognitive prowess to analyze vast datasets, organizations can unlock insights that fuel strategic decision-making and predictive modeling. The amalgamation of AI with automation streamlines operations, boosting productivity and operational efficiency. Moreover, AI-driven enhancements in user experiences, encompassing personalized interactions and predictive interfaces, elevate engagement and satisfaction. While the paper underscores AI's transformative potential, it also conscientiously addresses the moral, privacy, and accountability concerns that arise alongside it. Through interdisciplinary collaboration and meticulous governance, these challenges can be navigated. The paper ultimately underestimates that AI, as an avant-garde catalyst, positions organizations on the front-line of innovation and adaptability, charting an uncharted course in the digital age.

1. Introduction

In the rapidly evolving digital landscape, the integration of Artificial Intelligence (AI) serves as a pivotal catalyst, reshaping industries and enabling unparalleled avenues for growth and innovation. This paper delves into the

transformative partnership between AI and digital transformation, exploring their multifaceted impacts on businesses and customer engagement. As AI evolves from a theoretical concept to an operational reality, organizations worldwide harness its capabilities to drive digital evolution and seize the potential of this symbiotic relationship (Perifanis N-A, Kitsios F, 2023).

By utilizing AI-driven automation, service providers can offer reliable 24/7 support through AI-supported software applications, enabling humans to manage conversations and interact with users using audio or text messages instead of direct exchanges with live agents (also known as chatbots) (Andrade, I.M.D. and Tumelero, C, 2022)). Moreover, intelligent data analysis can facilitate personalized interactions, optimize workflow processes, and reduce costs for organizations and businesses.

With AI swiftly becoming a core technology in the digital transformation journey, its role cannot be understated. Recent reports from the Statista shows that the overall artificial intelligence market is forecast to grow annually by more than 100 percent each year up to 2025 (see figure 1) (Arne Holst, 2018), underscoring the swift acceptance and integration of AI technologies within global enterprises. This signifies the escalating recognition of AI's potential to revolutionize business landscapes across various sectors.

Figure 1: Market size and revenue comparison for artificial intelligence worldwide from 2016 to 2025 (in billion U.S. dollars)

Source(s): Grand View Research; MarketsandMarkets; IDC; Tractica; Frost & Sullivan; Statista; UBS

AI, in essence, involves the creation of algorithms and software tools that emulate human cognitive functions, enabling machines to perform intelligent tasks (Duan, Y et al, 2019). This paper seeks to unveil AI's multifaceted role in digital transformation, emphasizing its applications, benefits, and the profound changes it instigates across numerous industries.

The amalgamation of AI and digital transformation yields transformative outcomes across diverse sectors, from national security to healthcare, communication, and education. The paper scrutinizes AI's potency in enhancing organizational scalability and adaptability in ever-changing environments. By facilitating predictive modeling, informed decision-making, and automation, AI empowers businesses to optimize operations, boost productivity, and offer unparalleled user experiences.

As the paper unfolds, it will uncover the profound impacts of AI on various facets of digital transformation, including customer relationship management, operational efficiency, personalized interactions, and more. Furthermore, it will delve into case studies, examples, and real-world applications that showcase AI's role in driving digital transformation across diverse industries.

It is evident that digital transformation is currently a prevailing trend among organizations and businesses. The integration of the digital transformation process is garnering considerable attention due to its numerous benefits for both organizations, businesses, and customers. AI and digital transformation are believed to be intertwined; however, concerted efforts are required to maximize the potential of this symbiotic relationship. Digital transformation calls for new structures, innovative technologies, and, most importantly, a fresh mindset in relation to customer engagement.

2. Findings

Overview of AI and digital transformation

AI and digital transformation are closely interconnected concepts that are transforming businesses and societies.

AI refers to the development of computer systems or machines that can perform tasks that typically require human intelligence (Kaplan and Haenlein, 2019). This includes tasks like speech recognition, visual perception, problem-solving, decision-making, and language translation. AI technologies, such as machine learning and deep learning, enable systems to learn from data, adapt to new situations, and improve performance over time. AI is being applied across various industries, including healthcare, finance, education, manufacturing, retail, and transportation, to automate processes, enhance productivity, and drive innovation.

Digital transformation, on the other hand, refers to the integration of digital technologies into all areas of business operations, processes, and models to fundamentally change how organizations deliver value to customers. It involves leveraging digital tools, such as cloud computing, big data analytics, the Internet of Things (IoT), and AI, to streamline operations, improve efficiency, enhance customer experiences, and unlock new business opportunities (Sascha Kraus et al, 2022). Digital transformation encompasses not only technological changes but also organizational and cultural shifts that enable organizations to embrace digital technologies and adapt to the rapidly evolving digital economy.

AI plays a crucial role in digital transformation initiatives. It enables organizations to utilize the vast amount of data generated by digital technologies and extract valuable insights to make informed decisions. AI-powered systems can automate repetitive tasks, optimize processes, and improve overall operational efficiency. AI-driven analytics can identify trends, patterns, and anomalies in data, enabling organizations to make predictions and take proactive actions. Additionally, AI-powered chatbots and virtual assistants are transforming customer interactions by providing personalized and responsive experiences.

In short, AI and digital transformation are intertwined, with AI serving as a catalyst for driving and enabling digital transformation efforts. By harnessing the power of AI, organizations can leverage digital technologies and data to gain a competitive edge, drive innovation, and meet the evolving needs of customers in the digital era.

AI's Multi-Faceted Role in Digital Transformation

AI offers a promising outlook for the digital landscape, serving as a technology that leverages digital capabilities to perform tasks once solely reliant on human intelligence. AI essentially mimics human thinking and learning processes, especially within computer systems. Its standout feature lies in its ability to self-learn, allowing computers to predict outcomes and analyze new data autonomously. Furthermore, AI exhibits exceptional prowess in processing extensive data at remarkable speeds.

In the realm of digital transformation, AI plays a multifaceted role, equipping organizations with a robust toolbox for instigating change and fostering innovation (Gregory Vial, 2019). One of the key domains where AI makes a substantial impact is in enhancing automation and efficiency. By employing technologies such as Robotic Process Automation (RPA), AI takes charge of automating repetitive tasks, liberating human resources to focus on strategic initiatives.

AI's capabilities in data analysis and insight generation are invaluable, enabling organizations to extract profound insights from extensive datasets and steer their decision-making with data-driven precision (Akhtar, P., 2019). Predictive analytics and forecasting also receive a significant boost from AI, empowering businesses to anticipate future trends and market demands. Furthermore, AI becomes a catalyst for product development and innovation by enabling organizations to identify market trends and understand consumer preferences. This facilitates swift prototyping and more informed decision-

making processes. AI's role in risk management and fraud detection is vital, as it excels at detecting anomalies and patterns indicative of fraudulent activities.

Additionally, AI contributes to optimizing processes, resource allocation, and augmenting decision-making capabilities, ultimately enhancing overall operational efficiency. However, the integration of AI into an organization's processes demands a cautious and tailored approach, taking into consideration specific needs, challenges, and essential elements such as thorough planning, effective data management, talent acquisition, and adept change management (Brock, J. K.-U., & von Wangenheim, F., 2019).

American computer scientist John McCarthy first introduced the concept of AI in the 1950s (Hau Giang Online Newspaper, 2022). Since then, AI has been continuously evolving and developing for over seven decades. Notably, AI has accelerated its progress in the past decade, with a growing number of patent disclosures. This demonstrates that AI delivers tangible value in applications and holds significant potential for the future.

AI technology offers diverse capabilities, including virtual shopping services, online banking, automation, expert systems, speech and computer vision recognition (identifying faces, objects, or text), crowd trend estimation, and even automated responses. AI has found applications in various sectors, such as healthcare, education, banking, security, transportation, and telecommunications. It reduces the burden on human resources, lowers production costs, enhances healthcare diagnostics, and propels development across industries, positively impacting the lives of many.

According to projections by financial auditing and consulting firm PwC, by 2030, the global GDP could increase by an additional 14% due to the support of artificial intelligence (Hau Giang Online Newspaper, 2022). Therefore, researching and applying AI technology in various fields is imperative in the current era. AI has already begun shaping a promising digital future with limitless creativity and potential.

Opportunities and Challenges of AI Application in Digital Transformation

AI holds a wealth of promise for organizations embarking on the digital transformation journey. Within this landscape, several key opportunities arise, each with the potential to significantly impact business operations and outcomes. First and foremost, AI's ability to automate manual, repetitive tasks present a remarkable opportunity. Organizations can redirect their efforts towards more strategic and value-added activities by relieving human resources of these routine

responsibilities. The result? Enhanced operational efficiency, reduced costs, and improved overall productivity.

Another avenue where AI shines is in the realm of customer experiences. Leveraging technologies such as natural language processing and machine learning, organizations can craft personalized and seamless interactions for their customers. Chatbots and virtual assistants powered by AI, can engage with customers, respond to inquiries, and offer tailored recommendations. The outcome is heightened customer satisfaction and loyalty, ultimately driving business growth.

Furthermore, AI unlocks the power of data-driven insights. With AI-driven analytics, organizations can sift through vast volumes of data, extracting invaluable insights that guide data-driven decision-making. This empowers businesses with enhanced business intelligence, more accurate forecasting capabilities, and well-informed strategic planning, setting the stage for success in a rapidly evolving digital landscape.

However, like any other technology, AI presents inherent risks such as job displacement, labour market shifts, personal and national security threats, potential biases towards specific groups or nations, and increased inequality among individuals and countries. To thrive in the age of AI, young people should continuously improve themselves, engage in self-learning, and strive to become outstanding students during their educational years and exceptional professionals in their careers. Developing emotional intelligence and enhancing communication skills are crucial for survival in the digital era, where they can create unique value. It's also essential to understand both the positive and negative aspects of AI to prepare adequately, considering AI as a "giant's shoulders" upon which they must learn to stand. In the AI environment, there is currently no universally defined data boundary. AI is still evolving, and there is no global legal framework governing AI. Countries are managing AI at different levels, and each nation must proactively establish its legal framework for AI management. However, they should also engage in international efforts to share experiences, learn from others, and develop AI standards that benefit humanity and nations.

In terms of legality, alongside the significant benefits that AI brings, there are also substantial risks when personal data is unlawfully collected and stored indefinitely on cloud servers, and infringements on privacy occur for exploitation and gain. Concerns have been amplified following allegations against DeepMind, Google's AI division, for violating the data protection laws of the United Kingdom and patient security regulations during the development and testing of

applications for the National Health Service. Faced with this challenge, many countries and international organizations have taken specific actions to safeguard privacy, the right to be forgotten, and personal data in the age of digital technology. The European Union enacted the General Data Protection Regulation, effective May 25, 2018. This regulation provides clear guidelines on personal data, protecting personal data, and the right to be forgotten when using others' information (Lưu Minh Sang & Trần Đức Thành, 2020).

Moreover, implementing AI necessitates a workforce with specialized skills and expertise, which can be in short supply. Organizations may encounter difficulties in recruiting and retaining AI talent. Additionally, the integration of AI may disrupt existing job roles, requiring thoughtful change management strategies that include reskilling and retraining programs to ensure a smooth transition.

Building trust in AI technologies emerges as another critical challenge. Organizations must address concerns regarding potential job displacement, security risks, and the reliability of AI systems. Transparent communication and comprehensive education efforts can help foster trust among employees and stakeholders, ultimately promoting the widespread adoption of AI.

Lastly, the complex regulatory and compliance landscape presents yet another hurdle. Depending on the industry, AI applications may need to adhere to specific regulations and standards. Navigating this intricate legal terrain requires diligence and a commitment to responsible and ethical AI practices.

Organizations must adopt a comprehensive approach to overcome these challenges and fully realize the potential of AI in digital transformation. This approach should encompass technological advancements, organizational readiness, ethical considerations, and the development of robust regulatory frameworks. By addressing these multifaceted facets, organizations can harness the full transformative power of AI, positioning themselves for success in an increasingly AI-driven world.

3. Conclusion

In the ever-evolving landscape of technology, the integration of AI has emerged as a transformative force, driving the trajectory of digital transformation across industries. This paper has explored the dynamic partnership between AI and digital transformation, unraveling the multifaceted impacts that redefine the way businesses operate and engage with customers. As AI transitions from theoretical speculation to practical implementation, organizations worldwide are

harnessing its capabilities to propel the evolution of digital landscapes and capitalize on the inherent potential of this symbiotic relationship.

Through AI-driven automation, service providers are redefining customer interactions by offering reliable and round-the-clock support through AI-enhanced applications. This not only optimizes resource management but also augments user experiences through personalized engagement. Moreover, intelligent data analysis further refines these interactions, streamlining workflows, and driving cost efficiencies across the board.

The fusion of AI and digital transformation presents a paradigm shift, extending transformative impacts across sectors ranging from national security to healthcare, education, and beyond. The paper accentuates AI's potential to bolster scalability and agility within fluid environments, catalyzing operational excellence and fostering innovation.

The comprehensive exploration of AI's role in digital transformation has showcased the depth and breadth of its influence on businesses' strategic directions. As AI-driven solutions permeate various aspects of operations, customer relations, and decision-making, a new era of unparalleled possibilities emerges.

In conclusion, as organizations embrace AI's transformative capabilities, they set forth on a trajectory towards unprecedented digital dexterity and innovation. The harmonious integration of AI and digital transformation heralds a landscape where businesses are not merely reactive but visionary pioneers. This confluence of technologies beckons organizations to recalibrate their strategies, reimagine customer engagement, and navigate the digital future with resolute optimism. The future belongs to those who leverage AI to navigate the ever-evolving currents of digital transformation, charting a course towards sustainable growth and meaningful innovation.

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BLOCKCHAIN AND IT'S FUTURE APPLICATION FOR INDUSTRY 4.0 TOWARDS PRIVATE CORPORATIONS IN VIETNAM

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INFORMATION

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ABSTRACT

This paper delves into the potential integration of blockchain technology within the framework of Industry 4.0 for private corporations operating in Vietnam. In the era of Industry 4.0, characterized by the convergence of automation, digitalization, and decentralization, there is an escalating demand for secure, efficient, and transparent systems. Blockchain, as a decentralized ledger technology, emerges as a promising solution to meet these demands and potentially reshape the landscape of business operations. Additionally, the paper underscores the pivotal role of education in STEM fields in equipping the younger generation with essential skills for navigating the digital age. It outlines a series of governmental initiatives required to support and nurture the talents of the youth, including policies that encourage innovation and educational programs tailored to digital proficiencies. Real-world examples of youth-led startups and projects harnessing cutting-edge technologies such as IoT, AI, and blockchain to address real-world challenges provide compelling evidence of the transformative potential of Vietnam's youth. Ultimately, this paper advocates for the central role that young individuals can play in advancing Vietnam's digital landscape and offers practical recommendations for collaborative efforts between the government and private sector to foster and strengthen this emerging talent pool.

1. Overview of Blockchain and Blockchain technology

A blockchain, at its core, is a type of digital ledger that keeps track of transactions in a safe and open manner. The ledger is made up of blocks that are connected by chains that are arranged chronologically. A list of transactions that have been verified by a network of computers, or "nodes," is contained in each block. ". One of a blockchain's key characteristics is that once a block is added to the chain, it cannot be changed or removed. As a result, a permanent and unchangeable record of every network transaction is produced.

Blockchains can be used for a variety of things, including storing digital identities, tracking the movement of goods, and recording financial transactions. The execution of smart contracts is one example of a process that can occasionally be automated using blockchain technology. Blockchain technology is a revolutionary distributed database technology tha enables the secure storage and transfer of information without the need for a central authority or intermediary. It is a digital ledger of transactions that is distributed across anetwork of computers, and each transaction is verified and recorded by multiple participants in the network.

The fundamental concept of blockchain is to create a secure and transparentrecord-keeping system that can be shared and trusted by multiple parties without the need for intermediaries such as banks or government institutions (Sura I. Mohammed Ali, 2021). Each block in a blockchain contains a unique cryptographic hash, which is a digital fingerprint that ensures the integrity of the data. Once a block is added to th chain, it cannot be altered or deleted, making the system immutable and tamper-proof.

One of the key features of blockchain technology is its decentralization, which means that there is no single point of failure or control (Bodó, B. &, 2021). Instead, the network is distributed across many computers, and each participant has a copy of theledger. This makes the system more resilient to cyber-attacks and provides greater transparency and accountability. The ability to record and track information in a secure, open, and decentralizedmanner offered by blockchains has the potential to revolutionize a variety of industries. Since they are still a young technology, there are a number of issues and restrictions tha must be resolved before they can be widely used.

Blockchain technology - distributed ledger technology - has changed our approach to share and transact data. As a matter of fact, blockchain technology, considered as the second generation of the Internet, provides ‘the Internet of Value’, whereas recent decades have witnessed the ceaseless evolution of the first generation of the Internet also named at ‘the Internet of Information’. Therefore,

blockchain technology is applied in a wide range of industries such as healthcare, education,tourism, retail, pharmaceutical industry, public sector, finance, and supply chain. Among these, blockchain platform seems to be potentially suitable to supply chain management (Cole, R., et al, 2019). This is because most salient features of blockchain are distributed architecture in the peer-to-peer network, immutability of data impossible to tamper with as soon as transactional approval, and transacted without the intermediaries.

2. Analysis of the applications of blockchain technology for industry 4.0 and it's potentials in Vietnam

In Vietnam, the government has demonstrated a growing interest in and support for the advancement of blockchain technology. As part of their national Industry 4.0 strategy, the Ministry of Science and Technology has prioritized the development ofdigital technologies, including blockchain. Moreover, the government has established several blockchain initiatives, such as the Vietnam Blockchain Country Report (NgueynVan, 2022) and the Vietnam Blockchain Forum. Although some Vietnamese companies have successfully integrated blockchain technology into various industries, such as finance, logistics, and healthcare, there are still challenges and limitations to widespread adoption. A lack of skilled professionals and high implementation and maintenance costs are major obstacles, along with the need for more comprehensive regulations and standards to ensure system security and privacy. Despite these challenges, the potential benefits of blockchain technology have encouraged growth and expansion in Vietnam' blockchain industry, with the government's support furthering its potential for the future.

Before we address the applications of blockchain for industry 4.0, it is essentia to explain what is the common knowledge of industry 4.0. The Fourth Industrial Revolution, also known as Industry 4.0, is the ongoing automation and digitization of conventional industrial and manufacturing processes. This process uses technologieslike the Internet of Things (IoT), artificial intelligence (AI), cloud computing, and robotics. It signals a move toward smarter, more responsive, flexible, and effectivesupply chains and factories (Mohd Javaid, et al, 2022). In Industry 4.0, devices are connected and converse with one another, allowing people to make better decisions based on real-time data analytics. All these technologies domains mentioned above can implement blockchain technologies in them and create a more effective process and usage.

2.1. The current state of industry 4.0 in Vietnam

Vietnam has emerged as an attractive destination for multinational corporationsin the past decade, primarily due to its geoeconomic advantages. Vietnam is currentlyon the path to digitalization, and the country is embracing Industry 4.0 technologies to improve productivity, efficiency, and competitiveness. The Vietnamese government ha been promoting digital transformation through various initiatives, such as the National Digital Transformation Project and the Smart City Project. According to a report by theVietnamese Ministry of Industry and Trade, the country's Industry 4.0 market I expected to reach USD 28.5 billion by 2030 (Public Security News, 2019).

According to customs data, Shenzhen's exports decreased 14 percent year ove year to US$18.3 billion as a result of lockdowns related to the pandemic, while Vietnam's exports increased by 48.2 percent from the previous month and 14.8 percentfrom the previous year to US$34.7 billion (Vietnam Briefing News, 2022). Source: Asian Development Bank Vietnam's increased exports and growth rate in the logistics and supply chainindustry have positioned it as a viable "China plus one" option for businesses. However, despite the competition, Vietnam and China are more likely to collaborate as Vietnam still relies on importing raw materials from China, South Korea, and Japan, and its supply chain is not as developed as China's.

In the financial and banking sector, the rise of digital devices has significantly impacted sales networks, distribution channels, and the way banks create their products and services. The paperless banking trend, new business partnerships, and the gradualshift to digital banking are emerging trends that have the potential to impact the market.

Digital traces are being used to estimate credit scores, and digital finance is promoting financial inclusion. The tourism sector can benefit the economy, culture, and security of Vietnam, and has seen positive growth trends despite the global trade slowdown since the 2008 global economic crisis. The industry is less vulnerable to the negative effects of automation, and the use of digital technology platforms has improved efficiency in marketing, selling, managing, and providing for customers. The advancement of digital marketing has also become significant in the industry. Vietnam's implementation of economic restructuring, digitalization, and international integration has made it an attractive destination for businesses looking to establish their presence in the region. The adoption of emerging trends and technologies has the potential to impact various sectors positively and contribute to the country's sustainable growth.

2.2. Potential applications of blockchain technology in Industry 4.0

The utilization of blockchain technology in Industry 4.0 has many possibl applications. One of the most significant ones is the use of smart contracts to secure and automate transactions without the involvement of intermediaries. These contracts canstreamline supply chain processes, increase transparency, and reduce costs. Another potential application is product tracking and management, which is especially useful Iindustries like manufacturing and logistics where it is vital to track the movement of goods.

In logistics, blockchain technology can create a decentralized and fool-proof database that can track the movement of goods from origin to destination. This canimprove supply chain management and increase transparency and efficiency. Smart contracts can be utilized to automate transactions and enable full tracking of products, reducing the need for manual intervention and increasing transparency and trust between all parties involved in the process. Blockchain can also verify the history of goods an reduce the risk of fraud and theft.

In the banking industry, blockchain technology can transform the way transactions are conducted by providing secure and transparent transactions without intermediaries. Digital identities for customers can be created, which can improve KYC processes, prevent fraud, and increase security. Blockchain-based smart contracts can also automate many manual processes involved in banking, reducing processing tim and costs. In Vietnam's banking system, blockchain technology can be utilized to create a udigital identity system for customers, simplifying the onboarding process and improving security. It can also create a more efficient and transparent payment system that provides instant cross-border transactions at lower costs and greater security.

The potential of blockchain technology to transform various industries, such as logistics and banking, is vast. As the technology evolves, more innovative and practical use cases will emerge, bringing greater transparency, efficiency, and security to our digital economy. However, the widespread adoption of blockchain technology will require significant investment in infrastructure, regulatory clarity, and industry-wide collaboration.

It is very possible to implement blockchain technology in Vietnam Industry 4.0 logistics system. Blockchain can help streamline supply chain operations, increase transparency and trust among all parties, and reduce the risk of fraud and error. In addition, Vietnam has worked hard to digitize and improve the efficiency of the logistics industry, and the government has a goal of reducing logistics costs to 16-20% of GDP by 2025. The adoption of blockchain technology could be a

crucial step in making this happen. While there may be challenges, such as the need for collaboration between various stakeholders and the costs associated with blockchain implementation, these challenges are outweighed by the potential benefits. The feasibility of implementing blockchain technology in Vietnam's logistics industry depends on various factors, such as the current infrastructure, regulatory environment, and the willingness of stakeholders to adopt the technology. The main benefit of using blockchain in logistics is its ability to increase the transparency and traceability of goods throughout the supply chain. This helps reduce fraud, theft and counterfeiting, as well as increasing efficiency and reducing costs. However, implementing blockchain in logistics requires significant investment in technology and training, and may require changes to existing business processes and infrastructure. In Vietnam, there is some interest in implementing blockchain technology in logistics, various pilot projects and initiatives are underway.

For example, in 2018, Vietnam's customs department announced plans to use blockchain to track and trace goods through customs. Some Vietnamese startups have explored the application of blockchain in logistics. However, there are still some issues to be resolved before blockchain logistics can be widely used in Vietnam.

In fact, some Vietnamese startups have already been exploring the use of blockchain in logistics. For example, Kyber Network native blockchain platform that aims to increase transparency and efficiency. Another startup, Wee Digital, has developed a blockchain-based solution for freight management, which provides real- time tracking and secure data sharing for logistics providers and their customers. With the growing demand for transparency, security, and efficiency in the logistics industry, the feasibility of implementing blockchain technology in Vietnam's logistics sector seems highly plausible.

In Vietnam, the younger generation is actively participating in addressing key challenges in the digital transformation journey, particularly in the implementation of blockchain technology across various sectors like banking and logistics. These youngprofessionals and students are not just users but are actively contributing to solving data privacy and security issues. They are also working on creating standardized protocols and ensuring interoperability between different platforms and stakeholders. In the growing digital banking sector, young innovators are exploring blockchain's potential for faster and more secure transactions. Banks like Techcombank and Vietinbank, where the youth have likely played a role, have already started implementing blockchain-based solutions for trade finance and cross-border payments. While challenges like

standardization and high implementation costs exist, the youngergeneration is at the forefront of finding solutions to these issues.

The regulatory environment in Vietnam is also youth-friendly, with the government issuing draft laws that recognize blockchain as a legal form of electronic transactions. This provides a supportive backdrop for young people to innovate and contribute to the development of blockchain technology in the country.

As Vietnam continues its journey towards digital transformation andmodernization of its industries, the youth are emerging as key players. They are leveraging blockchain as a tool to achieve greater efficiency, transparency, and security, thereby playing a significant role in the country's digital future.

3. Challenges and limitations of blockchain technology applications in Vietnam

While blockchain technology offers a plethora of opportunities for digital transformation in Vietnam, it's not without its challenges and limitations. One of thprimary concerns is data privacy and security. Despite blockchain's promise of enhanced security, the technology is still susceptible to sophisticated cyber-attacks, and there's need for robust security protocols.

Another significant challenge is the lack of standardized protocols andinteroperability between different blockchain platforms. This makes it difficult forbusinesses and stakeholders to collaborate effectively, hindering the widespreadadoption of the technology.Cost is also a considerable barrier. Implementing blockchainsolutions requires significant investment in infrastructure and skilled professionals,which can be prohibitive for smaller companies and startups.

In the banking sector, while there's potential for blockchain to revolutionizefinancial transactions, the technology is still in its nascent stages. Banks likeTechcombank and Vietinbank have made strides in implementing blockchain-based solutions, but these are still isolated cases and not industry standards. The regulatoryenvironment, although supportive, is still evolving. The government has issued draftlaws recognizing blockchain, but comprehensive regulations that address all aspects ofthe technology are still lacking.

While there's high potential for blockchain technology in sectors like logistics and banking, these challenges need to be addressed for widespread adoption.Collaboration and investment from both the public and private sectors are essential to overcome these limitations and realize the full potential of blockchain in Vietnam.

4. The development of Blockchain technology applications for Industry

4.0 in Vietnam

Vietnam is becoming a hotspot for the development of blockchain technolog applications in Industry 4.0. The Vietnamese government has recognized the potential of this technology and is taking steps to promote its use in various industries. Several companies in the country are making efforts to implement blockchain technology in their operations to improve efficiency, transparency, and security. One such company is VinGroup, which announced the creation of a blockchain-powered smartphone in 2019 (Van Duy Pham, 2020). This smartphone aimed to provide secure storage and transfer of personal data, as well as facilitate easy payments and access to decentralized applications (dApps).

Another company in Vietnam that is exploring the potential of blockchain technology is FPT Corporation. FPT is developing a blockchain platform for supply chain management that aims to enhance transparency and reduce fraud by tracking products from production to delivery (Hoang Long Nguyen, 2020). The platform also includes smart contracts to automate transactions and ensure compliance with regulations.

Katalon Studio, a Vietnamese startup, developed a blockchain-based supply chain management platform designed to provide real-time tracking and monitoring of goods throughout the supply chain, ensuring transparency and traceability for all parties involved. Similarly, TomoChain is a blockchain platform focused on scalability and speed, with applications in finance, logistics, and gaming (Vu Tran Thien, 2021). Lina Network is a blockchain platform focused on supply chain management and traceability with applications in agriculture, healthcare, and logistics. Kyber Network is a decentralized exchange that allows instant transactions between different cryptocurrencies, with applications in finance, gaming, and e-commerce. Lastly, Infinity Blockchain Labs is a research and development company focused on blockchain technology with applications in finance, logistics, and healthcare (Hanbum (Albert)Cho, 2021).

These blockchain applications are being utilized in various ways. For example, blockchain technology is used to provide secure storage and transfer of personal data in VinGroup's blockchain-powered smartphone. Katalon Studio's platform utilize blockchain to ensure real-time tracking and monitoring of goods throughout the supplychain, providing transparency and traceability for all parties involved. TomoChain's blockchain platform, on the other hand, focuses on scalability and speed, enabling faste and more efficient transactions in finance, logistics, and gaming.

Implementing blockchain technology in Industry 4.0 in Vietnam could offer several potential benefits. Firstly, increased transparency and traceability in

supply chain management can enhance accountability and efficiency, reducing costs and improving overall performance. Secondly, the decentralized nature of blockchain technology could provide greater security and privacy, reducing the risk of fraud and data breaches. Finally, blockchain technology could enhance efficiency by enablingfaster and more secure transactions between different parties in Industry 4.0 applications.

The development of blockchain technology applications in Industry 4.0 in Vietnam is not limited to the private sector. The Vietnamese government is also exploring the potential of blockchain technology in various areas, such as healthcare, finance, and education. For instance, the government is planning to use blockchain technology to manage medical records, reduce fraud in financial transactions, and improve the transparency and accountability of educational institutions.

So, the development of blockchain technology applications in Industry 4.0 in Vietnam is gaining momentum, and the country has the potential to become a leading player in this area. The use of blockchain technology in various industries is expected to enhance efficiency, transparency, and security and enable Vietnam to become a more competitive player in the global market.

5. Conclusion

In conclusion, blockchain technology has shown great potential for revolutionizing Industry 4.0 in Vietnam, with examples of companies like Vingroup, Katalon Studio, TomoChain, Kyber Network, and Infinity Blockchain Labs using it in various applications. The benefits of implementing blockchain technology in Industry 4 .0 include increased transparency, efficiency, and security.

However, there are still challenges and limitations that need to be addressed, such as the lack of legal framework, technical infrastructure, and skilled workforce. In addition, the cost of implementing blockchain technology can be high, and there may be resistance from traditional industries to adopt new technologies. Overall, the potential benefits of blockchain technology outweigh the challenges, and it is essential for private corporations in Vietnam to consider adopting it to remain competitive in Industry 4.0. The government and relevant stakeholders must also work together to establish a legal framework and provide support for the development and adoption of blockchain technology. With the right approach, blockchain technology can bring about significant improvements in Industry 4.0 in Vietnam and drive the country's economic growth in the years to come.

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BRIDGING THE GAP:

GENETICS LEARNING THROUGH VIRTUAL LABS

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INFORMATION

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Genetics, virtual lab, Virtual Lab Software Program (VSLP), digital transformation and technology.

ABSTRACT

With the constant of growing of digital technology and population, virtual lab is becoming an essential medium for youths, which are students, precisely those in STEM majors to have a better understanding in genetics. Genetics refer to the study of inheritance, specifically DNA as the basis of inheritance due to the transmission of genes that contain in DNA from generations to other generations, without changing the number of genes, as the alterations and aberrations occur in reproduction. However, with the unfairness occur in education, some students have limited opportunities to experience hands-on experiment and practical learning.

Therefore, virtual lab construction is essential to broaden access to genetics education outside typical classroom settings and to highlight how virtual labs provide a practical and hands-on method to reinforce theoretical knowledge in genetics. The materials needed for this research is high quality computer and learning materials. From that, Virtual Software Learning Program (VSLP) will be created that consists of experiment simulations, laboratory equipment, specimen and sample handling, data collection and analysis, feedback and assessment, collaborative and communication, progress tracking, compatibility and customisation along with user guidance and technical support. The expected result for this research is to be

able to conduct a virtual lab that precisely able to convey the same experience as physical lab and to enhance the ability in hands-on experiments with critical thinking analysis and obtain knowledge acquisition.

1. Problem statement

With the rapid development and adaptation of the world in science, technology in digital transformation also have started to move in order to follow the pace. Learning genetics with the aid of modern technologies able to enhance the quality of understanding among youths as the familiarity level in technology among youths are exceptionally high. This indicates that youths are well-aware with the existence of technology in digital transformation. However, youths, especially students, have limited opportunities to engage in hands-on experiments and practical learning experiences due to lack of resources, lack of the equipment necessary to build up fully genetics laboratory and unexpected restrictions, such as COVID-19. Therefore, this study is conducted to broaden the access to genetics education outside typical classroom settings by creating genetics virtual lab and to highlight how virtual labs provide a practical and hands-on method to reinforce theoretical knowledge among youths.

2. Literature review

2.1. Genetics

In general, 'genetics' is one of biology majors that is focusing on the study of heredity, transformation and adaptation of any living and non-living things to the world. The study of genetics moved from classical genetics to modern genetics that not only covered the transmission, but it also covers the adaptation of living things through world evolution.

According to Waters (2004), the classical genetics was established to study the heredity, based on the transmission theory that analysed by in the philosophical literature. There were debates between geneticists and philosophers regarding how transmission work that classified as traditional genetics, in which the philosophers believed that there was a philosophy theory regarding transmission in inheritance that produced such an explicable phenomenon for the continuation of human evolution around the world. However, with the aid of Drosophila (flies) as main medium of experiments, geneticists conducted experiments and results that were produced were all related with the philosophical theories. Hence, that is where deoxyribonucleic acid (DNA) comes from. Father of Genetics, Gregor Mendel took

an interest in genetics, precisely epigenetics with a memoir of plant hybridisation which was held in 1885. The medium used was pea.

According to Jean (2016), Mendelian genetics mainly focused with the chromosomal theory of inheritance that referred to the classical genetics. However, after several debates and experiments conducted to construct an accurate concept of genetics, the basis of inheritance moved from chromosome to DNA. There are three Mendelian laws, which consist of the Law of Dominance and Uniformity which describes the variants of a particular gene found at the same chromosomal locus or location are dominant over the other alleles for a given gene. Second Mendelian law the Law of Segregation, which states that two alleles for each gene separate from each other during gametogenesis so that the parent may only pass of one allele, thus, the offspring can only inherit one allele from each parent. Lastly, the third law of Mendelian Law is the Law of Independence Assortment which states that the alleles of different genes segregate independently of one another during gametogenesis and are distributed independently of one another in the next generation.

2.2. Digital transformation

According to Karel and David (2015), the definition of 'digital' varies. In terms of technology, digital is a breakthrough of way of developments in creating value at new frontiers. For marketing, technology is the key to unlock the emerging of growth sectors in evaluating and creating data that already exist in chains. In automotive industry, transportations are well-connected with self-navigation and in-car entertainment apps that basically cover all around the globe. With the existence of digital, people can be proactive in decision making. Based on intelligence, people will deliver and set personalised contents to experience better quality and provide only relevant things for them to explore. The most important thing in the establishing of digital is contextual interactivity. It is fascinating that sending letters is no more a major communication because we are currently moving with the rising of technology in communication that mainly use devices, such as mobile phones or laptops.

According to Sabrina and Olga (2021), digital transformation refers to the growth and development of technologies. The central paradigm for digital transformation has continuously growing with two to three-tenfold every year which enabled the constant connection between objects and people. With that, according to Vial (2019), 'digital transformation' refers to the process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication and connectivity

technologies. Due to adaptation and adoption, digital technologies are constantly moving although every upgrade or improvement require lot of process, as each of them needs to be specific to the context. For example, according to Vaia and others (2012), artificial intelligence (AI) is mainly built to establish a sense of trust, fairness, transparency high-flexibility and accountability, as well as realistic human needed.

2.3. Virtual lab

According to Céline, Florien and Albert (2022), technology can provide an authentic understanding among students regarding scientific practice and also helps them to polish their memories to a deeper understand of concepts, knowledge and application. This is mainly due to the familiarisation in technology among students. Initially, virtual lab technologies were proposed by the National Science Foundation's (NSF) task force, basically to enhance STEM education as a dynamic response to preparation of the complexation of population in 21st century. The main purpose of the establishment of virtual lab is due to the limitations inspace, samples and equipment needed for various types of experiments. With the growing of population everyday and the constant limitations of physical lab, virtual lab is the solution that will be able to help all students to experience the fairness in education, without leaving anyone behind. The main cause of shortage of equipment is due to the high cost and maintenance, as some of them, which are samples, at the end, will be discarded after getting the results of the experiments. Virtual lab dynamic is a one-time investment that will not have any relations with disposal or maintenance, as it is mainly focusing on the upgrade of technologies as years passed. Hence, virtual lab provides significant information for students that require complex and costly equipment. In terms of education, virtual lab will eventually expedite instructors' work in teaching theoretical and basic concepts of knowledge to students. It is due to the simplify version of experiments of virtual lab with an immersive experience to both of them.

3. Expected result

At the end of this research, students will be able to have access to genetics virtual labs and able to improve the understand of genetic concepts and practical laboratory skills. The outcome from these virtual experiments is the students will be able to enhance their ability in hands-on experiments with critical thinking analysis and obtain knowledge acquisition.

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CLASSIFICATION OF MOTION CONTROL OF HUMANOID ROBOTS USING HUMAN BRAIN WAVES

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INFORMATION

Keywords:

Humanoid Robot, Neurosky MindWave EEG

ABSTRACT

The rapid development of technology is the driving force behind the advancement of the robotics technology industry. Human brain waves can be detected with an Electroencephalograph (EEG) device placed on the head. This research will implement EEG technology in NeuroSky MindWave technology to control the motion of robots, such as humanoid robots. The result of this research is that the system can capture human brain waves as a robotic recognition medium. The brain waves captured by the system will be broken down into 10 parameters which consist of Delta, Theta, Low Alpha, High Alpha, Low Beta, High Beta, Low Gamma, Mid Gamma, Attention, and Meditation. The data set in each parameter is obtained from the dominant range that often appears from random subjects. The results were obtained in the one-way motion test repeatedly with an accuracy of 60-100%. As for the combination of two moves, the accuracy is 40-90%. The accuracy obtained varies greatly because the subject must be consistent with the intuition thought of by the humanoid robot.

1.Research method

General Design

Initially, humans thought about what movements he was making. From the human mind, it triggers brain waves that the MindWave EEG sensor will detect through the TGAM sensor. From these sensors, brain waves are transformed into cues that are divided into several parameters, then they will be taken to the sender to be sent to the receiver. From the signal received by the receiver, it will be

processed by a microcontroller to express existing commands to the servo motor. The result of the command formed a movement on the humanoid robot. This can be seen in Figure 4 showing the Block diagram of the system in general.

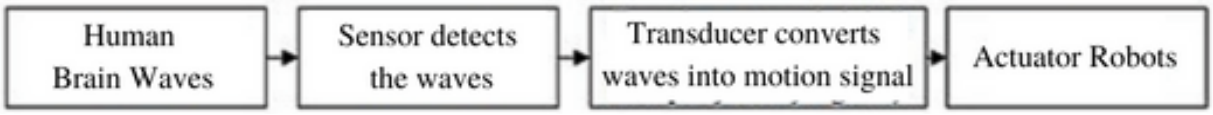


Figure 1. Block Diagram of the System in General

Hardware Design

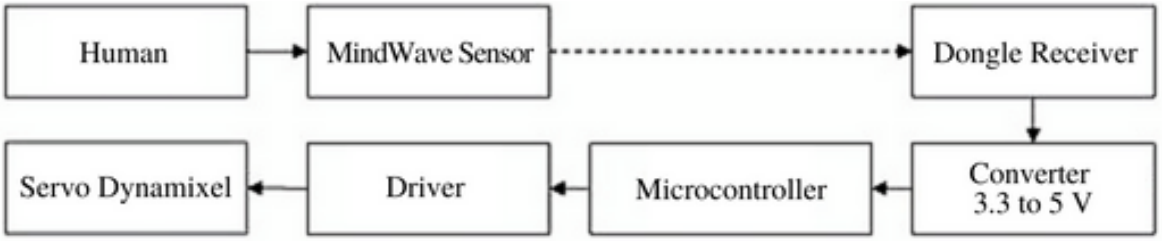


Figure 2. Block Diagram of the Hardware

In figure 2, this study used hardware consisting of EEG MindWave sensors, MindWave receiver dongles, Arduino Mega 2560, IC 74LS241, IC TXB0108, and Humanoid Robots. The EEG Mindwave sensor serves to measure brain waves in the human's head. The data is transferred to the receiver dongle that has been modified as a receiver wirelessly. After the data is received, the data goes through IC TXB0108 to change the voltage from 3.3 V to 5 V which will be lowered to the Arduino Mega2560 serial pin. After the data enters the Arduino Mega 2560, then the data is processed into motion commands in the form of positions on the servo motor on the humanoid robot. The motor in the humanoid robot is used IC 74LS241 as a communication interface with a humanoid robot. The IC functions as a data parser whether the data is addressed as data from the transmitter or data from the receiver. After going through IC 74LS241, a humanoid robot consisting of several dynamixel motors will move based on the position received from the Arduino Mega 2560. The position of the group of motorcycles forms a human movement on a humanoid robot as shown in Figure 2.

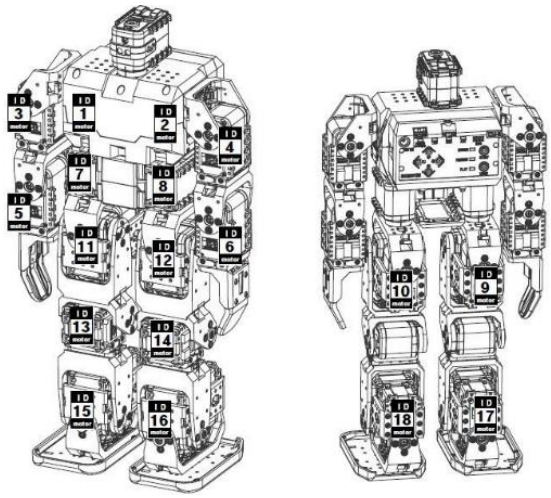


Figure 3. Dynamixel AX 12 Humanoid Robot

Software Design

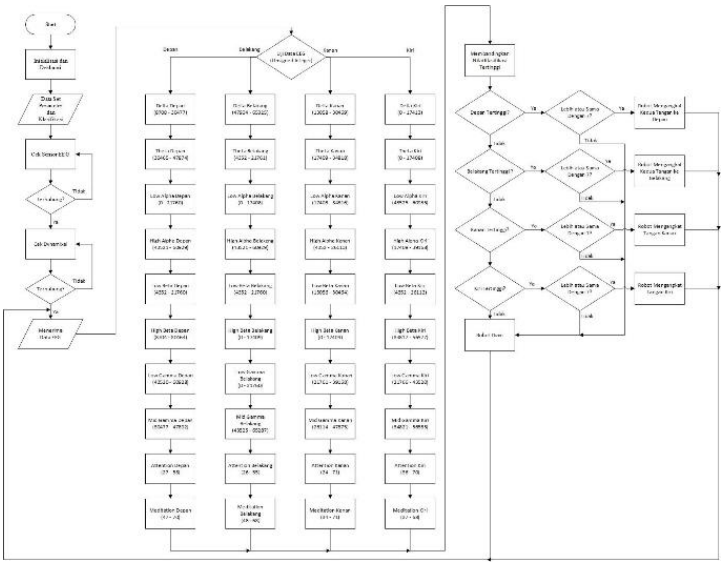


Figure 4. Software Design Flowchart

In Figure 4, variables related to the robot system are initiated and all parameters related to EEG are put together in a matrix. When the system is active, the Mindwave sensor is checked to see if it has been connected to control the robot. In the dynamixel section, an inspection is carried out when run to find out whether the motor has malfunctioned or not. Once the sensors and motor are checked and successful, then Mindwave can be used by the user in controlling humanoid robots. When connected the sensor sends data to the microprocessor which is divided into 10 parameters. These parameters are Delta, Theta, Low Alpha, High Alpha, Low Beta, High Beta, Low Gamma, Mid Gamma, Attention, and Meditation. Ten parameters will be commands based on the classification of parameters that have been created. When data comes in from MindWave the value

will be classified into motion commands. Parameter values will be compared to each parameter of each classification whether the value falls within the range of that classification or not. If the value is included in the range of classification parameters, it is given point 1, but if not then it is given a point 0. After comparison, the value of each classification will be compared to which is the highest total points and meet the limit of value 7 to drive the robot. However, if the highest classification is not equal to or less than 7 then the robot will remain stationary. The picture shows the workflow of robot control software with Human brain waves.

2. Test Design

One Motion Test

This test aims to find out whether the user can move the robot continuously within a predetermined time limit. This test was conducted with two types of users consisting of three users with trained data record data and three random users without any trained data records. This test has a limit for each repetitive move with a span of three minutes per loop. The number of the same movements performed repeatedly is as many as five times.

Two-Motion Combination Test

This test aims to find out whether the user can move the robot with a combination of two different movements. This test was carried out with two types of users consisting of three users with trained data record data and three random users without any trained data records. This test is carried out based on the user's command whether the movements that the robot performs have been the same as what the user wants. The total number of moves that can be performed is as many as ten movements.

3.Results and discussions

Determination of Parameter Set Data per Classification

Training data collected from 9 people was used to classify movements in the robot. The data set is obtained through a dominant range of values that appear when the subject imagines the robot moving its hands. Training data collection takes 2 minutes 45 seconds with a 5-minute pause that is carried out twice for each move classification. This is done to avoid the subject's condition from fatigue and boredom. Data collection from the subject was carried out to determine the range of values that often arise from the subject, the result obtained was the number of dominant value ranges on the graph as a data set per motion

classification parameter which is the example in Figure 4 as a Theta parameter for forward motion classification.

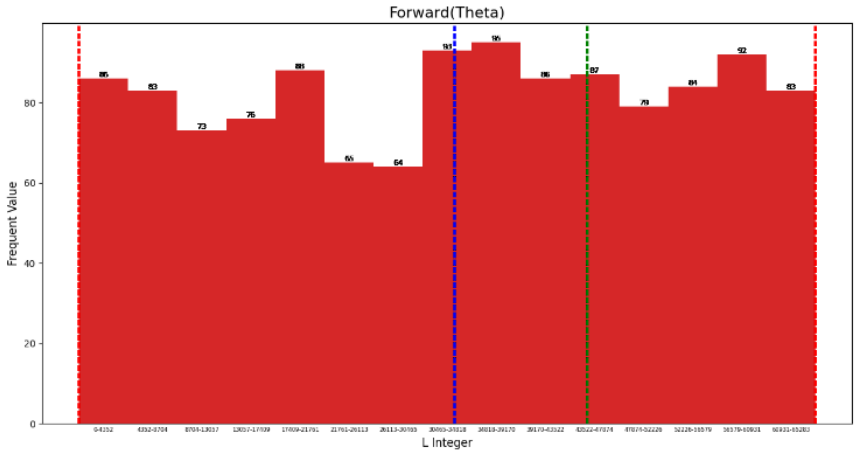


Figure 5. Forward Theta Parameter Value Range

Figure 6. The subject sees and imagines the direction of motion of the robotic arm

The example parameters in the image produce a data set that is used to determine the range of the parameters in each motion classification. The data set of each parameter can be seen in Table 1 which shows the range of parameter values in the motion classification to drive the robot.

TRAINING DATA SET

Parameter	Front	Back	Right	Left	Idle
Delta	8708 – 30477	47904 - 65325	13058 - 30469	0 - 17413	47884 - 65296
Theta	30465 – 47874	4352 - 21761	17409 - 34818	0 - 17408	0 - 21763

Low Alpha	0 – 21760	0 - 17408	17408 - 34816	43525 - 60935	0 - 21761
High Alpha	43521 - 60929	43521 - 60929	4352 - 26113	17408 - 39168	17408 - 34816
Low Beta	4352 - 21760	4352 - 21760	13056 - 30464	4352 - 26112	43520 - 60928
High Beta	8704 - 30464	0 - 17409	0 - 17409	34817 - 56577	13056 – 30464
Low Gamma	43520 - 60928	0 - 21760	21761 - 39168	21766 - 43520	8704 - 26112
Mid Gamma	30477 - 47892	43525 - 65287	26114 - 47875	34821 - 56585	34826 - 52239
Attention	27 - 58	26 - 55	24 - 71	36 - 70	14 - 65
Meditation	47 - 70	48 - 68	34 - 71	37 - 68	34 – 80

Test Result of Robot Raise One-Way Hands When the Subject Thinks

In this test, the subjects envisioned moving the robot one way repeatedly 5 times with one loop of a maximum of 3 minutes. This is done to avoid fatigue in the subject when controlling the robot. This test was carried out by involving 6 people and consisted of 2 types of subjects which were training subjects consisting of n1, n2, and n3 and non-training subjects consisting of n4, n5, and n6. There are 4 test results performed for one move consisting of raising your hand forward, backward, to right and left.

Table II is the result of measurements where the subject thinks about controlling the robotic hand to raise the hand forward. Subjects n1, n2, n3, and n6 can do as many as 5 times each period they do under 3 minutes with 100% Accuracy. For n4 and n5 there was a decrease in focus intention when trying to think about in the T4 and T3 periods making the accuracy of both subjects at 80%.

Table III is the result of measurements in which the subject thinks of controlling the robotic hand and raising his hand back. Subjects n1, n2, n4, n5, and n6 can do as many as 4 times each period they do under 3 minutes with 80% Accuracy. For n3 can do as much as 5 times which each period they do under 3 minutes with 100% accuracy.

Table IV is the result of measurements in which the subject thinks of controlling the robotic hand raising the hand backwards. For n1 can do as much

as 5 times which in each period they do under 3 minutes with Accuracy 100%. Subjects n2, n3, n4, and n6 can do as many as 4 times each period they do under 3 minutes with an Accuracy of 80%. While n5 can do as much as 3 times per period they do under 3 minutes with an accuracy of 60%.

HAND RAISE TO THE FRONT

Periode (T)	**Subject (n)**					
	n1	**n2**	**n3**	**n4**	**n5**	**n6**
T1	00:02:34,13	00:00:31,64	00:02:58,40	00:00:53,56	00:00:45,70	00:02:20,54
T2	00:02:35,9	00:01:32,10	00:01:11,52	00:00:21,54	00:01:49,81	00:00:14,56
T3	00:01:13,61	00:01:40,45	00:01:04,78	00:02:26,71	Pass	00:01:07,18
T4	00:00:49,41	00:01:57,75	00:00:15,74	pass	00:02:00,60	00:01:32,91
T5	00:00:25,07	00:01:15,01	00:00:39,97	00:01:13,91	00:02:20,18	00:00:55,65
Akurasi	100%	100%	100%	80%	80%	100%

HAND RAISE TO THE BACK

Periode (T)	**Subject (n)**					
	n1	**n2**	**n3**	**n4**	**n5**	**n6**
T1	00:01:00,62	00:02:12,40	00:02:08,36	00:00:11,47	00:00:04,63	00:00:42,54
T2	00:02:58,76	00:02:45,38	00:01:49,15	pass	00:00:17,44	00:00:50,57
T3	00:00:30,83	pass	00:01:04,08	00:00:21,44	00:00:55,96	pass
T4	00:01:13,28	00:02:03,96	00:01:59,45	00:00:32,91	00:01:25,48	00:01:15,62
T5	Pass	00:02:14,96	00:00:37,15	00:02:43,38	Pass	00:00:12,53
Akurasi	80%	80%	100%	80%	80%	80%

HAND RAISE TO THE RIGHT

Periode (T)	**Subject (n)**					
	n1	**n2**	**n3**	**n4**	**n5**	**n6**
T1	00:00:53,05	00:00:20,15	00:00:53,86	00:02:09,33	00:02:35,69	00:02:48,58
T2	00:01:47,11	pass	pass	00:01:11,20	Pass	00:01:29,19
T3	00:00:50,87	00:01:14,37	00:01:56,58	00:00:30,44	00:02:25,84	pass

T4	00:01:21,45	00:01:15,13	00:02:26,53	pass	Pass	00:02:29,72
T5	00:00:11,64	00:00:36,18	00:02:28,36	00:00:08,52	00:00:41,04	00:02:45,07
Akurasi	100%	80%	80%	80%	60%	80%

HAND RAISE TO THE LEFT

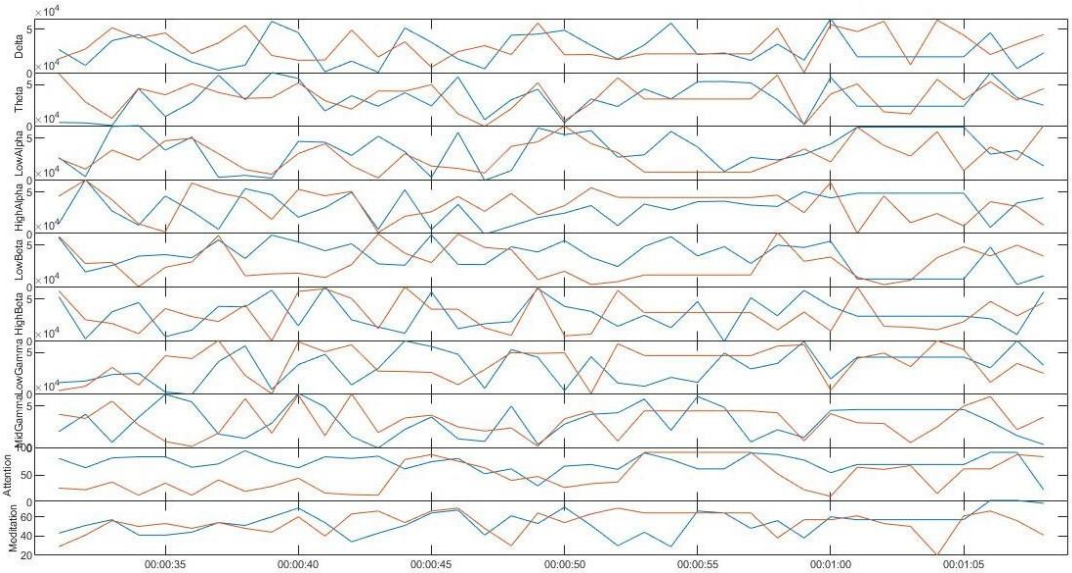
Periode (T)	**Subject (n)**					
	n1	**n2**	**n3**	**n4**	**n5**	**n6**
T1	00:00:42,91	00:01:50,45	00:02:10,75	00:02:29,71	00:01:06,98	00:02:05,19
T2	00:00:27,59	00:02:26,44	00:02:52,17	00:00:08,84	00:01:52,02	00:00:15,32
T3	00:02:59,70	00:01:12,26	00:00:53,51	00:01:01,93	00:02:26,48	pass
T4	00:01:31,98	00:00:19,41	00:00:46,54	00:00:52,19	00:00:29,53	00:02:58,92
T5	00:02:43,48	00:02:34,46	00:01:21,92	00:00:39,52	00:01:02,87	pass
Akurasi	100%	100%	100%	100%	100%	60%

Table V is the result of measurements where the Subject thinks about controlling the robotic hand by raising the hand back. For n1 to n5 can do as much as 5 times which each period they do under 3 minutes with an accuracy of 100%. While n6 can do as much as 3 times each period they do under 3 minutes with an accuracy of 60%.

Test Result Robot Raise Hands Two-Way When the Subject Thinks

In this test, the subject was able to move the robot in two different directions repeatedly 10 times where the subject freely chose the same two directions. This test was carried out by involving 6 people and consisted of 2 types of subjects which were training subjects consisting of n1, n2, and n3 and non-training subjects consisting of n4, n5, and n6. There are 2 test results performed for two-way movements consisting of raising the hand forward or backwards and raising the hand to the right or the left.

Table VI is the result of measurements in which the subject thinks of controlling the robotic hand to raise the hand forward or backwards. For n2, an accuracy of 90% is obtained, where 9 moves the robot following the subject's mind. In n3, n4, and n5, an accuracy of 80% is obtained, where 8 moves the robot following the subject's mind. Then in n1 obtained an accuracy of 70% where 7 moves the robot following the subject's mind. While n6 obtained an accuracy of 40% where 4 moves the robot following the subject's mind. Table VII is the result of measurements where the subject thinks of controlling the robotic hand raising the hand to the right or the left. For n2, an accuracy of 90% is obtained, where 9



moves the robot following the subject's mind. Then n5 obtained an accuracy of 80% where 8 moves the robot following the subject's mind. In n4, an accuracy of 70% is obtained, where 7 moves the robot following the subject's mind. For n1 and n3, an accuracy of 60% is obtained, where 6 moves the robot following the subject's mind. While n6 obtained an accuracy of 50% where 5 moves the robot following the subject's mind.Figure 7. Human Brain Waves When Controlling the Robot Forward by Swinging Hands (blue) and Without Swinging Hands (red)

In terms of the response period, it can be seen that it is better without swinging an arm to move a robotic arm. This happens because the subject performs control by swinging his arm, the subject thinks of two conditions together, namely when the subject thinks about his arm and thinks about controlling the robot so that the focus of the subject controlling the robot is not on optimal conditions. Whereas without swinging the arm, the subject can control the robot because the subject's focus is only on controlling the robotic hand.

4. Conclusion

This study presented the motion of humanoid robots using Human brain waves. Types of waves consisting of Delta, Theta, Alpha, Beta, and Gamma are parameters of brain waves and motion which include simple human motion in robots as a classification of motion that occurs in robots. The data set in each parameter is derived from the dominant range that often arises from random subjects. The results were obtained in repeated one-way motion testing with an accuracy 60 – 100%. As for the combination of two moves, an accuracy 40 – 90% is obtained. The accuracy obtained varies greatly because the subject must be consistent with the intuition thought of in a humanoid robot. For further

development, the method of retrieving data sets needs to be carried out more massively so that the desired motion accuracy can be more precisely carried out.

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THE ROLE OF YOUTH IN PROMOTING THE "SOFT POWER" OF VIETNAMESE CULTURAL IDENTITY ON SOCIAL MEDIA PLATFORMS IN DIGITAL ERA (2019-2023)

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INFORMATION

Keywords:

Soft power, digital era, In promoting

ABSTRACT

In today's society, "globalization" has become an irreversible trend, the world transforms from a space demarcated by borders to a "global village", where geographical borders become more blurred. The current world has the character of "interdependence". Military power and power politics are no longer the first choices, instead, states are now trying to strengthen "soft power" to lead the game in international relations. National actors and communities from around the world seek opportunities to collaborate, connect, and promote development. Throughout this process, waves of culture blend into each other, interacting in complex ways. External trends from the outside have significantly changed the lifestyle, perception, and behavior of each individual and collective in society. This places considerable requirements on nation-states to find the "anchor" to maintain their identity, affirm the superiority of their culture, and also prove the prestige, influence and independence of their own countries. Social media has become a vital platform in spreading ideas and policies. They are essentially a non-physical environment, but their impacts on the physical society is undeniable. Young people are a highly adaptable force, pioneering in the use and exploitation of social networks. In Vietnam, since 2019, when the Covid-19 epidemic transformed most social activities to digital platforms, young people have proved their leading role when creating Vietnamese cultural trends and products that are highly diffuse not

only at the domestic level, but also internationally. Such practice illustrates that approaching and researching the role of young people in contributing to the increase of "soft power" of Vietnamese cultural identity is a requirement of high scientific and practical significance.

1. Definition of cryptocurrency

Cryptocurrency is a type of digital or virtual currency that uses cryptography for security and operates independently of a central bank. Cryptocurrencies are decentralized, meaning that they operate on a distributed ledger technology called blockchain, which records and verifies transactions. Unlike traditional currencies, cryptocurrencies are not issued by a government or financial institution. Instead, they are created through a process called mining, which involves solving complex mathematical problems using powerful computers. Cryptocurrencies are designed to be secure, anonymous, and fast, which makes them attractive to users who value privacy and convenience. They can be used to purchase goods and services, transfer funds, or hold as an investment. A crypto asset is an intangible digital asset whole issuance, sale or transfer are secured by cryptographic technology and shared electronically via a distributed ledger. The value of crypto assets is not controlled by any government, meaning that its value cannot be determined by any individual.

1.1. Brief history of Bitcoin

In the early days, Bitcoin was primarily used by a small group of enthusiasts and technologists. The first known Bitcoin transaction occurred on January 12, 2009, when Satoshi Nakamoto (person/group who created Bitcoin) sent 10 bitcoins to a programmer Hal Finney. As Bitcoin gained popularity, its price began to increase. In 2010, the first real-world transaction involving Bitcoin occurred when a programmer named Laszlo Hanyecz bought two pizzas for 10,000 bitcoins. At that time, the value of a single bitcoin was less than a penny. Over the years, Bitcoin has gone through various cycles of growth and decline. Through some research we got, we found it every 4 years, there is a price bump that makes the Bitcoin price increase rapidly. It experienced a significant boom in 2017 when its price skyrocketed to nearly $20,000.

1.2. Importance of understanding risks and potential returns associated with cryptocurrency

The world of cryptocurrencies is characterized by its rapid and unpredictable price movements, which can result in substantial gains or losses for investors. It

is paramount to be aware of the risks associated with these price fluctuations and to take into account one's investment objectives and risk tolerance before investing in cryptocurrencies.

Apart from the volatility aspect, security is another major concern when it comes to cryptocurrencies. The digital wallets that store these currencies can be susceptible to hacking or theft if not adequately secured. Hence, it is vital to comprehend the security risks associated with digital wallets and adopt appropriate measures to safeguard one's cryptocurrency holdings. On the other hand, being aware of the potential returns linked with cryptocurrencies can prove advantageous for investors. Cryptocurrencies have shown their ability to provide significant returns over relatively short periods of time; for instance, Bitcoin's value surged from around $1,000 in early 2017 to nearly $20,000 by year-end.

Furthermore, cryptocurrencies offer several benefits such as decentralized transactions, anonymity, and global accessibility that have led individuals and businesses worldwide towards increasing adoption of these currencies. So, comprehending both the risks and potential returns associated with cryptocurrency is crucial for anyone seeking to invest or use these currencies. While they offer significant profit potentialities, they also come with substantial risks that should not be overlooked. Conducting thorough research and carefully considering investment goals and risk tolerance are essential prerequisites before investing in cryptocurrencies.

The study concluded to use Maximum Drawdown to observe loss from a peak to a trough of a portfolio before a new peak is attained. However, it's important to note that it only measures the size of the largest loss, without taking into consideration the frequency of large losses. Because it measures only the largest drawdown, MDD does not indicate how long it took an investor to recover from the loss, or if the investment even recovered at all. It is an indicator used to assess the relative riskiness of one stock screening strategy versus another, as it focuses on capital preservation, which is a key concern for most investors. We tested with the scenario in 24 hours, showed the result that Bitcoin/cryptocurrency could dropped down to 52% of its price, showed its risks for investors, concluded that this kind of digital money should be invested when we have enough knowledge, information, or finance conditions to invested in Bitcoin also other cryptocurrency.

1.3. Impact of covid 19 on cryptocurrency

The highest price ever known was at the peak up to 65,153.09$ on 5th of November 2021. At that time the economic climate has been marked by

considerable uncertainty, with many individuals experiencing financial difficulties or losing their jobs due to the Covid-19 pandemic. In response, some people are turning to cryptocurrency as a means of diversifying their investments and safeguarding their wealth. Given the historically low interest rates, traditional investment options like bonds and savings accounts may not be yielding sufficient returns for investors. This has led some individuals to explore alternative investments such as cryptocurrency. The pandemic has also brought about greater awareness of cryptocurrency and its potential as a viable investment option. As more people become acquainted with this asset class, they may be more inclined to invest in it. However, it is important to note that cryptocurrency is a highly speculative asset and carries significant risk. Despite this fact, some investors may still be drawn in by the potential for high returns during these uncertain times. Moreover, market volatility has been rampant across all asset classes including cryptocurrency since the onset of the pandemic. Many investors view this as an opportunity to make profits through trading or buying low and selling high.

1.4. Research Methods

The research methodology used in this academic research paper was a quantitative approach that focused on analyzing trends and data related to the risks associated with cryptocurrency, with a specific focus on the Covid-19 pandemic. The study used the Maximum Drawdown (MDD) method to analyze the risks of Bitcoin, which is simple and one of the most important method that widely used cryptocurrencies.

The data on Bitcoin were collected from Kaggle sources, which provided a large dataset of historical Bitcoin prices and related information. We focused on the time that Covid-19 pandemic started and ended (2019 to 2021). The researchers analyzed the data to identify trends in Bitcoin prices loss, volatility, and other key factors that could impact the risks associated with cryptocurrency.

To ensure the accuracy and reliability of the data, we used Google Colab and Excel methods to clean and preprocess the data.

We then used the MDD method to calculate the risks associated with Bitcoin. This method measures the maximum loss from a peak to a trough of a portfolio over a specified period. In this study, we calculated the MDD of Bitcoin over a 24-hour period to analyze the risks associated with the cryptocurrency.

The findings of the study were then presented using statistical methods such as graphs and charts. We also used descriptive statistics to summarize the data and provide insights into the risks associated with cryptocurrency.

The research methodology used in this study provided a rigorous and systematic approach to analyzing the risks associated with cryptocurrency come along with the up-trend information, with a specific focus on the Covid-19 pandemic. The use of quantitative methods and statistical analysis helped to ensure the accuracy and reliability of the findings and provided valuable insights for investors interested in cryptocurrency.

4. Literature review

This scholarly article delves into the potential hazards linked to cryptocurrency, with a particular focus on its implications during the Covid-19 pandemic. To furnish a backdrop for this study, an exhaustive review of literature was conducted to scrutinize and assess prior research on this topic.

The literature review brought forth several key themes and discoveries related to the hazards associated with cryptocurrency. One of the biggest concerns surrounding cryptocurrency is its high level of market volatility, which has proven to be a significant challenge for both investors and businesses. Research indicates that cryptocurrencies like Bitcoin have experienced extreme price fluctuations, with prices sometimes swinging by as much as 10-20% in a single day (Bouri et al., 2018; Cheah & Fry, 2015).

Another crucial finding from the literature review was the potential risks associated with cryptocurrency, particularly in terms of fraudulent activities, money laundering and other criminal operations. Criminals have taken advantage of cryptocurrencies to carry out illicit transactions, and due to inadequate regulatory oversight and legal protections, law enforcement agencies have faced difficulties in combating these activities (Kiviat, 2019; Yermack, 2013).

Additionally, it was highlighted in the literature review that regulatory supervision is necessary for mitigating risks linked to cryptocurrency. Numerous studies have emphasized that greater regulatory clarity and oversight are essential to ensure safe and responsible use of cryptocurrencies (Chohan & Barber, 2019; Claessens et al., 2018).

Additionally, technological challenges and risks were identified in association with cryptocurrency such as cyber-attacks risk and an increased need for security measures to safeguard digital wallets along with other storage solutions (Soltani et al., 2018; Zohar, 2015).

On balance, the literature review provided valuable insights into all aspects related to risks associated with cryptocurrency thus posing challenges for investors, businesses, and governments. The literature review provided an excellent foundation for the research methodology used in this study and helped to frame the research question and objectives.

5. Discussion and conclusion

In these uncertain times of the Covid-19 pandemic, it's crucial to take steps to minimize the risks associated with cryptocurrency investments. To achieve this, we provide several measures.

The first and most essential step is diversifying the portfolio. It's unwise to invest all the money in one cryptocurrency or investment type. By spreading risk across various cryptocurrencies and investment products, we can minimize potential losses.

Secondly, staying up to date with the latest news and developments in the cryptocurrency market is crucial. Being informed about reliable sources can help us stay aware of any potential risks or changes in the market.

Thirdly, using reputable exchanges for buying and selling cryptocurrencies is vital. Conducting thorough research and reading reviews before choosing an exchange will ensure that we only use trustworthy options.

Fourthly, implementing security measures such as using a secure e-wallet, two-factor authentication, hardware to keep the cryptocurrency and regularly updating passwords can safeguard cryptocurrency holdings.

Lastly, it's important to be cautious of scams that prey on unsuspecting individuals by offering investment opportunities or requesting personal information through unsolicited emails or social media messages. Scammers often use fear tactics during uncertain times like these.

Individuals and businesses can mitigate potential risks associated with cryptocurrency investments during the Covid-19 pandemic while preserving their financial stability.

The study has been successfully pointed out pandemic caused by Covid-19 has brought to light the dangers that come with investing in cryptocurrencies, such as market volatility, cyber threats, regulatory ambiguity, fraudulent activities, and also with Maximum Drawdown method for analyze the Bitcoin loss, we received the loss approximately 50% in 24 hours, which is the crucial information for investors before making any decision to invest in Bitcoin or any other

cryptocurrency. Nonetheless, the growth of blockchain technology and other technological advancements have also opened new avenues for financial progress and investment opportunities.

To minimize the potential risks associated with cryptocurrency investments during this pandemic period, it is imperative to adopt a diversified approach towards investing. It is also crucial to stay updated on market trends and developments while using reputable exchanges that prioritize security measures. Additionally, one should exercise caution in order not to fall prey to scams.

Risks are basically the possibility of losing money. Indeed, there are always risks if investors invest in anything, but with looking up for information, using the right methods for analyze, we can reduce, optimize the risk of its.

Investing in cryptocurrencies remains a high-risk venture that can yield high rewards if approached correctly. Therefore, it is vital to conduct extensive research and seek professional advice before making any investments. By taking these necessary precautions, individuals and businesses can safely navigate the cryptocurrency market during this pandemic while potentially achieving significant financial gains.

Limitations and future research of the study

The study's limitations may stem from a small sample size or a short data collection period, which could affect the applicability of the findings. Furthermore, the study may not have accounted for all potential risks associated with cryptocurrency investments during the pandemic, such as the effect of a worldwide economic downturn on the market.

To address these limitations, future research could delve into how the pandemic has affected cryptocurrency investments over an extended period and evaluate different risk management strategies to minimize potential losses. Additionally, further studies could explore how government regulations might impact cryptocurrency markets and examine more advanced security measures to guard against cyber threats. Researchers could also investigate whether cryptocurrency investments have the potential to foster sustainable development and financial inclusion in developing economies.

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EMPOWERING HIGHER EDUCATION WITH AI-DRIVEN MATHEMATICAL SUPPORTON MOBILE DEVICES

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INFORMATION

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ABSTRACT

The significance and impact of mathematicsinindividuals' lives are expanding as technologyadvances.The advent of mobile technologies has yieldednumerousadvantages, including enhanced mobility, ease, andaccessibility, particularly within the realmof education. Thedevelopment of a mobile system that addresses the needsofboth high school pupils and college/university studentsisofutmost importance. This system should include solutionsforfundamental calculations as well as advanced algorithmsspecific to various disciplines. In response tothisrequirement, the present study introduces AiMA, amobiledevice that utilizes artificial intelligence to providesupportto college students in resolving mathematical challenges.This research aims to examine the constraints associatedwith existing mobile applications for mathematical problem-solving and put forth a proposed solution that specificallyaddresses the needs of university students throughtheincorporation of specialized algorithms. The AiMAsystemutilizes React Native for the front-end interface rendering,while employing Flask-server on the back-endfor theprocessing of numerical data. Furthermore, the integrationof an artificial intelligence (AI) model has been employedtoprocess input photographs that are kept within a cloud-basedmedia management platform for the purpose of detection.The

examination of the system's functioning suggeststhatAiMA offers several benefits compared tocurrentalternatives. It allows users to effectively tackle intricatecalculus issues and obtain customized answers that catertocertain mathematical domains. AiMAis an exceedinglyimportant resource for college and universitystudentsseeking specialist support in their mathematical studies.

1. Introduction

The term "mobile application" or "app" is frequently used to describe software programs developed for use on mobile devices, including smartphones, tablets, and other comparable devices. The main difference between regular desktop software and mobile applications is that they can be simply obtained from the designated app store. Most mobile phones can automatically install applications upon download, enabling a smooth and continuous setup process for the user. Furthermore, a significant advantage of mobile applications is their affordability. Nevertheless, mobile applications can display reduced functionality compared to desktop competitors, mainly due to the constraints imposed by the mobile operating system, such as iOS or Android. However, the application industry has gained popularity among developers due to its compact size, portability, user-friendly interface, and fast responsiveness. The employment of mobile technology to tackle practical challenges holds considerable importance. One remarkable area that require attention is the realm of education, with a particular emphasis on mathematics.

The increase in technology has led to an associated rise in the importance and influence of mathematics on individuals' daily lives. Students' perspectives regarding the importance of mathematics in their future studies and career paths will be influenced by changes in how they learn the subject and their conceptualizations. This will eventually affect people's views on the role of mathematics in their future educational and professional paths [1]. The research conducted by Sven Ove Hansson [2] has demonstrated the vital role of mathematics in advancing current technology and innovation. Several technical developments, such as artificial intelligence, machinelearning, and cryptography, heavily depend on mathematical principles such as calculus,statistics, and linear algebra. Developing a thorough computing system that addresses fundamental arithmetic operations and complex algorithms is the highest priority. This system should cater to many users, including high school students, undergraduates, and individuals seeking advanced studies. The popular mathematics mobil

applications now available in the market mainly focus on well-known and fundamental aspects of mathematics, such as calculus or trigonometry. Our research aims to tackle the existin gap in those specific areas.

This study presents AiMA, a mobile device that utilizes artificial intelligence to support college students in solving mathematical challenges. The mobile system will be implemented within the client-server architecture to create the mobile application. React Native is used in front-end development to promote the user interface (UI) rendering and enhance the overall user experience (UX). In the back-end context, the Flask server is applied and recognized as a highly efficient server for processing numerical data to control and compute the provided input. To improve user experience through feature diversity, an artificial intelligence (AI) model is used to handle input images that are kept within a cloud-based media management platform known as Cloudinary. The AI model is specifically employed for the task of detection.

The following are the most notable features of AiMA, which are convenient to create a portable feature for the application. Next is content quality, which is about generating an application that covers a broad spectrum of topics, from fundamental math to complex algorithms. In addition, the performance can be changed by employing various techniques, such as decreasing the file size of images and videos, utilizing caching, limiting network requests, etc. Finally, cost: The app should be free or inexpensive to use. If so, additional customers can be reached.

The performance evaluation shows the system's capacity to accurately calculate basic and complex expressions in a specified response period.

2. Background and Related Research

In our system, we mainly focus on the term "Theoretical Models in Computing", which refers to mathematical or abstract models that depend on using numerical methodologies. Numerical methods address mathematical issues across multiple fields that are not accessible to conventional mathematical equations or traditional methodologies. These approaches employ numerical and computational tools in substitute of conventional methods. The following issues are resolved utilizing various methodologies: First, linear and nonlinear algebraic equations, including the iteration method, Jacobi method, Gauss-Seidel method, etc. Second, derivatives and integrals with Newton method, Raphson method, Simpson ⅛ rule, Simpson ⅜ rule, etc. In addition, differential equations have Euler’s method and Runge-Kutta method. Finally, optimization problems, including the Newton method, Golden-section search method, an Interpolation method.

The advantages of employing numerical approaches over traditional methods include that using analytical methods can take time and effort to address some issues precisely. Numerical methods can be used to approximate their solutions. For example, complex integrals can be calculated via quadrature techniques such as Simpson's Rule, Trapezoid Rule, and Romberg's Method.

Additionally, several final products relating to mathematics mobile applications have been widely distributed to end users. A mathematics solver system was given by Microblink company, Photomath. This application is accessible only on the mobile platform. Because Photomath has become one of this category's most widely used applications, Tech Edvocate named it one of the top 20 teaching and learning apps in 2 017 [3]. In 2021, Photomath LLC reported raising $23 million in Series B funding, with Menlo Ventures serving as the lead investor [4]. Photomath is a vital tool for solving problems in only one realm of calculus. It can swiftly solve problems involving integrals, derivatives, and so on. Photomath, on the other hand, has difficulty solving lengthy and intricate expressions. However, a user-friendly interface makes Photomath more accessible. Photomath has an R&D (Research and Development) team researching mathematics approaches to provide the correct solution and ensure all of the show processes are expert-verified. Photomath scans and recognizes mathematics symbols on a user's mobile device using sensitive AI algorithms. Initially, Photomath could not notice the handwriting issue, but beginning in 2016, the software began recognizing handwriting in addition to printed text. The fact that Photomath can show you how to answer each problem for free is a big plus, but the explanations could be more varied. Due to student feedback, Photomath can now be used in the classroom for instructional purposes [5] Furthermore, pupils remarked that Photomath is a visually pleasing computational support tool with a simple interface [6]. Similarly, in 2011, Israeli businessmen Michal Avny, Adam Arnon, and Lev Alyshayev released Symbolab, a mathematics smartphone application. This multi-platform software can serve users on both mobile and online platforms. Nevertheless, users are advised to use their mobile version for optimal performance and to use all of Symbolab's features. When the AI scanner is only available on this platform, users can detect the expected mathematics problems using the camera on their mobile device. One limitation is that it cannot remove unnecessary characters. Symbolab, similar to Photomath, may resolve calculus issues. Conversely, this system covers a wide range of math topics, including geometry, trigonometry, and linear algebra. Furthermore, Symbolab's step-by-step display technique has been evaluated as effective. As a result, it has been proposed to be used as a teaching tool in many studies, including Nguyen

Viet Duong et al. [7]. Mathway is a different but equally popular application. Mathway expands on previous apps and covers a much broader range of fields. Mathway can also support physics and chemical formulas alongside math. The ability to solve trigonometrical problems is the most remarkable [8], and Mathway has been effective in this area since it includes various formulas and straightforward uses. Mathway, like Symbolab, is a multi-platform program with an advanced AI model that can accurately identify handwriting.

3. System Design

AiMA is primarily designed for web services and mobile devices. As a result, this research is exclusively focused on software, the application development process, and the waterfall development process model being utilized to construct the system illustrated in that is linear and sequential. It is divided into various phases, which include requirements collection and analysis, design, implementation, testing, deployment, and maintenance. Each phase must be completely executed before proceeding to the next.

A. Requirements & Analysis

The project requirements were gathered, assessed, and recorded throughout. Requirements & Analysis phases. To begin developing any product, getting needs from users is always critical. As a result, conducting a survey may gather the wants of future clients. A small-scale survey was conducted in this study to determine what the Information Technology and Logistics majors at the International University – Vietnam National University Ho Chi Minh City desired from the application of mathematics. . Students from these majors are asked one question in this survey. According to the survey findings, students from both main groups were familiar with and often utilized mathematics learning help programs. Mathway received excellent marks overall for its wide range of subject matter and user- friendly layout. However, the students stated that the primary disadvantage of many existing applications is the lack of support for specific mathematical subjects. Thus, they desire an app that addresses this issue. The following is a survey result that reveals the most concerned specialist fields:

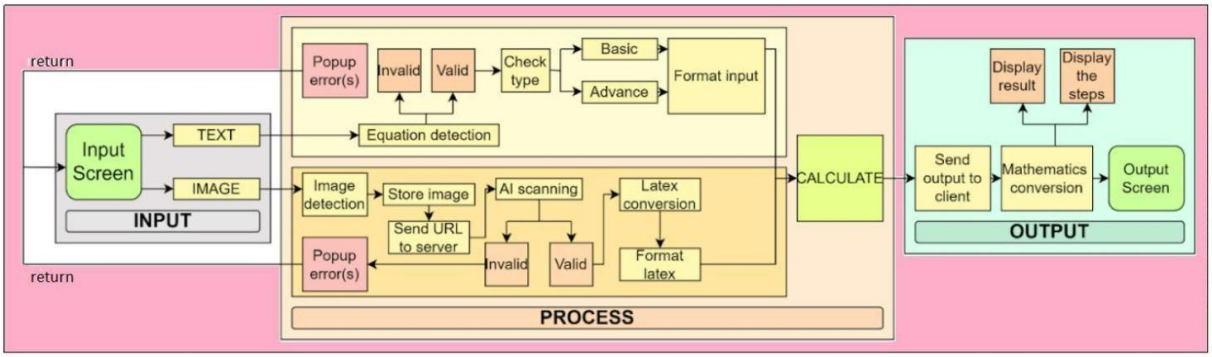

Figure 2. The bar chart indicates students' interest in areas of need

B. Design & Coding:

The design of this software program is primarily concerned with the process of receiving and exporting processed data. Said, the anticipated equation is the input data, which is then provided to the system for formatting and calculation, after which the system exports the output result for return to the user. Figure 3 depicts AiMA's system design.

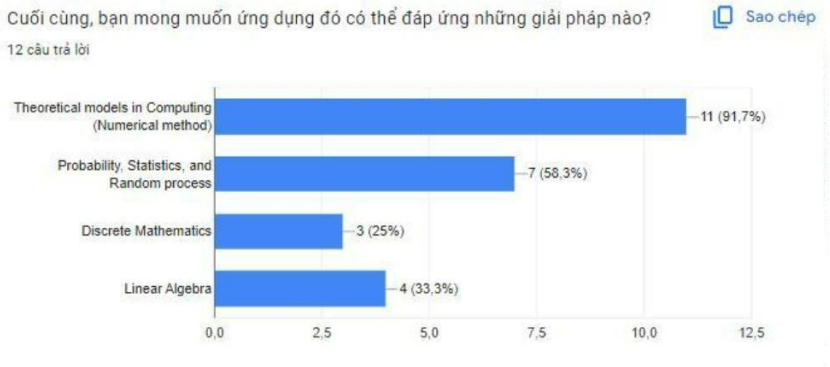

Figure 3. AiMA System design

The client-server architecture is often used in every mobile application, and mathematics mobile systems are no exception. JavaScript and Python are the primary programming languages utilized in this system [9]. The most prominent of which is React Native, a framework designed to construct clients for mobile apps. The main goal of React Native is to enhance the user experience on mobile devices. Native apps also provide fast-paced, high-performance cross-platform and mobile apps [10]. React Native provides a set of built-in Core Components and APIs ready to use in the app, such as React Navigation for constructing app routing or Axios for communicating to the back- end side. For the AiMA system, users have choices between typing in the edit box or scanning by their own mobile device's camera to recognize the mathematics input equation. All input data will be sent to the server for handling. On the back-end side, it focuses on the Flask

server, which is a collection of one or more computers that are packed together and solely dedicated to running software applications over the internet. It is server software capable of handling HTTP requests via the public internet, private LANs, and private WANs [11]. Due to a micro web server, Python has a solid capacity to execute numerical data from the client. As previously stated, the Axios library is included in this system to connect the client to the server through the HTTP protocol. The process will start from input data, which here is the equation string entered by the user. It will be passed from the client to the Flask server for processing. If the input is valid, the system will check the attached URL received by Axios for being sent to the corresponding back- end address for further processing actions. After getting the correct string, the server will format the input formula using Python methods such as Regex. Subsequently, the server will be able to compute and export the output, which contains the problem's solution and a set of steps for displaying on the user's side. The procedure will be quite different if the user makes use of the scanning feature of the application. The input will be in image format. This work incorporates an AI model known as pix2tex. Pix2tex[12] stands for picture to Latex", which means that this model plays a role in the conversion between image and text. For the model to recognize the image, several steps are required to process it. First, Python Imaging Library (PIL) is used to image class within it to display the image. In addition, Base64 is used for encoding and decoding the URL/URI of images. BytesIO is used as a class of Python that permits an object of IO. Data will be stored and executed in the format of byte. Moreover, Sympy a powerful library that can handle the expression by providing many symbolic mathematics.

Initially, the taken picture will be sent to the Flask server through a URI. Furthermore, base64 is in charge of encoding and decoding the legal URI for BytesIO's bytes-to-bytes conversion. Finally, PIL will read the output, which will allow the AI model to recognize the input picture.

The purpose of this pix2tex AI model is to discover a LaTeX code that corresponds to a given picture of an equation. Figure 4 is an example of the Latex Math Code.

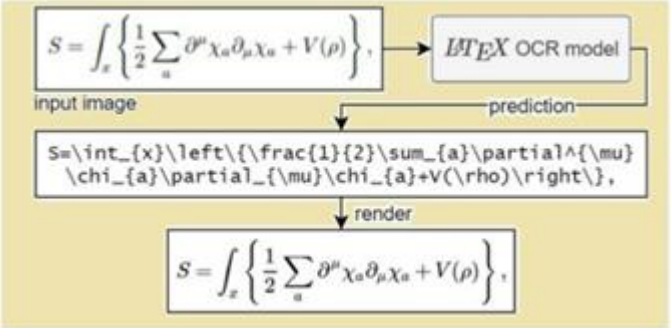

Figure 4. An example of the Latex Math Code [12].

When getting a Latex string, the back-end system can format it utilizing Regex and the Sympy library. One shortcoming of this model is that its capacity to detect handwriting has not been optimized; this must continue to be addressed in the future. The procedure is complete when the client receives the result as a latex string, which is then transformed back to mathematical characters for presentation on the client's screen via the Mathview library.

C. Testing & Deploy:

This application has been employed by Android Studio, which is responsible for supplying an emulated mobile device platform. To reach the end user, the program must be able to operate on a physical device. Therefore, it is essential to deploy the application on a mobile device to evaluate the system's functionality.

6. Results

AiMA could meet specific requirements after an aspect of its development was completed, and it became possible to solve problems involving simple mathematical operators, calculus, and numerical methods. Figure 5 depicts an AiMA screenshot.

Figure 5. The screen shows the result and steps on a mobile device

Reliable sources have thoroughly validated the answers to each method; consequently, it can be concluded that the project is proceeding in the correct direction. This mobile application for mathematics is currently accessible if it can be launched on a smartphone with Android OS. In addition, continually revised specialized computations, including the Golden section search method, Newton's method, Euler's method, Heun's method, and Simpson's rules, etc., not only yield exact results, but the step-by-step box is always displayed clearly and concisely. Applying React hooks such as useMemo and useCallback, which limit the time between interface re-renderings, dramatically improves performance. Table 1 shows comparisons between AiMA and associated mobile systems. AiMA satisfies the majority of the fundamental requirements for a math application. The simplicity and understanding of the UI and UX facilitates user interaction with the system Mathquill, a library that enables string-to-mathematics-symbol conversion, was implemented on the client side to assist the user in adjusting the input equation flexibly and accurately, particularly following the conventions of mathematical form. This library, nevertheless, cannot be integrated into this application since it is not compatible with th mobile platform. To overcome this limitation, Webview, a React Native component tha helps render the content on the native view, was implemented. However, Webview onl supports writing web pages in HTML, CSS, and vanilla JavaScript, which can result in many limitations when vanilla JavaScript cannot supplant and perform certain functions that the React framework can. Nonetheless, it is an effective method for achieving these essential tasks. Additionally, when digitizing photos, AiMA permits the selection of images from the gallery, a feature that a few other math applications in the app store lack. Therefore, users have more options to interact with the system.

7. Discussion, Conclusion, and Future Works

As technology advances, the value and impact of mathematics in people's lives improve. Mobile technologies have brought numerous benefits to education, including portability, simplicity, and accessibility. Developing a portable system that can serve college and university students and high school students is essential, providing solutions to fundamental and complex mathematical problems. The majority of available math mobile applications include a high-accuracy rate calculator with a variety of features. However, these software products are only designed to support mathematics topics for students in 12th grade and under, which means that a shortage of advanced disciplines can limit the software's accessibility to undergraduates. Furthermore, despite the reality that financial aid is used to sustain the application, a user who has utilized many math tools can recognize the constraints of the free package, including Mathway. To develop a

better application and reach the end user, it is essential to consider creating a low-cost product, even if it is free.

This study introduces AiMA, a mobile AI-based system that assists students at any level with math-related problems to fulfill this requirement. The client-server architecture is utilized for hosting, delivering, and managing the requested client resources and services. To create a software product, it is necessary to employ the appropriate development paradigm, in this instance, the waterfall method. This model's clear structure makes it simple to administer. In addition, the cascade paradigm is suitable for small-scale initiatives with specific requirements. Research focuses primarily on specialized areas of mathematics, such as numerical methods in theoretical models in computing subjects and probability and statistics issues. AiMA is an essential mobile system for college and university students needing specialized mathematics study assistance.

The AI feature of future works should be optimized. AI systems can be improved in several ways, the first of which is to collect more data because the more data collected, the more accurate and efficient the AI model will be. In addition, it is essential to clean and preprocess the data to minimize noise, outliers, and inconsistencies before training the model. This can be accomplished using dimensionality reduction, feature scaling, and data standardization.

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UTILIZING ARTIFICIAL INTELLIGENCE FOR IMPROVED DATA CENTER EFFICIENCY AND OPTIMIZATION OF POWER CONSUMPTION

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ABSTRACT

The rapid expansion of data center facilities in recent years has brought forth a myriad of concerns regarding operational efficiency and power consumption. These data centers, now pivotal in the era of Industry 4.0, face the formidable task of managing the vast data generated by technological advancements and diverse businesses. In response to this challenge, Artificial Intelligence (AI) emerges as a beacon of hope. The purpose of this study is to investigate the practical implementation of AI to enhance operational efficiency and optimize power consumption within data center facilities. Employing a qualitative methodology, our study adopts a multifaceted approach characterized by the integration of multi-case studies and semi-structured interviews involving three prominent data center facilities in Indonesia. Participants from each data center facility were selected through purposive sampling, ensuring that their insights would provide a profound understanding of the subject matter at hand. The findings derived from this study underscore the potency of combining the trio of technological advancements, namely the Internet of Things (IoT), Machine Learning (ML), and Artificial Intelligence (AI), in data center operations. This synergy results in several noteworthy outcomes, including the refinement of monitoring mechanisms for heightened accuracy, the

generation of invaluable historical data streams conducive to predictive analytics, and a comprehensive evaluation of equipment efficiency. In conclusion, the integration of AI into data center operations brings about a profound paradigm shift, decisively enhancing both operational efficiency and power optimization to such an extent that it holds significant promise for the data center industry.

1. Introduction

A data center facility (DCF) stands as a specialized facility dedicated to housing server racks and computer systems, serving a multitude of critical purposes, including telecommunications (Phan & Lin, 2014) and the provision of information services (Wiboonrat, 2020). These facilities are meticulously crafted to cater to specific high-priority applications, with servers and power infrastructure tailored to efficiently manage peak usage demands (Bhattacharya *et al*., 2013). The importance of data centers is underscored by several key factors, including their pivotal roles in data storage, data processing, ensuring 24/7 availability, facilitating disaster recovery, and offering scalability (Knapp *et al*., 2011).

Data centers have gained immense significance in the realm of business operations, driven by factors like the digital age, technological advancements, and enterprise Information Communication Technology (ICT) strategies (Shahim, 2021). As highlighted by Lu and Zhu (2021), the ICT industry has undergone a significant transformation with the introduction of cloud computing, which offers flexible on-demand resource provisioning and operates on a pay-as-you-go business model. Furthermore, prior research has consistently shown that the cooling of information technology (IT) equipment constitutes a substantial portion, accounting for 40% of the total energy consumed by data centers (Pawlish *et al*., 2015; Zhang *et al*., 2017).

The purpose of this study is to investigate the application of AI to improve operational efficiency and optimize power utilization within data center facilities in Indonesia. To address this purpose, the central research question (RQ) guiding this study is as follows: "*How can Artificial Intelligence be leveraged to enhance operational efficiency and minimize power consumption in data center facilities*?"

As the global importance of data centers continues to grow significantly, an increasing number of countries, including Indonesia, are developing essential

infrastructure, emphasizing data sovereignty, and implementing and enforcing regulations within this sector. As stated in the preamble of the 1945 constitution of the Republic of Indonesia, Indonesia's national aspirations aim to protect state sovereignty, national territory, and the nation's security, foster the intellectual advancement of the nation, and implement relevant regulations regarding data sovereignty (Nugraha *et al*., 2015). Furthermore, as reported by Mordor Intelligence (2023), the Indonesia Data Center Market is projected to expand from USD 2.06 billion in 2023 to USD 3.98 billion by 2028, representing a Compound Annual Growth Rate (CAGR) of 14.09% for the forecast period spanning from 2023 to 2028.

2. Literature Review

2.1. Artificial Intelligence

Artificial intelligence (AI) refers to the capability of machines to replicate cognitive functions commonly associated with human intelligence, including tasks such as learning, problem-solving, decision-making, and the recognition of faces and speech (Wei *et al*., 2023). From an alternative perspective, AI can be defined as a system that adeptly comprehends external data, acquires knowledge from this data, and applies these insights to accomplish specific objectives across diverse domains (Simay *et al*., 2022). Previous studies have investigated how AI-powered techniques improve the efficiency of data centers (Wang *et al*., 2015; Tuli *et al*., 2020). For instance, Wang *et al*. (2015) employed an AI-driven automatic scheduling technique to effectively manage cooling facilities, thereby optimizing cloud data center temperatures. This approach was instrumental in minimizing energy consumption, reducing latency, and optimizing bandwidth usage. Similarly, Tuli *et al*. (2020) leveraged an AI abstraction model to notably boost energy efficiency within data centers, underscoring the substantial positive impact of AI-driven approaches on energy conservation in such environments. Building on previous research, this study mainly investigates how data center facilities in Indonesia employ AI-powered techniques to enhance operational efficiency and optimize power consumption.

As the realms of big data and artificial intelligence (AI) continue to drive the advancement of social intelligence, there is an escalating global demand for data centers. However, considering data centers as information infrastructures, they exhibit substantial energy consumption. Consequently, the effective optimization and management of power consumption are emerging as pivotal concerns. Previous studies have delved into the efficient management of energy consumption in data center subsystems, including computing, storage, data

management, network, and infrastructure systems (Ebrahimi *et al*., 2014; Hammadi & Mhamdi, 2014). For instance, Ebrahimi *et al*. (2014) primarily explored the use of data center cooling technology to curtail power consumption, while Hammadi and Mhamdi (2014) investigated the impact of evolving data center network architectures on energy efficiency. In contrast, our study places its primary focus on AI-powered techniques as a means to address power consumption issues within Indonesian data centers. Leveraging AI offers several advantages. Firstly, the integration of artificial intelligence enhances a system's capacity to proficiently interpret external data, manage that data, and utilize the processed outputs for predefined purposes (de Sousa *et al*., 2019; Goralski & Tan, 2020; Vinuesa *et al*., 2020). Secondly, AI's transformative potential extends to the automation of numerous processes, ultimately leading to increased efficiency and productivity (Langer & Landers, 2021).

While there are numerous advantages to employing AI-powered techniques in data centers, it's crucial to recognize that the location of a data center plays a significant role in reducing energy consumption. For instance, in 2011, Google repurposed a former newsprint plant in Hamina, Finland, to create one of its most cutting-edge and efficient data centers globally. This facility stands out for its utilization of seawater from the Bay of Finland in its advanced cooling system and its commitment to running entirely on renewable energy from a newly constructed onshore wind park. Similarly, Facebook expanded beyond the United States by establishing its first data center outside of America in Sweden (Liu *et al*., 2020).

2.2. Machine Learning

In the field of artificial intelligence (AI), machine learning (ML) serves as a comprehensive term denoting the process by which a system acquires new knowledge, not through explicit programming but by analyzing data. The significance of machine learning has escalated across various domains, including applications in smart homes, healthcare, robotics, edge computing, cybersecurity, wireless communication, autonomous automobiles, and the Internet of Things (Hussain *et al*., 2020; Wang *et al*., 2020; Zhou *et al*., 2020). Additionally, the substantial volume of data accessible for research in contemporary society has contributed to the resurgence of machine learning solutions (Dong *et al*., 2021). The primary objective of machine learning is to enhance, define, and predict outcomes through the utilization of diverse algorithms that continually refine their capabilities through data analysis. As these algorithms assimilate training data into their models, they progressively augment their accuracy.

3. Methodology

The primary focus of this study is to comprehend artificial intelligence (AI) and its applications in data center facilities, while also recognizing the advantages of adopting AI, a relatively recent phenomenon, to enhance efficiency. This qualitative study employed case study data analysis, which serves as a valuable research design for gaining an in-depth understanding of real-world subjects, enabling the exploration of key characteristics, meanings, and implications. As noted by Johansson (2007), the case study method acts as a bridge across methodological gaps in the social sciences. Its utility extends beyond disciplines like psychology, sociology, anthropology, and economics, finding application in practical fields such as architecture, planning, environmental studies, social work, education, and business studies. Case studies analyze real-life situations using various data collection methods to gain a clear understanding of a problem (Sekaran & Bougie, 2016). These studies are conducted in a natural, holistic, and in-depth setting, akin to other qualitative research methods like phenomenology, ethnography, ethnomethodology, grounded research, and text studies.

This approach allows for the collection of natural data without imposing specific treatments on the research subject or context. Holistic research necessitates comprehensive information collection, including in-depth interviews, observations of community members, daily notes, and an examination of the subject's history. We aspire to glean comprehensive and factual insights from their data, leaving no informational stone unturned. As suggested by Salminen *et al*. (2006), the core objective of case study research is to attain a profound understanding of a selected phenomenon or set of cases. Exploratory studies are essential when limited information is available about a situation or research issues, and more information is required to establish a viable theoretical framework. They often involve secondary research, literature reviews, or qualitative data gathering methods.

In this study, semi-structured interviews have been employed to address initial issues and gather information. Semi-structured interviews prove highly effective for a variety of valuable tasks, particularly when several open-ended questions necessitate follow-up inquiries (Adams, 2015). These in-depth interviews allow participants to freely express their opinions about their world and thoughts, with a focus on understanding life experiences and their interpretations (Wilson *et al*., 2016). As proposed by DiCicco-Bloom and Crabtree (2006), the primary aim of individual face-to-face, in-depth interviews

is to cultivate a deeper understanding of participants' unique experiences and perspectives regarding a particular set of issues.

The interview flow was further facilitated by a well-prepared outline without constraining question wording or order. Semi-structured interviews cover essential questions and themes, allowing for adjustments in flow and the addition or removal of questions based on the conversation, which benefits the participants (Kallio *et al*., 2016). The interviews are recorded, enabling us to think freely and fill gaps in information. This technique permits revisions by comparing the interview with earlier statements, ensuring the accuracy and reliability of the data (Busetto *et al*., 2020). In qualitative research, validation measures the accuracy of findings in representing the study's phenomena. Data triangulation is vital for ensuring validity, as it was used in this study. Data triangulation involved comparing or cross-referencing information obtained from various sources to verify its validity.

We carried out the research at the three prominent data center facilities in Indonesia (**Table 1**). To maintain confidentiality and anonymity, data center facilities were given alternate names in line with ethical principles.

Table 1. Data center facilities

Case Studies	Brief Description
DCF 1	DCF 1 is a leading data center provider in Indonesia, offering reliable, well-networked, and carrier-neutral infrastructure services. DCF 1 was established with a total area of 8.7 hectares and a total power capacity of 300 megawatts (MW) across 5 data center buildings.
DCF 2	DCF 2 is a forum for gathering and coordinating all the nation's potential related to the data center industry in Indonesia, with the goal of creating data sovereignty in Indonesia. DCF 2 was also formed to support government programs, especially in realizing Indonesia's position as the largest digital nation in the region. The vision of DCF 2 is to fulfill Indonesia's potential as the largest data center market in Southeast Asia. The DCF 2 mission

	includes building a sustainable data center business ecosystem in Indonesia, enhancing cooperation in the data center industry both domestically and internationally, promoting data center business innovation in Indonesia, and supporting the use of data centers in Indonesia to further the country's national interests. Currently, DCF 2 oversees 7 data centers in Indonesia.
DCF 3	DCF 3 is one of the largest banks in terms of assets, funding, credit, and an extensive branch network. DCF 3 operates 417 branches, including conventional branches, Sharia branches, digital lounges, mobile branches, and kiosks; it also manages 3,278 ATM units, 4 Multi Denom Machine units (MDM), and 925 Cash Recycle Machine units (CRM), with a workforce of 10,936 employees spread across Indonesia. To manage its various business lines and customers, as well as the data owned by the company, DCF 3 rents space at a colocation data center facility.

4. Findings and discussion

The findings primarily rely on feedback provided by the participants. Important codes and themes are given in **Table 2**. We discovered that the integration of the Internet of Things (IoT) with machine learning capabilities plays a significant role in the implementation of artificial intelligence in data center facilities. According to Lee and Seshia (2017), IoT plays a crucial role in establishing a combined approach with artificial intelligence and machine learning. The findings also indicate that IoT devices, in the form of smart sensors, are being deployed for ecosystem monitoring and automation processes. These sensors effectively sense the physical environment and convert that information into data (Hua *et al*., 2023). These devices are responsible for controlling and monitoring various equipment, including but not limited to chillers and cooling towers, air handling equipment, hydraulic services, electrical services, UPS and batteries, temperature and humidity sensors, and water leak detection.

Table 2. Important themes and codes

Themes	Codes
Ecosystem monitoring	Temperature, humidity, power usage analysis, real-time analysis, monitoring time, infrastructure management
Predictive analysis and maintenance	Resource scheduling, preventive measurement, disaster recovery
Resource optimization	Power usage effectiveness, electricity optimization, human capital optimization

The findings highlight that leveraging the Internet of Things to establish connectivity among sensors and gather extensive data from environmental systems (including temperature, humidity, power usage, cooling systems, and security systems) significantly expedites the monitoring process, delivering real-time results. Previously, these results could only be obtained after a minimum of 3 days, with the quickest turnaround taking 1 day. This aligns with a previous study's argument that the integration of machine learning and artificial intelligence enhances the framework's intelligence and overall effectiveness (Manavalan, 2020). In a related context, Smolaks *et al*. (2022) conducted a study involving the implementation of AI at the TI Sparkle data center in Athens, Greece, for monitoring and controlling environmental conditions. The outcomes derived from the utilization of this AI software demonstrate a remarkable energy efficiency improvement of 20% to 25%.

Another significant finding of this study is that artificial intelligence (AI) can substantially enhance efficiency in data center facilities through big data analysis. According to one of the respondents, who serves as the chairman of a data center organization, AI's primary role in data centers is predictive analysis and maintenance. By processing vast amounts of data in real-time, AI can identify patterns and anomalies, enabling data center operators to proactively address potential issues and prevent system failures. This predictive analysis and maintenance approach minimizes downtime and maximizes the overall performance of the facility. Predictive analysis and maintenance involve using sensors and engine performance data to identify patterns and trends, ultimately improving productivity, efficiency, and workplace safety. Machine learning is often implemented to carry out predictive analysis and maintenance. As Landset *et al*. (2015) point out, machine learning aims to enable systems to learn from past events and make predictions about unknown future events. Implementing predictive maintenance programs in industrial companies requires the right technology infrastructure, trained teams, and a solid understanding of machine

operations, leading to increased efficiency, extended machine lifespan, and reduced repair costs. AI's automation capabilities play a crucial role in streamlining operational tasks within data centers. Through intelligent automation, AI can efficiently manage equipment, cooling systems, and other essential processes, reducing the need for manual intervention and optimizing overall efficiency. Furthermore, AI's anomaly detection and cybersecurity monitoring capabilities are vital for data center security. AI continuously analyzes network traffic, enabling it to detect unusual patterns and potential security breaches. Early detection allows data center operators to respond promptly and mitigate risks, ensuring the safety of sensitive data and the reliability of the facility. In conclusion, the research findings underscore that the utilization of advanced algorithms, machine learning, and extensive data resources empowers AI to aid organizations in recognizing potential threats, evaluating their ramifications, and formulating suitable response strategies.

Based on the findings, the utilization of AI has a significant impact on optimizing power usage. According to one of the respondents, power usage optimization can be achieved by analyzing the results from predictive analysis. These results are used to assess whether the equipment's performance and resource distribution are functioning efficiently. Since 2007, the data center industry has employed two key measures, Power Usage Efficiency (PUE) and rack density, to monitor progress toward increased facility efficiency. Power Usage Effectiveness (PUE) is a widely recognized energy efficiency measurement in data centers, considered one of the best methods for analyzing data center efficiency (Sharma *et al*., 2015). The optimal PUE value is one (1.0), and it cannot be reduced to the required value solely by addressing some unavailable DC facility components due to power loss (Sharma *et al*., 2015; Taheri *et al*., 2020; Uzaman *et al*., 2019). According to Kumar *et al*. (2021), PUE needs to be adjusted based on the DC component that will be tracked over time to achieve success. The PUE ratio is calculated as a percentage of the total DC loads, which encompass Data Center Cooling Load and IT Load. Temperature significantly affects energy efficiency in data centers. Cooling fans prevent overheating, which can reduce computing power and computation time. Maintaining an optimal temperature is crucial for maximizing energy efficiency (Kumar *et al*., 2022).

AI has brought about a revolution in data center efficiency through the optimization of power usage. By harnessing machine learning algorithms and real-time data analysis, AI dynamically allocates computing resources and manages power consumption based on actual demand. This approach leads to more efficient energy utilization and reduces operational costs. Notably, AI's

adaptability surpasses static power distribution models, as it continuously monitors and analyzes data center operations, accurately predicting future resource demands. AI intelligently allocates computing workloads across servers, directing them to the most suitable hardware resources based on their processing requirements. This minimizes resource wastage and maximizes utilization. Moreover, AI can effectively control and optimize cooling systems in data centers, making real-time adjustments to match specific heat dissipation needs. This dynamic cooling management prevents energy waste and lowers overall power consumption.

The AI-driven power optimization implemented in data centers results in substantial cost savings and contributes to a more environmentally friendly operation. It achieves this by reducing the overall carbon footprint through efficient energy usage. In a study conducted by Smolaks *et al*. (2022), AI was successfully implemented at the TI Sparkle data center in Athens, Greece. They deployed Vigilant cooling optimization AI software to monitor and control environmental conditions, resulting in a remarkable 20% to 25% improvement in energy efficiency. Early adopters also reported impressive reductions in power usage effectiveness of 20% to 30%. In essence, AI and machine learning applications excel in optimizing cooling and energy efficiency while effectively managing uninterruptible power supplies by seamlessly switching power paths to servers.

5. Conclusion

The challenges faced by data center facilities in reducing their carbon footprint and increasing efficiency amid high demand are formidable. However, with the rapid advancement of technology, numerous innovations have emerged to address these challenges. One such technological advancement that can tackle these issues is the Internet of Things (IoT), combined with artificial intelligence and machine learning. Based on the findings from this study, the utilization of artificial intelligence, machine learning, and the Internet of Things can offer solutions for the data center facility industry. The Internet of Things, comprising interconnected smart devices, generates precise and real-time data. This data is processed by AI to produce monitoring results. AI significantly reduces the time required for the monitoring process and enhances the accuracy of predictive and maintenance analyses. Data center facilities can mitigate existing risks by studying historical data and formulating future plans through the integration of AI, machine learning, and IoT. This integration yields remarkable results in

optimizing resource utilization. It not only conserves electricity and automates processes but also provides insights when machine performance is suboptimal.

The limitations of this study are primarily associated with the research process. Firstly, confidentiality constraints prevented us from gaining full access to all the necessary data. This restriction impacted the depth of the analysis and potentially led to the oversight of important factors. Secondly, the relatively small sample size used in this study is a result of the relatively new adoption of AI in data centers. Consequently, the findings may not offer a comprehensive representation of the overall population and may lack generalizability. Furthermore, the study's results need to be interpreted cautiously due to variations in equipment requirements among different data centers, and they may not be universally applicable to all data centers.

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YOUTH AND THEIR ACCESS TO DATA ANALYTICS

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INFORMATION

Keywords:

youth, big data, data analystics

ABSTRACT

Young people are a pioneering force promoting development in the digital age because of their dynamic, creative and energetic characteristics. Our diverse applications and potential Big Data is increasingly taken seriously, Data Analytics is an area that young people can pursue along with high recruitment demand, attractive salaries. The research paper is based on references and secondary data of reputable Web sites combined with the survey. In addition, short survey was conduced to examine the perception of young people today towards the bursting era of Big data and its potential implications, their willingness to learn and improve their skills. However, this paper also suffers from unfortunate limitations because the sample size is not yet large enough to represent a student community, but in the future this can be overcome.

1. Introduction

Nowaday in data-driven world, the field of data analytics has emerged as an important area of expertise. With an increasing reliance on data to drive decision-making and innovation, it is important to ensure that young people have broad access to this transformative field. Young people's access to data analytics has become an increasingly important topic as their potential to shape their future careers, drive digital literacy, and empower them to navigate the complexities of the modern information age.

To further clarify that issue, the research team produced this paper exploring the importance of young people's access to data analytics, highlighting the benefits, challenges, and the need for inclusive opportunities to bridge the gap between youth and the world of data analytics.

2. Theoretical background

Definition of youth

Although the example for the definition of youth in the eyes of the majority of us is easy to understand, but in theory, it has its scope and limitations, such as "A fluid concept with no fixed definition. It encompasses concepts such as 'youth' and 'adolescents'. For instance, the UN defines youth as persons aged 15 to 24 years, but in some contexts, this age can range up to 35." (INEE, 2023). Or in terms of personality, young people can be visualized "As a young person you are fit, strong and have enough energy to face problems, in fact you do not think about any problems, you look forward to every day in which you may try something new and challenging and people around you tend to tolerate your faults because of your lack of life experience."(Veronica, 2020).

Big data and data analytics

According to Hariri et al.(2019) "Big data analytics describe the process of analyzing massive datasets to discover patterns, unknown correlations, market trends, user preferences, and other valuable information that previously could not be analyzed with traditional tools. With the formalization of the big data's five V characteristics, analysis techniques needed to be reevaluated to overcome their limitations on processing in terms of time and space. Opportunities for utilizing big data are growing in the modern world of digital data. The global annual growth rate of big data technologies and services is predicted to increase about 36% between 2014 and 2019, with the global income for big data and business analytics anticipated to increase more than 60%.

Several advanced data analysis techniques (i.e., ML, data mining, NLP, and CI) and potential strategies such as parallelization, divide-and-conquer, incremental learning, sampling, granular computing, feature selection, and instance selection can convert big problems to small problems and can be used to make better decisions, reduce costs, and enable more efficient processing."

In another hand, Nguyen Thi Thanh Mai (2020) believed that "Data is the heart and center of accounting and the application of big data and Data Analystics today will help accountants convey more value of businesses to information users".

Data Analytics Applications

Financial statement analysis

According to Nguyen Thi Thanh Mai (2020) "Data is at the heart of accounting, and therefore big data can help accounting bring more value to

businesses. Internal or independent accountant needs to be at the forefront of applying big data and Data Analystics to professional practice.

For the audit industry, the content of big data refers to the collection of many types of data, including a combination of traditional structured financial and non-financial data, logistic data, sensor data, emails, phone calls, social media data, etc. blogs, as well as internal and external data. Big data and data analysis related to auditing financial statements is both a big challenge but also has the potential to create solutions for this very activity, which is new technology."

In addition, “Big Data is expected to continue spreading in the entrepreneurial world, and external auditing needs to become competent in terms of knowledge and implementation of new techniques. Besides, Big Data creates an opportunity for further enhancement of the auditing process by integrating financial and non-financial information.” (Balious et al.,2020).

Besides to its effective applications in economics-related disciplines, Nathan et al. (2022) claimed that big-data approaches lead to an increased understanding of the ecology of animal movement. It was asserted that the utilization of high-throughput wildlife tracking technologies is paving the way for novel research opportunities in the fields of biology and ecology. Nevertheless, these advancements bring along certain inherent challenges associated with big-data costs such as computational load, intensive data management and processing, and challenging statistical analyses.

Medical big data mining

At present, big data technology has been widely applied in health care, manufacturing, energy, transportation, environment, and many other fields. For example, Enayet et al. (2018) indicated that real-time access, sharing, storage, processing, and analysis of big data need to be realized. Villeneuve et al. (2017) showed that detecting vital data of patients with chronic diseases facilitates doctors to make clear decisions. Chen et al (2017) showed that accurate analysis of medical... Zhihan (2020).

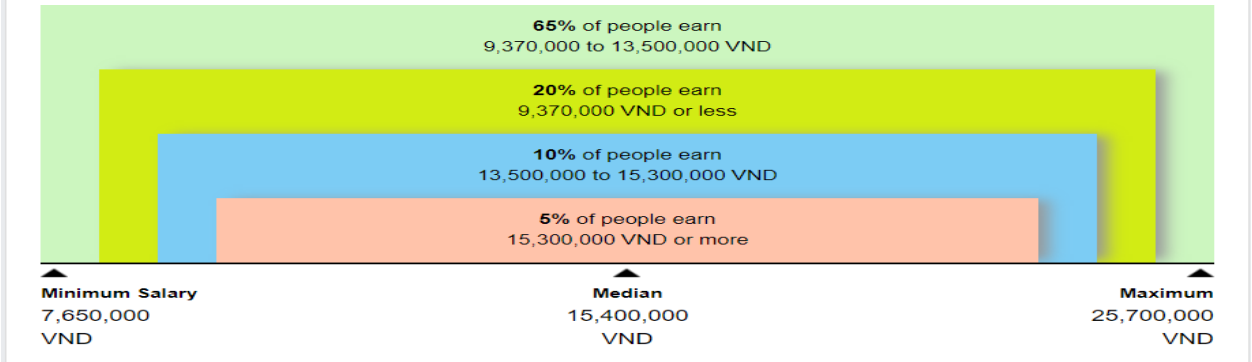
According to Kee and Ing (2019) “Analysis of big data by machine learning offers considerable advantages for assimilation and evaluation of large amounts of complex health-care data. However, to effectively use machine learning tools in health care, several limitations must be addressed and key issues considered, such as its clinical implementation and ethics in health-care delivery. Advantages of machine learning include flexibility and scalability compared with traditional biostatistical methods, which makes it deployable for many tasks, such as risk

stratification, diagnosis and classification, and survival predictions. Another advantage of machine learning algorithms is the ability to analyse diverse data types (eg, demographic data, laboratory findings, imaging data, and doctors' free-text notes) and incorporate them into predictions for disease risk, diagnosis, prognosis, and appropriate treatments. Despite these advantages, the application of machine learning in health-care delivery also presents unique challenges that require data pre-processing, model training, and refinement of the system with respect to the actual clinical problem. Also crucial are ethical considerations, which include medico-legal implications, doctors' understanding of machine learning tools, and data privacy and security. In this Review, we discuss some of the benefits and challenges of big data and machine learning in health care."

3. The access of young people and the current situation of data analytics

The current state of the data analytics industry

Today, Data Analytics is one of two biggest major branches of Data Science and is focused to develop, research its potential application in the fields of Health, Finance-Banking, Tourism-Travel, Weather, Environment, ... Since the digital transformation movement launched by the Vietnamese Government. According to Salaryexplorer (2023), an average salary of Vietnamese data analysts is 16.3 milion VND per month, which will range from 7.65 million VND/month to 25.7 million VND/month.



Source: Salaryexplorer's survey results (2023)

Figure 1. Salary Structure and Pay Scale Comparison.

The majority of reported salaries, around 65%, range from VND 9,370,000 to VND 13,500,000. About 20% of reported is below 9,370,000 VND, while 10% is between 13,500,000 VND and 15,300,000 VND. Only 5% of individuals' salary of more than VND 15,300,000.

In terms of years of experience, salary for Vietnamese Data analysts increase by about 12% every 18 months; while in all other occupations the figure is around 9% (Salaryexplorer, 2023).

Source: Salaryexplorer's survey results (2023)

Figure 2. Salary Comparison by Years of Experience for Data Analysts in Vietnam

It can be seen that for an amateur data analyst who have up to 2 years of experience, has a comparable salary to the average salary of a common Vietnamese labor is 8.25 million VND/month (VTV News, 2022). Wages tend to increase less for those with 10 to 15 years of experience or more. However, those have many years of experience tend to be promoted to senior management or senior staff have a higher rate and frequency of rewards than their subordinates. This is very predictable given the inherent responsibility of being senior personnel in the hierarchy, and that isn't pretty bad at all, with 57% reported they've received at least one form of compensation ranging from 2% to 7% of their annual salary (Salaryexplorer, 2023).

Considering the salary paid according to the degree, a person with diploma or certificates will have changes to get paid about 10.5 million VND / month and will increase to 58% if it is a Bachelor's degree, about 16.7 million VND/month. More than that, who got a Master's degree will have an average salary of 23.2 million VND/month.

With this enticing salary offer, it isn't difficult to understand that the Data Analytics along with many branches of Data Science are considerate as a promising industry when the Vietnamese Government is determined to ultilize digital transformation, which will contribute 20% to the GDP (Tuong Vi, 2022).

Young people's access to data analytics

Although Data Analytics is a very new industry, in the field of 4.0, people will create more and more data, and for the younger generation, today's trend gradually shows their clear access to the data analytics industry. Programming languages, such as Python, are increasingly sought after, with over 42,000,000 students enrolling in courses in the Python programming language at Udemy.com (Udemy, 2023). Until short courses on Data Analytics are held at platforms such as Udemy.com, Coursera.org, EdX.org, etc. In particular, at Udemy, there are more than 3,000,000 students participating, with minimum preferential prices from 199,000 VND (Udemy, 2023), while more than 150,000 students have registered for the IBM Data Analyst course held on the Coursera platform (Coursera, 2023), and there are more than 600 Data Analysis courses also implemented on edX.org (edX, 2023).

Not only that, the search for students of universities in Data Science in the markets is also very active. In Vietnam, in 2023, there will be 31 universities enrolling students in Data Science, with not too high scores from 15-18 points in terms of subject combinations, 75-950 in terms of competency assessment test scores (huongnghiep.hocmai, 2023). These figures show that universities in Vietnam are expanding enrollment opportunities so that young people can more easily access Data Analytics, paving the way for the promotion of big data analytics in Vietnam. Not only that, in the hotcourseabroad.com platform developed by IDP, there are more than 193 universities in the US that have offered Data Analyst courses, additionally, the platform also supports features for international students to find suitable universities (hotcourseabroad, 2023).

Indispensable in data analysis are data visualization and presentation skills. "Data presentation", or more correctly, "the art of storytelling through data", this is a skill developed by UEF University of Economics and Finance in Ho Chi Minh City. In order to help students better understand through the workshop "Data Storytelling", speaker Bui Thi Ngoc Thu said that Data storytelling is a structured approach to communicating Data insight, according to Nguyen Le (2022).

Student survey

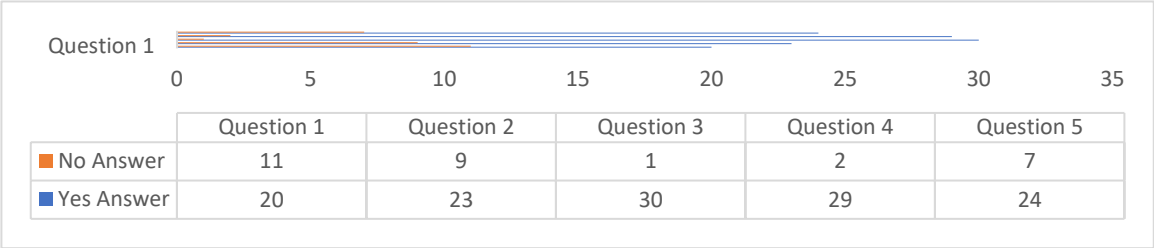
To examine the attitudes of some young people towards this field, we conducted a small survey with 31 students from Ho Chi Minh City University of Industry and Trade (HUIT). The survey will have 5 questions in the form of Yes/No answers including:

1) Are you currently interested in being a data analyst?

2) Do you think this could be your main job?

3) Do you have need to learn it as a formal training program at the Universities?

4) Are you genuinely accept to self-study through English online resources?



	Question 1	Question 2	Question 3	Question 4	Question 5
No Answer	11	9	1	2	7
Yes Answer	20	23	30	29	24

5) Currently, this is necessary to spend time supplementing with other knowledge of Mathematics and Informatics such as Statistics Query Language, Programming language. Will you accept to learn these knowledges?

Figure 4. Student response results.

In general, surveyed students have considerable interest and think this can be a major source of income when both the first two questions, the Yes answers are more than 50%. In addition, he vast majority of respondents have the desire to study Data Analytics to support financial analysis as a formal discipline at universities, even when asked whether they accept to self-study through English online resources or not. Finally, when asked about their acceptance of having to spend time supplementing with other knowledge before starting to study Data Analytics, the Yes answer was 3.34 times the No.

4. Conclusion

The number of multilingual Data Analytics courses is increasing and getting better and better, and universities are also expanding enrollment for related professions. It shows that the market is tending to promote and create more opportunities for young people to get closer to the Data Analytics industry. However, according to the survey, many students are still hesitant to pursue this new career because of technical and academic barriers.

In short, the young generation with epochal skills, promises to be a stepping stone for the data analytics industry to develop along with the amount of knowledge generated, indirectly helping business executives or researchers across the field to have broader insights, thereby making the right decisions, aiming at the common development goal of society in the digital age.

TIỂU BAN 2: CHUYỂN ĐỔI SỐ TRONG VĂN HÓA - GIÁO DỤC

A DISCUSSION ON DEVELOPER LIABILITY: BREAKING A BARRIER FOR YOUTH IN THE ADVANCEMENT OF THE WEB

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INFORMATION

Keywords: liability, a barrier, web

ABSTRACT

Who is to blame when a crime is committed using newer technologies? Its developers, the perpetrators, or both? This was a glaring question brought up in the author's undergraduate thesis[1] and explored broadly amongst those interested in technology[2]. During the aforementioned research, the author discovered that in the case of Tornado Cash, the answer was "both".[3] However, in the case of The Tor Project (Tor), the answer was "the perpetrators".[4] Despite both crimes stemming from the exploitation of platforms by criminals, evidently, there is no one-size-fits-all answer to this question.

1. Introduction

In her previous research, the author brought up two concerns arising from imposing legal action on developers if their creation is exploited by third party users: (1) it would only provide temporary relief, and (2) it may discourage technological innovation in the future. These opinions are shared by a co-founder of another service providing privacy for its users.[5] In the current research, the author focuses on the latter concern—how this matter may pose as a major deterrent for youth wanting to contribute to the development of the web. When it

[1] Andi Freeda Azizah Rezal, "Contradictions Between the US Anti-Money Laundering Regime and the Development of Web3: A Study on the Sanction Imposed on Tornado Cash" (2023) unpublished undergraduate thesis 8–11.

[2] See in general as cited in Rezal (n 1): (1) William J Tronsor, "The Omnipotent Programmer: An Ethical and Legal Analysis of Autonomous Cars" (2018) 15 Rutgers J L & Pub Pol'y 213; (2) Kristopher-Kent Harris, "Drones: Proposed Standards of Liability" (2018) 35 Santa Clara High Tech L J 65; (3) Karolina Drachovska, "E-Liability: Who Takes the Blame When No Human Is at Fault" (2020) 16 Common L Rev 23; (4) Yavar Bathaee, "Artificial Intelligence Opinion Liability" (2020) 35 Berkeley Tech LJ 113; (5) Cristina Carmody Tilley, "Just Strict Liability" (2022) 43 Cardozo L Rev 2317; (6) David Atkinson, "Criminal Liability and Artificial General Intelligence" (2019) 2 RAIL 333; and (7) Ankit Kumar Padhy and Amit Kumar Padhy, "Criminal Liability of the Artificial Intelligence Entities" (2019) 8 Nirma U LJ 15.

[3] Rezal (n 1) 1–2, 5–6.

[4] ibid, 11. The Tor network was initially worked on by members at the US Naval Research Lab in the 1990s and was deployed in 2002. The Tor Project was then founded in 2006 to maintain the development of the browser. See: Tor, "History" <https://www.torproject.org/about/history/> accessed 9 September 2023.

[5] See as cited in Rezal (n 1): Brian Newar, "Tornado Cash ban could spell disaster for other privacy protocols — Manta co-founder" (Cointelegraph, 17 August 2022) <https://cointelegraph.com/news/tornado-cash-ban-could-spell-disaster-for-other-privacy-protocols-manta-co-founder > accessed 10 September 2023.

comes to technological advancements, there is always the risk of new methods of committing crime arising.[6] Therefore, the author stresses the importance of prioritizing in-depth research concerning crimes committed through newer digital platforms to ensure proper solutions are set in place promptly. This is to ensure that future developments in technology by youth are not hindered by uncertainty surrounding criminal activity. Specifically, the author aims to explore the concept of developer liability—making recommendations on the criteria for holding developers liable for the illegal practices facilitated by their platforms, what developers must do to ensure that their platforms are used properly, and how to ensure that the rightful bad actors are punished for their offenses.

In this current paper, the author aims to first analyse and compare the cases of Tornado Cash and Tor; and then provide broad suggestions based on this study for matters to consider when developing policies in relation to criminal liability in cases where crimes are committed on digital platforms. Despite US law being relevant in both cases as explored in her thesis, the author shall not base her suggestions on only one country's policies in particular. This is to ensure that the recommendations given can be used to enhance the policies of any country.

2. A study on tornado cash and the tor project

In 2022, the cryptocurrency tumbler platform "Tornado Cash" was sanctioned by the US Office of Foreign Assets Control and added to the Specially Designated Nationals and Blocked Persons List (SDN) for its alleged involvement in multiple cases of money laundering.[7] One of the developers, and the accounts on Tornado Cash directly tied to the heist were also added to the list.[8] In addition to this, the developers of the service were charged and/or arrested in relation to this case.[9]

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[6] See in general as cited in Rezal (n 1): (1) Lamar Smith, "The New Challenges of Cybercrime" (2008) 20 Fed Sent R 356; (2) Jonathan Mayer, "Cybercrime Litigation" (2016) 164 U Pa L Rev 1453; and (3) Stephen Cobb, "Advancing Accurate and Objective Cybercrime Metrics" (2020) 10 J Nat'l Sec L & Pol'y 605, 607–608.

[7] See as cited in Rezal (n 1): US Department of Treasury, "U.S. Treasury Sanctions Notorious Virtual Currency Mixer Tornado Cash" (8 August, 2022) <https://home.treasury.gov/news/press-releases/jy0916> accessed 10 September 2023.

[8] US Department of the Treasury, "Cyber-related Designation" (8 August 2022) <https://ofac.treasury.gov/recent-actions/20230823> accessed 10 September 2023. For the full SDN List, see Office of Foreign Assets Control, "Specially Designated Nationals and Blocked Persons List" (10 February 2023).

[9] See: (1) Nikhilesh De, "Tornado Cash Devs Charged With Helping Hackers Launder $1B, Including Infamous North Korean Attacks" (CoinDesk, 25 August 2023) <https://www.coindesk.com/policy/2023/08/23/tornado-cash-devs-arrested-on-money-laundering-sanctions-violation-grounds-over-alleged-1b-moved/#:~:text=Tornado%20Cash%20developers%20Roman%20Storm,who%20is%20behind%20crypto%20transactions.> accessed 10 September 2023; and (2) Jack Schickler, "Tornado Cash Developer Alexey Pertsev to Remain in Jail Until at Least Late Februrary" (CoinDesk, 24 November 2022) <https://www.coindesk.com/policy/2022/11/22/tornado-cash-developer-alexey-pertsev-to-remain-in-jail-until-at-least-late-februrary/>.

We can see a stark difference in the treatment of Tor compared to Tornado Cash. A former executive director of Tor had previously revealed in 2017 that most sites available through the Tor browser facilitated criminal activity.[10] Some of these activities include the sale of illicit substances and firearms, and the distribution of child pornography.[11] However, rather than restricting or outright discontinuing the service, law enforcement has instead shifted their focus to bringing the actual perpetrators of the crime to justice.[12] Furthermore, the service is still available for public use.[13]

Why exactly were these two services treated differently by law enforcement? Their purpose, in essence, is to provide its users with some form of anonymity. Both platforms facilitate the use of cryptocurrencies, which in fact has been critiqued by many researchers for its involvement in cybercrime.[14] Both have been exploited by its users to conduct crime as discussed in this paper. But why did the developers of Tornado Cash face such severe consequences whereas the developers of Tor did not? The author suspects it may due to the lack of understanding law enforcement have of cryptocurrency mixers like Tornado Cash due to it being a new phenomenon. Since idea of Tor had been developed as early as the 1990s,[15] this gave enough time for it to be more researched.

3. Suggestions

3.1. Defining Developers' Liability

It is important to clearly state what exactly developers can be held liable for when their programs are misused as well as the rights of holders in such situations

[10] Patrick Howell O'Neill, "Tor's ex-director: 'The criminal use of Tor has become overwhelming'" (Cyberscoop, 22 May 2017) <https://cyberscoop.com/tor-dark-web-andrew-lewman-securedrop/> accessed 10 September 2023.
[11] See as cited in Rezal (n 1): (1) James Martin, "Lost on the Silk Road: Online Drug Distribution and the 'Cryptomarket'' (2014) 14 Criminology & Crim Just 351, 351-353, 356; (2) Amanda Haasz, "Underneath It All: Policing International Child Pornography on the Dark Web" (2016) 43 Syracuse J Int'l L & Com 353, 360-361; (3) Jakob Demant, Rasmus Munksgaard and Esben Houborg, "Personal Use, Social Supply or Redistribution? Cryptomarket Demand on Silk Road 2 and Agora" (2018) 21 Trends Org Crime 42, 43-44; (4) Julia Weber and Edwin W Kruisbergen, "Criminal Markets: The Dark Web, Money Laundering and Counterstrategies – An Overview of the 10th Research Conference on Organized Crime" (2019) 22 Trends Org Crime 346, 349-351;
(5) Paul Bleakley, "Watching the Watchers: Taskforce Argos and the Evidentiary Issues Involved with Infiltrating Dark Web Child Exploitation Networks" (2019) 92 Police J 221, 227-228; and (6) Shelby Davis and Bruce Arrigo, "The Dark Web and anonymizing technologies: legal pitfalls, ethical prospects, and policy directions from radical criminology" (2021) 76 Crime L & Soc Change 367, 371-375.
[12] See: (1) Haasz (n 11), 361-366; (2) Martin (n 11), 357-363; (3) Bleakley (n 11), 227-228.
[13] The Tor website is still up and the browser is still available for download as of 10 September 2023. See: The Tor Project, <https://www.torproject.org/> accessed 10 September 2023.
[14] See as cited in Rezal (n 1): (1) Eric Engle, "Is Bitcoin Rat Poison: Cryptocurrency, Crime, and Counterfeiting (CCC)" (2016) 16 J High Tech L 340; (2) Riddhi Pratim Dutta, "Changing Pattern of Criminal Economy: Use of Cryptocurrencies in Darknet and Criminal Forums" (2020) 3 Int'l JL Mgmt & Human 873; (3) David Buil-Gil and Patricia Saldaña-Taboada, "Offending Concentration on the Internet: An Exploratory Analysis of Bitcoin-Related Cybercrime" (2021) 43 Deviant Behaviour 1453; and (4) Elisabeth M S Frommelt, "Liability Challenges in the Blockchain Ecosystem" (2021) 21 UC Davis Bus LJ 165.
[15] Tor (n 4).

to avoid legal uncertainty. In the case of Tornado Cash, the developers were charged and/or arrested for "their involvement in money laundering".[16] In addition, their accounts on GitHub[17] were also banned.[18] With this, we can contemplate the fate of future developers: perhaps, would creating a platform that may potentially facilitate crime be considered "involvement"? With that logic, however, it would make sense for the developers of Tor and the project itself to also face the same consequences. Though, evidently, this was not the case.[19] The inconsistent treatment of both services may cast doubts amongst youth wanting to contribute to technological advancements. To avoid this, a clear provision on what exactly developers can be held accountable for should be provided. To ensure that these laws support technological developments, the legal protection of developers should be prioritized when determining this.

3.2. Standards Concerning Sensitive Information for Digital Services

In order to come up with clear standards for digital services that deals with the sensitive information of its users and aims to protect such data, it is important to take privacy and anonymity on the internet into heavy consideration. These are two very important things for users. This is especially true with decentralization[20] on the internet becoming more common due to the transition from Web2 to Web3.[21] The developers of Tornado Cash[22] and Tor[23] had acknowledged the importance of this and provide it with their platforms. A standard for how platforms that wish to provide its users with privacy and anonymity must therefore be provided. Furthermore, it should be made certain that the standards are up to date with the rapid developments of technology. Specifically, the author suggests that such a standard should ideally provide requirements for services to still collect certain data from its users (albeit limited) so that any criminal activity can

[16] De (n 9); Schickler (n 9).
[17] See to learn more about GitHub: Technology Transformation Services Handbook, "Intro to GitHub" <https://handbook.tts.gsa.gov/training-and-development/intro-to-github/> accessed 10 September 2023.
[18] See as cited in Rezal (n 1): Roman Semenov, X (02:04 a.m. WIB, 9 August 2022) <https://twitter.com/semenov_roman_/status/1556717890308653059?s=20&t=6RgUKmHNgRRi%20DhZM0QPpdA> accessed 10 September 2023. His GitHub profile shows that his last 'contribution' to the platform was on 2 August 2022. Roman Semenov, GitHub <https://github.com/poma> accessed 10 September 2023.
[19] See: (1) Haasz (n 11), 361-366; (2) Martin (n 11), 357-363; (3) Bleakley (n 11), 227-228.
[20] Rezal (n 1) 3–4. See: Ethereum, "Introduction to Web3" <https://ethereum.org/en/web3/> accessed 10 September 2023.
[21] See for detailed information and a comparison between Web2 and Web3: Ethereum, "Web2 vs Web3" <https://ethereum.org/en/developers/docs/web2-vs-web3/> accessed 10 September 2023.
[22] In an interview, Roman Semenov, a co-founder of Tornado Cash, stated that services like Tornado Cash helps to defend the right to financial privacy of its users. See: Sam Reynolds, "Tornado Cash Co-Founder Says the Mixer Protocol Is Unstoppable" (CoinDesk, 25 January 2022) <https://www.coindesk.com/tech/2022/01/25/tornado-cash-co-founder-says-the-mixer-protocol-is-unstoppable/> accessed 10 September 2023.
[23] In its history, and in its mission, the team behind Tor has expressed their goal with the project: to provide the public with privacy and anonymity when browsing through an uncensored internet. See: Tor (n 4).

still be traced; and to provide a guided process on how law enforcement can utilize this information to conduct their investigations efficiently.

3.3. Education and Training for Law Enforcement

To ensure that these types of criminal activity are handled properly by law enforcement, it is crucial to provide such personnel with sufficient education and training. Better yet, having a unit within law enforcement dedicated to cybercrime would be highly beneficial. This goes hand-in-hand with providing a clear definition of developer liability in the case of such crimes. The lack of understanding by law enforcement when dealing with the case of Tornado Cash was critiqued in the past.[24] This was discussed in the author's thesis: although the Financial Crimes Enforcement Network[25] has made efforts to improve and modernise the Anti Money Laundering Regime in America, these efforts have evidently fallen short.[26] With this recommendation, the author additionally suggests for the establishment of a standard for how to properly handle criminal cases involving the exploitation of digital platforms. It is essential to determine all parties involved in the case, with an emphasis on how exactly they were involved.

3.4. Transnational Cooperation

One of the most crucial elements on the internet is that it has no geographic boundaries. Activities done on the internet is not contained in only one country. Rather, it is transnational in nature. Many websites may be created by individuals or groups from one country for the purpose of sharing information with citizens of the same country.[27] However, nationals of other countries may still access such websites.[28] Therefore, in order to ensure that justice is served when it comes to cybercrime, transnational cooperation is necessary. This can come in two forms: Memorandums of Understanding (MoU) between two or more countries related

[24] Newar (n 5).

[25] Known as FinCEN; is the body that acts as the administrator for the anti-money laundering regime in America. See: Financial Crimes Enforcement Network, "Mission" < https://www.fincen.gov/history-anti-money-laundering-laws > accessed 10 September 2023.

[26] See: Rezal (n 1) 7–8. See also as cited in Rezal (n 1) 7: (1) Financial Crimes Enforcement Network, "FinCEN Seeks Comments on Modernization of U.S. AML/CFT Regulatory Regime" (14 December 2021) <https://www.fincen.gov/news/news-releases/fincen-seeks-comments-modernization-us-amlcft-regulatory-regime> accessed 10 September 2023; and (2) Himamauli Das, "Review of Bank Secrecy Act Regulations and Guidance" (FinCEN 15 December 2021) for prompt questions to be answered to help in the modernisation of the AML regime.

[27] For example, government agencies publish content on the web for the purpose of spreading information amongst their citizens. We know this since the information is almost always written in the country's primary language.

[28] Ibid. Some government websites do, however, provide an English translation of their website. This could be since they may expect non-native speaking individuals to access the website every once in a while. See for example: Mahkamah Agung Republik Indonesia <https://www.mahkamahagung.go.id/id> accessed 10 September 2023.

to cross-border cooperation for cybercrime, or the ratification of relevant treaties. It is important to note that some countries already have MoUs related to cybercrime and cyber security.[29] Furthermore, the Budapest Convention, a convention on cybercrime, already exists within the European legal sphere.[30] Additionally, a UN convention on cybercrime is currently being debated.[31]

4. Conclusion

In order to ensure that the issue of developer liability in criminal cases do not threaten the future of technological advancements by the youth, it is essential for countries to adopt comprehensive legal frameworks on new web-based technologies. For such policies, the author suggests countries to consider providing clear standards for the practices of both developers and law enforcement whilst emphasizing the protection of developers whose creations are exploited unbeknownst to them.

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[30] Convention on Cybercrime (Budapest Convention).

[31] UNGA Res 74/247 (27 December 2019) UN Doc A/RES/74/247. See meetings of Ad Hoc Committee: United Nations Office on Drugs and Crime, "Ad Hoc Committee to Elaborate a Comprehensive International Convention on Countering the Use of Information and Communications Technologies for Criminal Purposes" <https://www.unodc.org/unodc/en/cybercrime/ad_hoc_committee/home> accessed 10 September 2023. The most recent session was held on 21 August–1 September 2023.

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ASSESSMENT OF CRITERIA INFLUENCING THE SELECTION OF SHORT-TERM ONLINE COURSES

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INFORMATION

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ABSTRACT

Online courses are increasingly asserting their role in education. Despite certain barriers, online courses still retain the important key of providing knowledge in a more flexible way than traditional methods. Through the MOOC (Massive Open Online Course) platform, students from all over the world can absorb a large amount of knowledge from courses from this platform such as Coursera, Udemy, edX, and Udacity. To evaluate and select suitable platforms, in this paper, the Ordinal Priority Approach (OPA) is applied to evaluate the list of criteria. The objective of this paper is to investigate the criteria influencing the choice of short-term online courses through opinions and questionnaires of experts. A set of criteria consisting of 5 main criteria and 24 sub-criteria has been proposed. The results show that the quality of the training content is the top concern. Besides, the findings not only contribute to the literature but also give some practical implications for policymakers.

1. Introduction

The outbreak of the COVID-19 pandemic in late 2019 swiftly resulted in the shutdown of universities and colleges worldwide, radically changing the way students learn worldwide. In this context, e-learning platforms have been the ideal way for students to access sufficient and quality education. Ongoing content digitization initiatives and the growth in student enrollments for online courses on a part-time and full-time basis are driving the quick increase in the employment of e-learning platforms in the academic segment [1], [2]. The development of online learning technologies in higher education and distance learning, Massive Open Online Course (MOOC) platforms, has reinvigorated teaching and learning

and created a virtual space for educational interaction. A MOOC is an online educational environment that enables a vast number of students worldwide to participate in online courses in any subject [3]. The instructors come from elite universities and teach using videos and presentations. Enrollees in these courses can also engage with a community of teachers and learners who have similar interests. Students who complete the course can receive a certificate at the conclusion [4]. With the introduction of MOOC platforms such as Coursera, Udemy, edX, and Udacity in 2012 [5], it was foreseen as the next wave of university learning and, for the time being, forms an essential part of the higher educational response to the pandemic [6]. Many MOOC platforms have reduced or waived fees on hundreds of programs in response to the pandemic, and enrollments have risen dramatically since the outbreak. As the popularity of MOOC platforms is growing and the rapid increase in the number of similar e-learning websites available, selecting the right platform becomes crucial for learners [7], [8]. Choosing a specific e-learning website will directly impact end-user performance and promote network teaching quality. As a result, there is a need to develop reasonable and effective methods to evaluate the various e-learning platforms for selection purposes.

Indeed, the evaluation of MOOCs considers numerous conflicting criteria. Besides the design and quality of a platform which is of great concern for learners and website designers, a good MOOC platform must satisfy many more factors in today's situation, such as the ability to enhance interactivity features, provide accreditation, certification, and career advice to learners [9], [10]. Thus, the process of evaluating and selecting MOOC platforms with the best performance for higher education can be formed as a multi-criteria decision-making (MCDM) problem. In this paper, the Ordinal Priority Approach (OPA) method is employed for assessing the criteria influencing the selection of short-term online courses through expert opinions and questionnaires.

2. Literature Review

Ever since MOOCs became popular, there has been an extensive number of previous studies paying attention to MOOC performance and success evaluation from various aspects. Espada et al. [11] evaluated the user experience of MOOC platforms with a quantifiable and helpful index for comparing different MOOC platforms, quantifying the quality evolution of the user experience, and promoting further studies to determine the impact of the user experience on students: satisfaction in surveys, enrollment figures, dropout rates, among others. They argued that user experience is a critical factor that MOOC platforms must put

much effort into caring for aside from the content. It significantly influences the quality of a course, with a bad user experience can lead students to drop out of an exciting and well-organized program. Baturay [5] examined MOOCs from pedagogical and technological implementations, with a combination of real-world issues with the experiences of well-known MOOC platforms was described. Tsironis et al. [12] investigated the usability features as specific non-functional requirements of the top MOOC providers (edX, Coursera and Udacity), using the combined experimental and inquiry usability evaluation methods. Conache et al. [4] analyzed various factors that led to some MOOC platforms' success. Based on the user's implication and demands, the comparative analysis contains three sets of criteria: business model, course design and popularity among online users. Gamage et al. [13] considered six MOOC platform designs regarding the lens of collaboration and types of interactions that occur as learner to learner, learner to instructor, learner to platform and learner to content. On the same note, Li et al. [14] analyzed many vital factors in MOOC pedagogy based on sentiment analysis of learner reviews to find what makes a hit for MOOCs. The study distinguishes two course types based on learners' outcome intent: knowledge-seeking MOOCs and skill-seeking MOOCs. Impey and Formanek [6] highlighted the enrollment increase during the second quarter of 2020 and its close relationship to the time of the pandemic as a result of the COVID-19 pandemic's effect on rising enrolment in online classes. The authors investigated systematic changes in learners before and throughout COVID. They then examined whether the recent increase in MOOC enrollments had long-term consequences for online learning and the future of higher education.

For the e-learning website evaluation and selection, the application of various MCDM techniques based on specific performance criteria has been put forward in the literature. Yuen [15] proposed an MCDM approach of primitive cognitive network process for elearning platform selection. Jain et al. [7] employed the weighted distance-based approximation (WDBA) method for solving e-learning website evaluation problems. For assessing and ranking various online learning websites in ascending or descending order based on their Euclidean distance value from the optimal website, a quantitative computational model based on weighted Euclidean distance-based approximation and complex proportional assessment has been developed in [16]. Garg [17] proposed a matrix method for e-learning website evaluation and selection. Khan et al. [8] presented the use of a newly created multi-criteria decision-making (MCDM) method, namely the Proximity Indexed Value (PIV) method, for ranking and selecting e-learning websites. A fuzzy complex proportional assessment (COPRAS) method was proposed in [18]

to measure the performance of programming language e-learning websites. Intending to offer an integrated MCDM based approach and symmetry principles for e-learning course selection, Jaukovic Jocic et al. [19] used the pivot pairwise relative criteria importance assessment (PIPRECIA) and the interval-valued triangular fuzzy additive ratio assessment (ARAS) methods. Gong et al. [20] suggested a novel combined MCDM model of linguistic hesitant fuzzy sets (LHFSs) and the TODIM (an acronym in Portuguese of interactive and multi-criteria decision making) method to determine the best e-learning website for network teaching. Toan et al. [21] proposed an integrated approach of grey analytic hierarchy process (G-AHP) and grey technique for order preference by similarity to ideal solution (G-TOPSIS) to evaluate the best e-learning service providers for network teaching in Vietnam. Su et al. [22] used the best worst method (BWM) to determine the significance of criteria and VIKOR (VIseKriterijumska Optimizacija I KOmpromisno Resenje) method to rank well-known domestic MOOC websites in China.

In this study, the author employs the Ordinal Priority Approach (OPA) method to assess the criteria influencing the selection of short-term online courses. This paper examines five primary criteria and 24 subsidiary criteria, with survey results evaluated by ten experts who are experienced university faculty/managers with over 5 years of expertise in the field of information technology.

3. Results Analysis

3.1. Evaluation Criteria System for Evaluating and Ranking MOOC Platforms

After conducting a literature review and obtaining expert opinions, the author team compiled a set of criteria including 5 main criteria: website design, website organization, teaching program design, content quality, customer needs and 24 sub-criteria. The criteria for evaluating short-term online courses are described below

Website Design (C1)

User-friendly (C11): It provides users with ease or understanding to operate the website effectively. It enhances their satisfaction level as they can easily access the website.

Stability (C12): The state or quality of being stable or unchanged in the e-learning system.

Attractiveness (C13): The website design must be attractive with font size, style, background and color to keep the learner's attention so that they will spend most of their time on the learning platform.

Browser compatibility (C14): Different users have different browser features and settings. Web-based solutions must be compatible with popular browsers and browser settings that learners are most likely to use.

Website Organization (C2)

Navigation (C21): The positioning system plays an important role in reducing search time for users and improving their satisfaction level as it provides guidance on how to access relevant information.

Response rate (C22): It refers to how long it takes for the website to load the information requested by the user. If the website takes too long to load, users will switch to another website.

Attraction score (C23): The frequency of display appearing on the website or advertisements displayed viewed by users.

Interaction (C24): This figure evaluates the availability of additional features of traditional media for digital media. The content of this aspect includes the availability of Frequently Asked Questions (FAQs), help systems and feedback. E-learners benefit from full responsiveness as a motivator.

Connection (C25): It characterizes the social links of the website with other Social Network sites such as Facebook, Twitter and YouTube. Their links allow users to connect with people all over the world, which will surely boost the number of potential users on the website.

Security (C26): This criterion contains features that can be used to evaluate the security of a website. A trustworthy website must ensure the privacy of personal information and user privacy. The security scope should be specified on the website.

Teaching Program Design (C3)

Timeliness (C31): It indicates that the amount of information on the website is updated. If documents are stagnant and not updated, users will lose interest. Therefore, continuously updating documents not only encourages users to return to the site but also improves its quality.

Usefulness (C32): The usefulness of teaching and learning materials aims to make lessons interesting, easy to learn and allows teachers to easily express concepts that can significantly increase learner performance by supporting learning.

Diversity and richness (C33): This criterion determine whether their teaching program can meet customer needs for richness and diversity of online training content and available libraries.

Practicality (C34): This criterion determines whether teaching and learning materials are practical, effective and realistic.

Content Quality (C4)

Easy-to-understand content (C41): Reliability, clarity and conciseness are all part of this criterion. When using educational websites, competence is especially important because high-quality materials must be ensured. It is also important to ensure that learning objectives are met. Furthermore, text must be simple to understand, clear and concise.

Multilingualism (C42): This criterion indicates whether the platform can provide courses in as many languages as possible.

Accuracy (C43): It relates to the accuracy of the information presented to the learner. Practical documents counteract user confusion, leading to increased user reliability and easy acceptance of the website.

Ethical and legal issues (C44): It is very important to clearly acknowledge legal and ethical issues on a specific e-learning platform.

Customer Needs (C5)

Price (C51): Prices on e-learning platforms can be confusing for users as there are many different types of courses and pricing methods. Therefore, a pricing plan page must be clear and simple, and must be classified to suit the needs of each user (free, fee per course, subscription).

Financial support (C52): Large cost savings for learners as a solution to support learners with related courses without incurring costs through the course page policy.

Personalization (C53): This criterion indicates the degree of customization based on consumer needs, making the website more attractive to e-learners.

Certification (C54): Whether the platform can provide learners with recognized degrees or certificates from top universities after completing courses.

Discussion environment (C55): Whether the e-learning platform is designed to create an interactive environment between learners and their instructors. They are usually in the form of forum discussions where students discuss lesson topics while being moderated by teachers. Some language and acting courses may even offer live classes through video conference rooms.

Career counseling (C56): This criterion indicates that if users can get a job after completing one of their courses. It depends on whether the e-learning

platform can provide career counseling services or organize meetings with their career counselors.

Survey data collected from 10 experts (E1,…E10) who are lecturers/managers at universities with over 5 years of experience and expertise in the field of information technology (Table 2).

Table 2. Expert survey data

Criteria	**E1**	**E2**	**E3**	**E4**	**E5**	**E6**	**E7**	**E8**	**E9**	**E10**
5 Main Criteria										
C1	5	5	4	5	3	4	5	5	4	5
C2	4	4	4	4	5	5	4	4	5	4
C3	3	2	2	2	1	1	3	1	1	2
C4	2	1	1	3	2	2	2	2	2	1
C5	1	3	3	1	4	3	1	3	3	3
24 Sub-Criteria										
C11	17	2	16	3	7	1	20	22	18	6
C12	16	3	14	12	8	2	11	9	23	5
C13	18	4	18	14	6	12	10	8	16	18
C14	15	5	24	13	15	3	21	7	16	24
C21	14	14	23	19	17	13	23	6	18	16
C22	10	15	15	21	9	4	12	10	23	4
C23	12	16	21	23	16	15	8	11	18	15
C24	11	17	20	4	1	5	9	12	3	3
C25	13	18	19	15	18	16	15	13	4	12
C26	9	1	17	16	19	6	24	21	7	11
C31	7	6	6	9	21	17	13	23	5	2
C32	5	7	5	6	2	7	14	24	1	1
C33	6	8	7	11	3	18	3	1	6	14
C34	8	9	4	10	4	8	2	2	2	7
C41	3	10	2	7	5	19	16	3	14	8
C42	4	23	3	24	20	9	22	14	14	23
C43	2	11	1	8	10	20	17	15	8	10
C44	1	12	3	22	22	14	18	16	21	19
C51	19	21	8	1	11	10	4	17	12	21
C52	23	22	11	20	12	22	5	18	12	22
C53	21	13	12	17	13	21	19	19	22	9
C54	20	24	9	2	14	23	1	4	9	20
C55	22	19	10	5	23	24	7	5	10	13
C56	24	20	13	18	24	11	6	20	11	17

3.2. Determining the Weight of the Criteria Set

The OPA method is used to calculate the weights of the criteria. There are 5 main criteria including website design (4 sub-criteria), website organization (6 sub-criteria), teaching program design (4 sub-criteria), content quality (4 sub-criteria) and customer needs (6 subcriteria). The survey results were evaluated by 10 experts who are lecturers/managers at universities with over 5 years of experience and expertise in the field of information technology. The weights of the experts, main criteria and sub-criteria from the OPA results are shown in Table 3 and the impact level of the criteria is shown in Figure 1.

From the weight result table of the 5 main criteria, content quality (C4) has the greatest impact with a weight of 0.3126, followed by customer needs (C5) with a weight of 0.2953, teaching program design (C3) with a weight of 0.2587, website organization (C2) with a weight of 0.0786, website design (C1) has the least impact with a weight of 0.0548. From the weight result table of the 24 sub-criteria, the 5 criteria with the greatest impact are: accuracy (W_C43=0.0753), ethical and legal issues (W_C44=0.0743), usefulness (W_C32=0.0700), easy-to-understand content (W_C41=0.0697), practicality (W_C34=0.0616). Therefore, these 5 criteria need to be given more attention in evaluating and selecting short-term online courses. On the other hand, the criterion with the lowest impact is career counseling (W_C56=0.0134).

Table 3. Results from OPA model

Expert	Weight	Main Criteria	Weight	Sub-Criteria	Weight
E1	0.3426	C1	0.0548	C11	0.0514
E2	0.1713	C2	0.0786	C12	0.0442
E3	0.1197	C3	0.2587	C13	0.0332
E4	0.0857	C4	0.3126	C14	0.0323
E5	0.0685	C5	0.2953	C21	0.0207
E6	0.0571	C22	0.0339		
E7	0.0489	C23	0.0225		
E8	0.0428	C24	0.0473		
E9	0.0291	C25	0.0229		
E10	0.0343	C26	0.0529		
C31	0.0493				
C32	0.0700				
C33	0.0602				

5. Conclusion

In recent years, online learning has become an important component of the modern education system. E-learning has been widely used in various fields with

many advantages over traditional face-to-face learning, including lower material costs, improved learning standards, real-time access, customized learning, time savings, high-quality learning content, and unlimited study time. Evaluating online learning platforms is very important, so this paper uses the Order of Priority Ranking (OPA) method to evaluate the criteria that influence the selection of short-term online courses. The author team has built a set of criteria including 5 main criteria and 24 sub-criteria, 10 experts in the field were invited to survey the impact of the criteria. The quality of training content is the top concern. For future research, the authors propose to consider adding more criteria and comparing results with other MCDM methods to enhance the practicality of research.

BALANCING INNOVATION AND PROTECTION: STRENGTHENING INTELLECTUAL PROPERTY SAFEGUARDS IN METAVERSE DIGITAL TRANSFORMATION EDUCATION FOR YOUTH

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INFORMATION

Keywords:

short-term online coursses, e-learning, criteria, MOOC, OPA, MCDM

ABSTRACT

Online courses are increasingly asserting their role in education. Despite certain barriers, online courses still retain the important key of providing knowledge in a more flexible way than traditional methods. Through the MOOC (Massive Open Online Course) platform, students from all over the world can absorb a large amount of knowledge from courses from this platform such as Coursera, Udemy, edX, and Udacity. To evaluate and select suitable platforms, in this paper, the Ordinal Priority Approach (OPA) is applied to evaluate the list of criteria. The objective of this paper is to investigate the criteria influencing the choice of short-term online courses through opinions and questionnaires of experts. A set of criteria consisting of 5 main criteria and 24 sub-criteria has been proposed. The results show that the quality of the training content is the top concern. Besides, the findings not only contribute to the literature but also give some practical implications for policymakers.

1. Introduction

In the era of the Industrial Revolution 4.0, it is impossible not to mention "Metaverse". On October 28th 2021, Facebook, one of the largest social networking platforms in the world officially changed its company name to Meta, aiming for a new era that is supposed to be the future of the internet. Since then, the Metaverse wave has spread around the world with rapid development and countless

potential projects are invested and implemented. Tech giants IBM, HTC, Microsoft... have also joined the race to build their own Metaverse standards.

The development of Industrial Revolution 4.0, including the Metaverse, has raised numerous legal problems for IP law when it is not difficult to see in Metaverse that there are objects that can be registered for protection as trademarks, industrial design, copyright. Therefore, IP legislation should soon create or clarify mechanisms to establish rights and protect IP rights for intellectual products created in this environment.

According to a report from ByBit, more than half (51%) of global users of metaverse virtual worlds are aged 13 or under. And 83.5% of metaverse virtual worlds users are under 18. With the trend of Metaverse users becoming increasingly youthful, coupled with the rising popularity of user-generated content activities, it emphasizes the importance of educating the younger demographic about protecting their intellectual property rights.

As the Metaverse gains traction as a dynamic digital landscape characterized by virtual environments and interactive experiences, it has attracted a significant number of young users. Many of these users being under 18 years old highlight the need to ensure their safety, well-being, and understanding of their intellectual property rights. The proliferation of activities involving user-generated content underscores the importance of instilling a sense of responsibility and digital citizenship among the youth.

Currently, there is no universally agreed-upon concept of the Metaverse, but based on its manifestations, the concept of the Metaverse can be understood as a digital realm created by technology, in which users can interact, communicate, engage in simulated activities and build immersive digital experiences. The services provided within the Metaverse are highly diverse, ranging from entertainment, shopping, social networking, to providing work environments, learning spaces, and more. What is particularly unique about the Metaverse is that young individuals can generate and own digital content, including digital assets like land, real estate, objects, clothing, and even personal brands. Simultaneously, they can trade and share their digital content to generate income

Industrial Property Rights (IPRs) include rights related to inventions, industrial designs, layout-designs of semiconductor integrated circuits, trade secrets, marks, trade names and geographical indications[2]. Regarding the subject of Industrial Property Rights (IPRs), it is evident in the Metaverse that there are objects that can be registered for protection. In this article's scope, the authors focus on analyzing a few issues related to two common subjects of IPRs:

trademarks and industrial designs. With that, came to a conclusion of specific indication for youth to gain a comprehensive understanding of intellectual property rights within the evolving landscape of the Metaverse. As they actively engage in creating, sharing, and trading digital assets, particularly trademarks and industrial designs, it is imperative for young users to familiarize themselves with the legal frameworks that safeguard their innovative outputs. By learning about the registration processes, protection mechanisms, and potential infringements related to their creative endeavors, young individuals can ensure their contributions are respected and properly attributed. Moreover, they can cultivate a culture of responsible and ethical digital content creation, contributing positively to the dynamic environment of the Metaverse.

2. Establishing industrial property rights in the Metaverse

2.1. Establishment of industrial property rights to industrial designs

The object of an industrial design is the outer shape of a product that crystallizes its aesthetic creation value and meets the conditions prescribed by law to be protected exclusively for a certain period of time. Industrial design is protected if it meets the following conditions:

Regarding novelty: Novelty is understood as a significant difference from other industrial designs which have been publicly disclosed by use or by means of written descriptions or in any other form either inside or outside Vietnam prior to the filing date or the priority date, as applicable, of the application for registration of the industrial design. Thus, the condition of novelty of an industrial design is expressed through two requirements:

(i) the existence of features that can be recognized, remembered and used to distinguish between two industrial designs and (ii) has not yet been disclosed by use, written description or any other form.

In the Metaverse context, the novelty of an industrial design can be judged on the basis of aesthetic features, design or unique features that the design brings to the virtual environment. However, users need to be aware that, due to the special nature of the virtual world, determining the novelty of an industrial design can also be more complicated than in the physical world. Firstly, due to its borderless nature, it will be extremely difficult to identify overlapped designs, a design created in one corner of the Metaverse could easily be recreated or adapted in another part, and users might not be aware of its existence elsewhere. This can lead to unintentional overlaps and challenges in recognizing prior art. Second, to evaluate the non-publicity of the design, it depends on the different standards of

each Metaverse, such as the popularity of the shape of the item in that environment and each environment could be different. Third, because industrials designs can be created using different tools, platforms or programming languages, an Industrials Designs can be considered new in this environment but not significantly different from another. Take an example, for the same Nike shoe with the same design that is intended to be used in 2 different Metaverses, does Nike need to apply for a protection title twice in a row for these 2 different Metaverses? Even in the event that an industrial design has already been granted a protection title in Metaverse A, and another enterprise applies for a design with a similar mark in Metaverse B, whether the IP Registry may consider this case to be a duplicate case to reject the application or not?

Regarding creativity: The condition of creativity shows that the creator has proven the effort and effort spent to create the exclusive protected industrial design for a limited time. Industrial design cannot be protected if it is created only by imitation or simple modification of one or more previous products. Circular 01/2007/TT-BKHCN lists cases of industrial design that are not considered innovative in order to be excluded when conducting evaluations.

In the following cases, the industrial design stated in an application shall be considered non- creative:

(i) It is a simple combination of known design features (publicly disclosed design features are put together or assembled in such a simple way as replacement, interchange of positions, increase or decrease of quantity);

(ii) It is a replication/simulation of part of or the whole inherent natural shape of a tree, fruit or animal, shapes of geometric figures (round, ellipse, triangle, square, rectangular, regular polygons and prisms, cross-sections of which are foregoing figures), which are widely known;

(iii) It is a simple reproduction of the shape of a product or work well known or publicly known in Vietnam or worldwide;

(iv) It is an imitation of an industrial design in another field, if such an imitation is widely known in reality (for example: toys imitating cars, motorcycles, etc...).

In Metaverse, users can create objects by arranging a series of geometric blocks in a certain sequence via the Developer Tool. For instance, the Builder Tool of Decentraland or GameMaker of The Sandbox, or even something more complex such as using a programming language to simulate the physical properties of an object in Second Life. However, according to current Vietnamese

laws, at least for the time being, the products in Metaverse may not be recognized and protected as industrial design due to the current creation mechanism, which is still limited in how much "freedom" the Metaverse Developer can allow, as much of this creativity is simply dragging and placing shapes to create a new shape, so for some Metaverse, it is still not possible to consider this as a unique effort to be able to recognize industrial design protection.

Regarding industrial applicability: An industrial design shall be deemed susceptible of industrial application if it can be used as a model for mass manufacture of products with the outward appearance embodying such industrial design by industrial or handicraft methods.3 Industrial design, true to its name, needs to meet the applicability that can be applied to create a series of products with similar external designs. Due to the nature of the “materials” in the Metaverse consisting only of lines of computer codes and its external graphic representation, these products can perfectly be used as templates to recreate another replica finish with a simple keystroke operation, hence, this condition can simply be satisfied by any virtual property.

However, the major problem is still that these products are not presented in a stable manner when they do not exist in the form that need physical contact in order to identify the object, but must go through computer screens or VR and AR devices to be able to feel their presence. According to Vietnam's IP law, it is unclear whether the protected product needs to exist in a specific physical form and be able to feel directly through human touch or not.

Referring to other IP legislation, it can be seen that in some countries, industrial design is not necessarily the external appearance of a tangible product to be protected. For example, in the United States, a Design Patent can be protected even if it is a "projection object, hologram, virtual and augmented reality object". In 2022, Japan amended the Design Act to provide industrial design protection for graphic images that are not stored on a physical device. This amendment paved the way for the protection of industrial designs that are images projected on non-display devices such as walls or floors, with the additional condition that these graphics are used during device operation or displayed by the performance of the device's function. Yet, till now, the Vietnam IP system has not had a clear answer in establishing IP rights for this special property. Therefore, young users must be aware that Vietnam Intellectual Property Law has yet held a clear answer on establishing IPRs for such unique assets. As the digital world and technologies like the Metaverse continue to advance, it's crucial for users to stay informed about any changes or developments in the legal framework. This will

help them make informed decisions regarding the protection and utilization of their creative and innovative digital assets.

2.2. Establish industrial property rights to trademarks

Trademarks are understood as signs selected and used by commercial entities to perform the function of distinguishing goods and services produced or supplied from different sources. According to Vietnamese law, a sign that wants to be protected as a trademark must satisfy both the content and form requirements.

In terms of content, a mark in the form of letters, words, drawings, images, holograms, or a combination thereof, represented in one or more colours or sound trademark that can be graphically presented[4]. In Metaverse, the protection of trademarks will be similar to that of the physical world, as long as the trademark is used in a stable manner and does not confuse consumers with other brands and products.

In terms of form, a protected mark is required to be complete and accurate in terms of documents such as application declarations, documents/samples representing the object of protection. At this time, the protection of trademarks for products in the virtual world may be more difficult than those in the physical world.

Currently, many countries around the world apply the International Classification of Goods and Services under the Nice Agreement (Classification). For example, a company specializing in the fashion industry would file an application for trademark registration under Class 14 (jewelry, necklaces, gems) and Class 25 (clothes, footwear, hats). However, for clothing types, virtual garments that exist only in the Metaverse can have the same appearance and image as physical goods, but completely different in function, manner. method of use, then the question will be which classification shall the owner need to file for a protection application in order to protect his trademark?

In this case, many large enterprises have filed trademark applications for use in Metaverse for products/services applying for registration under Class 09 "downloadable virtual goods, namely computer programs", Class 35 “online retail store of virtual goods”, or Class 42 “offering virtual and non-downloadable online goods”. As of now, in 2023, the 12th version of this system has added subheading 090918 "downloadable digital files authenticated with a non-fungible token [NFT]". This update implicitly acknowledges that products that exist in the Metaverse such as NFT[5] are subject to trademark protection.

However, this is unlikely to happen in the Vietnamese legal system. According to Article 87 of the current IP Law: “*1. Organizations and individuals shall have the*

right to register marks to be used for ***goods such organizations or individuals produce*** *or for* ***services such organizations or individuals provide****."* Accordingly, the concept of "goods" under the Commercial Law 2005 includes movable property, movable property formed in the future and objects attached to land. NFTs and digital assets do not have the characteristics of a movable property when they have no specific physical form and cannot move on their own or be moved when applied to physical contact. Therefore, Vietnamese law still cannot recognize the registration of trademarks for digital assets as goods. As for "services", up to now, the provision of virtual products in video games is still considered a type of entertainment service, but this is usually only true for traditional video games where these services cannot be exchanged or returned once provided, and content production and service consumption occur simultaneously. In Metaverse, the production and consumption of content can be independent of each other, even if that Metaverse closed down, virtual items can still be stored on the Blockchain network, hence, it can be controversial to consider products such as virtual shoes and slippers on Metaverse as a type of service.

Therefore, there is also the view that the addition of subheading 090918 has almost no impact in drawing the line between virtual goods and physical goods. Because the nature of NFT is merely a piece of code to certify ownership, not the goods - services themselves. What is protected for IPR is the content associated with the NFT rather than the digital token. Hence, the registration under the traditional sub-categories can enable the applicant to be granted a protection title, and whether they have grounds to ask the enforcement agencies to handle the use of the same or similar trademark to the point of confusing the goods in the Metaverse, whether or not they are subheading, remains an unresolved legal gray area.

In the United States, a French fashion brand - Hermès International sued designer Mason Rothschild in the Southern District Court of New York. Hermès alleges that Rothschild sold the NFT handbag collection in the Metaverse under the name MetaBirkins. This collection includes 100 handbags in a variety of colors and designs identical to the Hermès Birkin bags currently on the market. Hermès accused Rothschild of using their trademark and image without permission. On the contrary, the defendant argued that the NFT handbags he designed were not trademarked goods of Hermès International but were virtual images generated by an algorithm and therefore cannot be considered as a fake. Rothschild also claims that these NFT handbags are works of art protected by the First Amendment as freedom of artistic expression. After a week-long trial and three days of deliberation, Rothschild was sentenced to pay a fine of US$133,000

for trademark infringement, dilution and cybersquatting. It is also the first trial decision in the United States regarding trademark protection in the virtual world6.

Because there are no separate regulations, currently establishing IP rights for trademarks and industrial designs in Metaverse through registration will be similar to the usual regulations on content, form, and application procedures. But in general, in most cases at the stage of substantive examination, industrial property management agencies in many countries, including Vietnam, are also facing many difficulties in considering whether to issue insurance documents for industrial designs could be an intangible product?

Similar to Industrial Design, Metaverse users need to be aware that the regulations related to trademark protection for virtual assets in Vietnam are still in their infancy and there are no specific instructions from the authorities. On the contrary, the acts of trademark infringement in fact have been happening, and even tend to increase. This is a wake-up call for individuals who commit acts of infringement or may be infringed in the future, when compared with reality, acts related to trademark use in the Metaverse are being scrutinized more carefully in response to the growing threat of IP infringement on Metaverse.

3. Protecting industrial property rights in a virtual space environment

3.1. Infringement of IP rights in the virtual space environment

Infringement of IP rights on Metaverse is extremely diverse with countless sophisticated tricks, some of the common infringements of IP rights in Metaverse include:

Using trademarks on commercial objects without requesting permission from the owner.

In the case of E.S.S. Entertainment 2000 Inc. the Rock Star. Plaintiff, E.S.S is the owner of the brand "Playpen" - a chain of nightclubs. The plaintiff accuses Rock Star - the company that produces the video game Grand Theft Auto of having recreated a "Pig Pen" nightclub in style and using the Play Pen's signature logo without asking for permission, by that misleading consumers about E.S.S consent to the game7. The Lanham Act is the legal basis for the establishment and protection of trademarks, whereby it allows Trademark owners sue individuals and organizations for using the mark without consent, causing confusion or reducing the distinctiveness of the mark. The court applied the Rogers test in the case of Rogers v. Grimaldi8 and concluded argued that the re-defining of the club in the game does not constitute an infringement of the E.S.S trademark since video games are considered a form of artistic expression and are protected under the First Amendment and also There is no clear basis that users will easily be confused between “Play Pen” and “Pig Pen”9.

The judgment of the Court in the above case may no longer be reasonable in Metaverse when in contrast to traditional video games, every user in Metaverse can generate their own content - Meanwhile, the fact that brands establish their presence in the Metaverse has shown signs of increasing day after day, and the use of trademarks by third parties in their content will not be considered merely as an artistic expression, as these art is often used for profit purposes when these content can be traded and bring huge profits to their creators. This is by far similar to the act of using other party's trademark for personal achievements and should not be considered as a mere artistic expression. Registering a trademark for use in the Metaverse is identical or confusingly similar to the registered trademark.

In the United States, on November 6, 2021, an individual with a Texas address filed a trademark application for GUCCI for products/services such as “downloadable virtual goods, specifically programs” computer has the function of creating products such as shoes, clothes, headwear, eyeglasses, bags ...", "virtual goods retail store services, namely shoes, clothes, headwear, eyeglasses, handbags…”, and “entertainment services, namely the online provision of footwear, clothing, headwear, eyewear, handbags, etc. used in a virtual environment for entertainment purposes). In this case, the USPTO has refused to protect the registered trademark on the grounds that GUCCI is the oldest operating fashion brand with annual revenue of about $13.6 billion and is therefore considered a famous brand. Therefore, the existence of a trademark that is identical with the well-known GUCCI trademark may mislead consumers into a relationship with GUCCI and mislead that the applicant's goods/services are made, manufactured or supplied by GUCCI. Thus, the applicant has bad intentions when filing the trademark registration application and will not be granted a protection title. However, if the marks involved are not well-known marks, it is not easy to get a satisfactory answer to such cases.

Forging, counterfeiting, or creating harmful content or products while using another party's trademark without the consent of the trademark owner will cause disrepute, seriously affect the reputation and image of the brand. Therefore, the law also needs to have different recognitions for these special types of IP. At the same time, in the period when the legal corridor has not been established, young Metaverse users should consciously respect the creative content of others. This includes not infringing on the intellectual property rights of others, not illegally using, counterfeiting content or trademarks, and complying with regulations on trading and sharing content in order to maintain an honest and responsible environment, but also ensuring the sustainable development of this digital space.

3.2. Jurisdiction in the Metaverse

Young people also need to be aware that IP rights are limited in space, which is based on territorial boundaries and even time, so IPR holders can exercise their rights within a certain scope and term of protection. IPRs are established on the basis of being granted protection title by a competent state agency, the scope and term of protection are determined according to that protection title. Particularly for well-known trademarks, which are automatically protected within the territory of the country where the mark is widely known by related consumers through the purchase, sale and use of goods and services bearing the mark. or through advertising Metaverse is a borderless environment, which means that they can be widely used and easily accessible from anywhere, which means that it is impossible to pinpoint the exact location of a trademark or industrial design and correspond to the specific rights and obligations of IP rights holders – or the jurisdiction of the Court. In the case of a trademark infringer located in the UK, while the trademark owner is registered in Vietnam, the infringement occurs on a Metaverse platform with servers in Korea, the decision on the applicable law will be based on what? Usually, jurisdiction will be in the hands of the country in which the violation took place or the country involved in the violation. However, determining authority in the Metaverse environment can be complicated due to the globalization of the online space and the fact that the event can occur in many different countries.

In Metaverse, the jurisdiction or at least the obligation to remove and prevent IPR infringing content rests with the Intermediary Service Provider (ISP), whereby, in the event of any information Upon notification of IPR infringement, ISPs - Metaverse are responsible for immediately disabling access to infringing content. This regulation is most commonly mentioned in the Digital Millennium Act (DMCA), the concept of exempting ISPs from liability is also mentioned for the first time in the IP Law 2022 in Article 198b. However, it should be noted that the affected scope of both the DMCA and Article 198b applies only to digitized works, phonograms, video recordings and broadcasts that are subject to the protection of copyright and related rights. This also means that the ISP's liability cannot be attributed to other intellectual property rights such as trademarks, IPs or patents. Thereby, the absence of a mechanism to protect IP objects in the Metaverse.

3.3. Several proposed measures to protect industrial property rights for young people in the virtual space environment.

In order to maximize their intellectual property rights, young people participating in Metaverse can consider taking the following measures:

First, timely registration of protection at competent state agencies. Accordingly, industrial designs and trademarks need to satisfy the conditions to be recognized as a protected industrial design or trademark. In most countries, the owner of a trademark or industrial design will be the first to file an application, so to maximize the possibility of protection, the trademark owner needs to register the trademark as soon as possible at the competent authority.

Second, apply liability provisions for internet service intermediaries (ISPs). Although the provisions on ISP liability exemption only apply to copyright entities. However, according to the terms of service (TOS) of some Metaverse models such as The Sandbox, including: *"The SandBox does not permit infringement of intellectual property rights on* the Service, and will remove the Property. and/or Games from the Service if properly notified that such Assets and/or Games infringe the intellectual property rights of others. We reserve the right to remove Property and Games from the Service, in whole or in part, without prior notice, for any reason or for no reason at all.". This provision is functionally equivalent to the mechanism of Article 198b to relieve intermediaries from liability. However, it must also be put in place that if the TOS of a Metaverse does not include as such provision for this responsibility, or does but is done through a decentralized mechanism, the process may take longer or does not take place at all.

Decentralization is understood as the fact that a Metaverse platform is not managed by a centralized entity such as a single company or publisher, but instead, the power will be transferred to users in deciding the fundamental problem. For example, Metaverse Decentraland, where governance is not in the hands of a single group of individuals, but is controlled by a Decentralized Autonomous Organization (DAO) consisting of users with voting authority to change the policies that define the way the world works. Accordingly, TOS of Decentraland, the removal, blocking and suspension of infringing content and accounts must be approved by the DAO on universal suffrage. However, this mechanism does not always work in all cases, typically with the DAO's unsuccessful attempt to ban the nickname "Hitler" on Decentraland's platform. Although it is not a popular and legally binding regulation, up to now, it is still considered the most optimal solution for users to protect their IP rights.

Third, continuously check and monitor for content containing piracy elements. Contents that contain elements of IPR infringing can exist in many forms, so trademark and industrial design owners need to constantly track and monitor acts occurring on Metaverse in order to quickly issue a removal notice. However, this means that while it is impossible to determine on which server the infringing content exists, there is no practical way for the owner to notify the intermediary to request that the content be removed. This is because the owner cannot continuously monitor and cover a large environment like Metaverse, especially when the content can exist in many different Metaverse platforms.

Users and authorities also need to continually review trademarks or industrial designs that are likely to be similar or similar during the application process via the registration portal database. Compared to the copyright, IP rights authorities can more easily prevent this by reviewing registration records to detect violations in these records and issue corrective notices. change or even refuse according to the rules. For acts of infringing upon trademarks and/or designs, IP rights holders must promptly notify intermediaries in order to ensure their legitimate rights and interests, even initiate disputes over them. IP rights. However, this can be quite difficult at the moment because IP rights regulations are still in their infancy and there is no precedent regarding IP rights disputes in the Metaverse.

Fifth, carefully examine the provisions in the TOS. Individuals and businesses participating in the Metaverse platform for the purpose of creating and trading - exchanging content need to carefully study the provisions of the TOS. These regulations govern much of what happens in digital platforms, including on the rights and interests of participants as well as dispute resolution mechanisms. Individuals and organizations need to pay close attention when these regulations may introduce unfavorable conditions or even be modified while using the service without prior notice for users.

4. Some inadequacies and suggestions for improving the law

First, supplement and clarify requirements on the form of representation for virtual IP. According to the provisions of Clause 13, Article 4 of the current IP Law, "Industrial design is the external appearance of a product expressed by shapes, lines, colors or a combination of these elements". Circular 01/2007/TT-BKHCN, last amended and supplemented according to Circular 16/2016/TT-BKHCN, further clarified the content of the term “product” mentioned in this law, specifically , “products are understood as objects, tools, equipment, vehicles, or parts used to assemble or combine such products, manufactured by industrial or manual methods, with a structure and clear function, to be circulated

independently11". It can be seen that the IP law of Vietnam does not have any specific regulations that require an industrial design to be the external appearance of a tangible product that must be physically held in order to be protected. However, the reality shows that the Intellectual Property Office of Viet Nam has never had a valid precedent to consider and approve the contents of industrial design registration for products that exist in digital form12. Therefore, for virtual intellectual property, state agencies need to review and re-evaluate relevant legal documents in order to adjust or clarify, avoiding the case of being "outdated" because of the advancement of digital technology.

Referring to other legislations, some countries listed above such as the United States, South Korea, and Japan have taken actions to amend and clarify the intellectual property protection mechanisms for products that do not exist in a specific physical form. As a result, Vietnam can also consider studying and adopting international experiences to swiftly enhance its legal framework in order to protect these unique intellectual assets. In doing so, Vietnam can potentially learn from and adopt the practices of these countries to efficiently refine its legal provisions for safeguarding intangible intellectual property econd, supplement and clarify criteria such as novelty and creativity for virtual intellectual property. Regarding novelty, IP law needs to have a clear distinction between the virtual world and the physical world, which arises from the concept of what is a new and not publicly disclosed product heterogeneity between different virtual environments. In terms of creativity, to a certain extent, many designs in Metaverse are still based on simply combining shapes or reusing existing designs, but changing the surface display of the design, so it cannot yet be recognized for protection as an industrial design. On the contrary, the reality has also recorded that many virtual intellectual products such as Nike - CrytoKicks shoes also show original creativity, so they should be protected as industrial design. Therefore, the agency that receives and examines the application also needs to have a clear and separate recognition for these two types of intellectual property.

Third, consider the recognition of virtual assets as an asset class and as a goods or commodity. According to Article 87 of the Intellectual Property Law, "Organizations and individuals shall have the right to register marks to be used for goods such organizations or individuals produce or for services such organizations or individuals provide". Goods, according to the provisions of the Commercial Law 2005, are understood to include movable property, movable property formed in the future and objects attached to the land. Therefore, to be able to register trademarks for goods and even services, it is first necessary to recognize the objects in the Metaverse as a kind of property. Up to now, the law

has not recognized objects and assets in the virtual reality environment as property as prescribed in the Civil Code 2015. Since then, transactions, as well as IP relations, have not been approved. recognized and protected by Vietnamese law. At the same time, considering it is necessary to expand the content of "goods" as prescribed by commercial law to include goods that do not exist in physical form, such as NFT or other exchangeable virtual asset units. From there, creating a solid legal corridor for the recognition and protection of intellectual products in the virtual reality space.

Fourth, expand the scope of regulation of exemption from liability of intermediate service providers (ISPs). Currently, the scope of the provisions regarding the ISP's liability waiver is still limited to the subject matter of Copyright. While in fact, the new Metaverse platforms are the units that can quickly enforce the protection process by removing the infringing content from the system. Therefore, in order to increase the effectiveness of the protection of intellectual property such as IPRs, it is considered necessary to study the extension of the scope of Article 198b to other objects of IP rights. Even regulations regarding the integration of the takedown mechanism in the TOS of intermediaries should be a mandatory rule for all Metaverse Developers.

Fifth, clarifying regulations on product protection in three dimensional space. On December 31, 2021, the Office of Intellectual Property of Vietnam added to the Regulation on examination of patent applications mentioned above by issuing an appendix specifying guidelines for the examination of patent applications related to computer programs. Accordingly, for user interface - GUI consists of signs that represent information and receive input as part of human-computer interaction. However, this regulation does not specify whether the representation of a GUI is necessarily through an intermediate device such as a computer monitor? U.S law has long recognized that objects displayed on software, including GUIs, can be protected under industrial design.13, During the review process for the 3-D property, the USPTO conducted public consultation14. In its assessment, the USPTO considered public views on the urgency of protecting “designs for projection, hologram, virtual reality, and augmented reality” (PHVAR). The views in favor of PHVAR are characteristic of industrial designs, arguing that virtual assets are also created by software similar to GUIs, fonts and icons and have been protected for decades. Also, pursuant to Article 171, the Design Patent Regulations do not stipulate that the protected product must be "tangible".

In conclusion, the rapidly evolving landscape of the Metaverse presents both exciting opportunities and complex challenges for the intersection of innovation and intellectual property protection. As the digital realm continues to expand and transform, it becomes imperative to strike a balance between fostering creativity and safeguarding intellectual property rights. The youth, being the frontrunners of this digital revolution, play a pivotal role in shaping the future of the Metaverse. To navigate this uncharted territory, there is a pressing need for robust education programs that equip young individuals with a comprehensive understanding of intellectual property rights, both in the physical world and the digital domain. By promoting awareness about the importance of respecting and protecting intellectual property, we empower the next generation to contribute ethically and responsibly to the Metaverse's dynamic environment.

Strengthening intellectual property safeguards requires a multi-faceted approach involving collaboration between governments, tech companies, legal experts, and educational institutions. It involves formulating adaptive legal frameworks that address the unique challenges of digital space while ensuring a fair balance between creators' rights and users' freedoms. As we embark on this journey of digital transformation, we must remember that innovation thrives in an environment where intellectual property rights are respected and upheld. By nurturing a culture of respect for creativity and intellectual contributions, we not nly foster a vibrant Metaverse but also lay the foundation for a sustainable and equitable digital future. Through continuous learning, responsible engagement, and harmonious collaboration, youth can harness the potential of the Metaverse while maintaining the values of creativity, integrity, and progress.

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CLOSING EDUCATIONAL DISPARITIES: LEVERAGING DIGITAL INNOVATION TO ADDRESS DROPOUT AND ATTRITION RATES AMONG 4PS, STUFAPS, AND TES BENEFICIARIES IN EASTERN VISAYAS, PHILIPPINES

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INFORMATION

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ABSTRACT

Spearheaded by CHED through the United Student Financial Assistance System for Tertiary Education (UniFAST), the Student Financial Assistance Programs (StuFAPs) aim to increase college and university graduates by setting up a system of scholarships, grants-in-aid, student loan subsidies, and other incentives that are made available to eligible college students who are identified as "poor but deserving" (Halili 2014). With Republic Act No. 10687 as its legal basis, StuFAPs flow through grants-in-aid and the national student loan program. Likewise, the Tertiary Education Subsidy (TES) Program with RA No. 10931 as its legal basis provides an "allowance for books, supplies, transportation, and miscellaneous personal expenses, including a reasonable allowance for the documented rental or purchase of personal computer or laptop, and other education-related expenses," as well as an "allowance for room and board costs incurred by the student" for eligible college students. On the other hand, the Pantawid Pamilyang Pilipino Program (4Ps) is the national social protection and poverty reduction strategy that provides cash grants to beneficiaries compliant with a set of conditions (Official Gazette n.d.; DSWD n.d.).

Moreover, it provides livelihood seminars, family planning orientations, and other social development programs aimed at alleviating poverty (DSWD n.d.). Insofar as education is concerned, however, 4Ps only cover those aged 0-18, of which the majority would be out of basic education and would have started tertiary schooling.

1. Education in the Philippines: Regarded yet Challenged

The Philippines has a deep regard for education. Its people's collective goals of national development, positive social transformation, and economic mobility are attestations that educational advancement needs to be placed at the center of all political, socioeconomic, and cultural capacities. The country's burgeoning role in the international arena and its extending array of influence in the region harbor skill sets, both professional and practical, that require no less than quality education.

The 1987 Philippine Constitution guarantees its provision: "The State shall protect and promote the right of all citizens to quality education at all levels and shall take appropriate steps to make such education accessible to all" (Const. 1987 art. XIV s. 1 Phil.). This is reaffirmed by laws such as the Governance of Basic Education Act of 2001 (RA 9155) and the Free Public Secondary Education Act (RA 6655) which provide children with free and compulsory elementary and secondary education, respectively, as well as the Universal Access to Quality Tertiary Education Act (RA 10931) which institutionalizes free tuition and exemption from other fees of students in state universities and colleges (SUCs), and local universities and colleges (LUCs). The overarching framework that houses these legislations and government actions is the Education for All (EFA) 2015 Plan "Functionally Literate Filipinos, An Educated Nation" (Rodriguez n.d.).

The tangible manifestation of the value placed on education may be seen in the budget allocated to its sector and the departments in its compass - Department of Education (DepEd), Commission on Higher Education (CHED), state universities and colleges (SUCs)—which Article XIV, s. 5, paragraph 5 of the 1987 Constitution ensures the highest portion be laid to them. Under the 2022 National Expenditure Program (NEP), the education sector received an 8.2 percent increase at Php 852.8 Billion in 2023. Of this, Php 710.8 Billion is appropriated to DepEd (Press and Public Affairs Bureau 2022) and hp 138.7 Billion to CHED (Philippine Information Agency 2023). During the process of budget formulation for the Department of Education (DepEd) for the year 2023,

Vice President and Education Secretary Sara Z. Duterte stressed how said budget would prioritize the major areas that have been recognized as contributing to the issue of poor quality education throughout the nation (Hernando-Malipot 2022). However, the budget of the Department of Education (DepEd) is not without controversy because it includes millions of pesos that were branded as "confidential funds." These millions of pesos are regarded as being dubious in terms of their ability to contribute to the achievement of a quality education or even their relatedness in education as a whole.

Spearheaded by CHED through the United Student Financial Assistance System for Tertiary Education (UniFAST), the Student Financial Assistance Programs (StuFAPs) aim to increase college and university graduates by setting up a system of scholarships, grants-in-aid, student loan subsidies, and other incentives that are made available to eligible college students who are identified as “poor but deserving” (Halili 2014). With Republic Act No. 10687 as its legal basis, StuFAPs flow through grants-in-aid and the national student loan program. Likewise, the Tertiary Education Subsidy (TES) Program with RA No. 10931 as its legal basis provides an “allowance for books, supplies, transportation, and miscellaneous personal expenses, including a reasonable allowance for the documented rental or purchase of personal computer or laptop, and other education-related expenses,” as well as an “allowance for room and board costs incurred by the student” for eligible college students. On the other hand, the *Pantawid Pamilyang Pilipino Program* (4Ps) is the national social protection and poverty reduction strategy that provides cash grants to beneficiaries compliant with a set of conditions (Official Gazette n.d.; DSWD n.d.). Moreover, it provides livelihood seminars, family planning orientations, and other social development programs aimed at alleviating poverty (DSWD n.d.). Insofar as education is concerned, however, 4Ps only cover those aged 0-18, of which the majority would be out of basic education and would have started tertiary schooling.

Notwithstanding legal mechanisms, education, its institutions, and the entire sector are faced with no less alarming problems of improving the cognitive, affective, and behavioral competencies of children, thereby enhancing their literacy, numeracy, and essential skills, and reconciling gender disparities. In a 2019 study by the Organization for Economic Co-operation and Development (OECD), the Philippines came in last place among 79 nations in terms of reading comprehension and second to worst in science and mathematics. Moreover, in the Programme for International Student Assessment (PISA) results, students in the Philippines received a score of 340–the lowest average reading score of all the countries examined.

UNESCO (2015) reported that dropout and repeater rates remain high, passing grades settle at low, and command of language is barely adequate. Exacerbated by poverty, education through schooling is done in overcrowded classrooms with poor teacher performance (UNESCO 2015). As the case persists despite the free education programs that cover kindergarten to college schooling, it is crucial to look into the quality of education in the Philippines that hinders children from genuinely learning and becoming productive citizens. While the aspiration is to ensure education for everyone, this objective falls short, thus, the imperative lies in furnishing the students with the quality of its kind that can stimulate academic success.

In Eastern Visayas, Northern Samar First District Representative Paul R. Daza expressed concern about the high dropout and attrition rates among college students, which according to CHED is at 26 and 40 percent, respectively. Probing CHED and its financial governance, the Congressman questions why these numbers are high when there are government assistance programs in place such as the Student Financial Assistance Programs (StuFAPs), Tertiary Education Subsidy (TES) Programs, and the *Pantawid Pamilyang Pilipino Program* (4ps). This paper, then, explores the intersection — or in this case, the apparent disjunction — of the government programs and policies for education and the dropout and attrition rates among 4Ps, StuFAPs, and TES beneficiaries in Eastern Visayas. Hinging on the provided context, it underscores through policy recommendations and options the pivotal role of youth as trailblazers and forces that propel technological innovation. The primary data used in this study are provided by the Offices of the Regional Development Council (RDC) VIII and National Economic and Development Authority (NEDA) VIII. Supplementary data that discuss theories are from academic journals.

We then recommend institutionalizing a digital bridging system that enables the determination of whether the student who is a beneficiary of 4Ps will still get financial assistance in tertiary education even prior to college. Said mechanism refers to a program that connects and integrates the financial aid given during senior high school and that during college, lest they operate independently in order to facilitate communication, data exchange, and compatibility. The transition in this sequential progression of academic schooling is crucial as the choice to proceed or drop out of college at this point heavily depends on the financial capacity of the students. Moreover, government aid should be holistic in that it encompasses all human facets. In such a way, students are not only attracted to reenroll in school but more significantly, they are kept “in the learning ambit long enough” to take and pass examinations and eventually graduate (Gamboa 2023).

Policy-Outcome Disconnect: Where the Problem Lies

The House of Representatives panel tackled House Resolution No. 767, duly authored by Northern Samar First District Representative Paul R. Daza, which seeks to improve access to tertiary education while reducing dropout rates among poor Filipino students. This is in response to the growing concern about the high dropout and attrition rates among Filipino college students which is at 26 and 40 percent, respectively. Said concern lies in the foreground of government interventions *Pantawid Pamilyang Pilipino Program* (4ps), Student Financial Assistance Programs (StuFAPs), and Tertiary Education Subsidy (TES) Program, of which beneficiaries are determined by the National Household Targeting System for Poverty Reduction (NHTS-PR) or simply, *Listahanan.* Given the aforementioned data provided by Representative Daza, are the 4Ps, StuFAPs, and TES that are government aid for poverty alleviation, livelihood provision, and psychosocial development effective or insufficient or futile altogether? Whereas Iloilo First District Representative Janette Garin attributed Congressman Daza's data to the vestiges of the COVID-19 pandemic, she maintained that the Commission on Higher Education (CHED) should pursue a study, thereby coming up with appropriate solutions, and for possible inclusion of the tracking of dropout and attrition rates in submitting the Department's standard report.

Anent, upon the motion of Dir. Grace Q. Subong, Regional Development Council (RDC) VIII-Social Development Committee (SDC) Chairperson and DSWD VIII Regional Director, it was unanimously approved in a resolution dated 24 May 2023, to direct the Regional Development Council VIII-Social Development Committee to conduct an in-depth examination of the ongoing challenges concerning the inability of students to successfully complete their tertiary education even in the presences of initiatives Education For All (EFA), Student Financial Assistance Programs (StuFAPs), and the Tertiary Education Subsidy (TES) Program. Likewise, it was resolved to direct CHED VIII and DSWD VIII to come up with appropriate statistics for Eastern Visayas that can accurately represent children of families in the National Household Targeting System for Poverty Reduction (*Listahanan*) and those in the 4Ps who avail the TES.

In a focused group discussion facilitated by the National Economic and Development Authority (NEDA) VIII following suit, representatives from CHED, DepEd, and DSWD sought to establish a method to assess the issue among children in the 4Ps and *Listahanan* databases and to quantify the effectivity of StuFAPs and TES in ensuring tertiary education completion. During the said

dialogue, it was resolved that NEDA VIII, through RDC-SDC, shall devise a uniform procedure, standardized information assessment, guidelines on data treatment, and appropriation of methodologies should the study be conducted. The delineation of managerial tasks and the possible involvement of a state university in Eastern Visayas to help in the research study undertaking were also underscored. All these were done in order to supplement the data provided by Congressman Paul R. Daza who pledged to elevate the issue for further discussion in Congress.

Foregoing considered, we find merit and deem it necessary to study the issue and work around the seemingly nonsynchronous projections between government interventions and their effect in implementation. Furthermore, policy options and recommendations that conclude this paper will hopefully aid NEDA VIII, RDC VIII, and all concerned agencies in resolving the problem in the education sector in Eastern Visayas and strengthening government services that contribute meaningfully to national development. Finally, the paper endeavors to amplify the increasing role of the youth in digital innovation, establishing livable communities, improving education and lifelong learning, advancing research and development, and accelerating climate action.

Moving Forward

Review and improve the centrality of 4Ps, StuFAPs, and TES through digitalization

The problem with government interventions such as those considered in this paper lies in their disjointed nature which does not account for the all-inclusive and encompassing facets of their beneficiaries' well-being beyond financial concerns. Practically, 4Ps, StuFAPs, and TES pride in standing as aiding programs that help "poor but deserving Filipino students" (Halili 2014) by providing monetary assistance monthly or semesterly. These, however, neglect other circumstances that equally affect and contribute to the decision of individuals to drop out of or leave school. These factors which have recently occupied the fore of Generation Z's priorities and are further reflected in the study of Pelino et al. (2022) conducted in Eastern Visayas include mental health, teen pregnancies as a result of low contraceptive use, familial distress, and the independent choice to join the workforce. These determinants should be accounted for in the overall government assistance schemes directed at increasing enrollment rates and lowering dropout and attrition rates. This means, therefore, that programs and policies alike that cover education-related costs and concerns should not work independently of or rather be supplemented by other programs and policies that focus on the other mentioned factors. This is the first

recommendation this paper offers: ensure that a holistic approach that accounts for the most important aspects of one's personhood is used in designing government programs by capitalizing technological aid such as assistive devices for people with disabilities, medical and healthcare technologies, disaster relief and emergency response, and financial literacy. At present, 4Ps, StuFAPs, and TES concentrate their engagement with CHED, DepEd, and DSWD, which is understandably valid given its current scope. Once CHED, DepEd, and DSWD obtain a list of the students that fit their requirements from the *Listahanan*, they work to provide scholarships, loans, and other grants through StuFAPs and TES. However, this is as far as they go, with no special regard to say, an impregnated student, or a victim of terrorism, or one diagnosed with post-traumatic stress disorder (PTSD) which has significantly different needed assistance. Likewise, factors such as isolation, disconnectedness, technological issues, peer pressure, students not being convinced by the school, and students' hostility toward school ethos also augment the decision to drop out of or leave school. In these cases, the monetary aid received by the student is reduced to a mere short-term cushion that is inadequate to keep them in school. If the government is to ensure student retention to finish their formal education, a program that is multi-agentially managed should be devised in order to leverage its unique expertise. In the cases on hand, CHED, DepEd, and DSWD could coordinate with the Department of Health (DOH), Population Commission (PopCom), Anti-Terrorism Council (ATC), and Department of Science and Technology (DOST)–all while still being part of one grand educational assistance. By realigning their goals, these agencies can avoid duplication, streamline resources, and enhance efficiency in genuinely rendering help.

Ensure accurate and early and eligibility identification through an institutionalized digital targeting system

Reviewing and ensuring comprehensive programs and policies as championed in the foregoing could not get far if the identification of its beneficiaries is ambiguous, ineffective, and prolonged. We probe not the eligibility requirements proposed by agencies. Instead, here we propound the need for an institutionalized digital bridging system that assesses said eligibility of 4Ps, StuFAPs, and TES beneficiaries for financial assistance come tertiary education even before they reach college. This bridging program would serve as an intermediary between the financial assistance given during high school and that before and during college, ensuring that beneficiaries maintain access to essential support during this time of change (Parreño 2023). The issue studied by this paper is the perfect case on point that lays out the necessity for a bridging system which, as shown, is yet to exist in the Philippines, in order to facilitate a seamless transition, communication, data exchange, and compatibility, lest students dropout due to challenges inherent in the transition process. Said phase in the

academic schooling progression between senior high school and college is critical as the decision to continue or defer college education significantly hinges on the student's financial capacity at this particular point. A student who is uncertain whether financial grants will still apply to them will be shoved into a sink-or-swim situation where the decision stands on hollow ground. The safer option, then, is to postpone their schooling until there is clarity on their eligibility. A system that enables the determination of beneficiaries months before the opening of classes provides certainty regarding their potential grants for higher education, thereby allowing informed decisions about students' educational paths. More importantly, said bridging system could lead to early planning and better-targeted interventions, thereto serving as a potent early intervention mechanism that identifies who needs more or less assistance, allowing more—or fewer—people to be granted help. Centered on this recommendation, CHED, DepEd, and DSWD should ensure an up-to-date, accurate, and verified, list of its beneficiaries and grantees by periodically, if not monthly or semesterly updating the Listahanan database. The accuracy of said repository database is of paramount importance both in the prompt identification of eligible beneficiaries and for the most part, in the elimination and reduction of the possibility of any resource misallocations. Whereas approaching software development and data management companies could be the grand solution to this, ensuring accurate data collection at the CHED and DepEd levels at the outset, that is to say, teachers' school reports, could be a catalyst for improvement. To this, a mechanism should be devised to objectively determine what qualifies as "poor" and "deserving", and when these reports are turned in to the central office. Realistically, teachers and the endless paperwork they have to deal with, no matter how demotivating or counterproductive, are already in place, therefore, the inclusion of this particular detail in their reports would not require immense effort. If anything, streamlined reporting templates and improved data sharing (which are overdue initiatives) should be integrated.

Strict enforcement of accountability measures among implementing agencies

The pretext of the preceding couple of recommendations, as it should for all government programs, projects, and policies, is the character and values upheld by its implementing heads and agencies. This third recommendation, then, pertains to questions asked since time immemorial: how do we elect non-corrupt (the most forgiving term we could think of) officials? How do we eliminate corruption? Who makes the calling out if the one mandated to do it also needs to be called out? At the onset of all these fiaschi, Northern Samar First District Representative Paul R. Daza wants this case opened in Eastern Visayas because of the recent corruption allegations directed at CHED Commissioner Prospero E.

de Vera III. Accusing the said Commissioner, Congressman Daza probes the misuse of the CHED budget which has resulted in the decrease of enrollment rates and the consequent increase in dropout and attrition rates. Whereas it would be easy to allude that the establishment of an ethics and integrity committee, codification of conduct and anti-corruption measures, and the institutionalization of internal audits would deter corruption stints among government officials, the Philippines' stiff grip on incompetence, misconduct, and dishonesty makes its guarantee trivial. To this end, only through continued, constant, and augmented conversations on accountability, transparency, and honor among agencies, departments, and organizations, made easier, faster, and richer by social media and the vast web as a result of technological advancements can we start making meaningful progress in curbing misconduct and promoting ethical behavior in the public sector.

Conclusion

The symbiotic relationship between science and technology leads to synergistic advancements in both fields, enhancing innovation and progress. Technology serves as a fertile source of novel scientific questions, encouraging the allocation of resources to address these questions efficiently and expand the scientific agenda. In the conversation, therefore, regarding the innovations in science and technology, the role of the youth, as well as of the society and the array of landscapes it houses–environmental, cultural, and political - should always be present. It should be interdisciplinary, intercultural, and intergenerational, allowing scientific knowledge to reach the understanding and consciousness of the greater public.

To foster a truly transformative and inclusive education system that maintains high enrollment and low dropout and attrition rates, it is imperative for programs and policies to work in synergy, supplementing each other's efforts to cover all critical determinants that affect students' educational journey. Dare to say, this paper believes that government assistance programs *Pantawid Pamilyang Pilipino* Program (4Ps), Student Financial Assistance Programs (StuFAPs), and Tertiary Education Subsidy (TES) Program are, in magnanimous degrees, beneficial in capacitating individuals to undergo formal schooling. However, around the foregoing recommendations, these three programs are insufficient, and in the implementation phase, loosely knit, to ensure student retention. This paper humbly offers to review and improve the centrality of 4Ps, StuFAPs, and TES, ensure accurate and early targeting and eligibility identification, and strictly enforce accountability measures among implementing agencies. Liberating the education sector from the grasp of incompetence is paramount to ensure that endeavors aimed at enhancing the overall quality of education are not trivialized. To embrace a collaborative, transparent, and ethically driven approach is to create an educational environment that empowers all students to contribute to nation-building. Only then can we bring students back to and make them stay in school, unleash the transformative

potential of education, and pave the way for a brighter, more inclusive future for generations to come.

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IMPOWERING YOUTH IN SHAPING DIGITAL TRANSFORMATION: ADDRESSING DISCRIMINATION AND PRIVACY CONCERNS IN AMAZON RING'S FACIAL RECOGNITION TECHNOLOGY THROUGH INTERNATIONAL HUMAN RIGHTS LAW ACCOUNTABILITY

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INFORMATION

Keywords: youth, facial recognition technology, artificial intelligence, privacy violations, discriminatory practices, procedural safeguards, international human rights law

ABSTRACT

The incorporation of facial recognition technology (FRT) into Amazon Ring, initially positioned as a home security device but later expanded to encompass surveillance capabilities, gives rise to apprehensions concerning privacy violations and discriminatory practices. This necessitates the involvement of youths for the adoption of procedural safeguards by Amazon to ensure lawful implementation of FRT, safeguarding against discriminatory use and harm to human interests. This paper aims to explore the significance of youth in ensuring Amazon's compliance with International Human Rights Law (IHRL) in effectively mitigating discrimination and privacy violations associated with FRT in Amazon Ring. The study investigates the relationship between soft technological determinism and IHRL, focusing on the international community's remarks towards youth involvement. While previous research has emphasized ethical principles in regulating the AI industry, the correlation of youth and IHRL in addressing risks posed by FRT algorithms remains underexplored. This paper's objective is to bridge this gap by elucidating the responsibilities of corporations regarding human rights implications and highlighting the involvement of

young individuals in proposing appropriate measures to be adopted.

1. Introduction

The predominant view held by young individuals regarding artificial intelligence (AI) leans significantly toward positivity, with an impressive 93.2 percent expressing a favorable perspective.1 As 80 percent of the participants routinely interact with AI,2 a significant 68 percent exhibit trust in the competencies of AI.3 Nonetheless, a substantial majority, accounting for 76.3 percent, regards AI technology's risks as significant, with the most commonly mentioned concerns encompassing privacy breaches (57.3 percent), issues of discrimination (53.5 percent), and governmental supervision (51 percent).4 However, youths remain confident in the feasibility of implementing effective control measures.5 Thus, 93 percent demonstrated an interest in discussing the utilization and regulations of AI to mitigate the risks of AI.6 Accordingly, the majority expresses a desire for global cooperation in the realm of AI, emphasizing the necessity of the United Nations playing a pivotal role in this collaborative effort.7

To acquire a more profound understanding of the association between artificial intelligence and the younger generation, an academic examination will be undertaken, drawing from the author's undergraduate thesis.8 This analysis will centre on a case study around the Amazon Ring Doorbell. Amazon to purchase a startup called Ring which specializes in selling smart doorbells.9 These doorbells are equipped with builtin cameras, microphones, and speakers with audio-visual recording devices that are triggered by motion detection.10 Users have the ability to receive instantaneous alerts to homeowners’ devices, store footage in the cloud and anonymously posted videos of suspicious activities to the public through the Neighbors app.11 Moreover, the partnerships brokered by Ring with 1,300 US law enforcement12 authorizing these agencies to extract footage by utilizing the Neighbors app13 or attaining a legal authorization under the Stored Communications Act (SCA).14 Thus these cooperations are not only limited to US and UK as Ring doorbells are available across other European countries.15

Despite marketing its Ring doorbells as home security devices, Amazon has gone beyond providing video and audio surveillance features.16 Instead, the company has proposed the use of facial recognition technology (FRT) in the future following the 17 patent applications.17 FRT refers to a type of software or application that is designed to automatically or semi-automatically identify, verify and categorize an individual by analyzing and comparing their unique facial features.18 This technology employs machine learning, which involves training

the algorithm to recognize faces or identify a specific individual.19 By repetitively exposing itself to a dataset filled with various images, videos, and photos of human faces, the algorithm can form associations and connections within the data.

Even though the initial purpose of FRT is to benefit humanity, the public including youth is currently encountering several instances of Amazon Ring that jeopardize human rights including concerns about non-users' privacy and implications on discrimination. This implies the urgency for Amazon to adopt procedural safeguards to ensure that FRT is implemented lawfully, protecting human interests from discriminatory use or harm. Therefore, this paper aims to discuss the question: What is the importance of involving young individuals in the process of holding companies like Amazon accountable for adhering to International Human Rights Law (IHRL) as a means to efficiently address issues related to discrimination and privacy infringements linked to the deployment of Facial Recognition Technology (FRT) in Amazon Ring? Most studies have discussed how ethical principles should be considered when regulating the AI industry, without thoroughly exploring how IHRL could solve the risks posed by FRT's algorithms.21 This article aims to bridge this discrepancy by clarifying the obligations of corporations for their effects on human rights and the appropriate actions they should take in response.

2. Legal analysis

Soft technological determinism focuses on to what extent technology forges society and the consequences that follow.22 This perspective reflects that technologies are inherently political and become intertwined with a particular way of life in the future, as is the case with Amazon Ring.23 In order to shape a future driven by AI that prioritizes human well-being and happiness, it is imperative to engage in international collaboration with young individuals since they will constitute the primary user base of AI technologies by the year 2050.24 Young people possess the capacity to foresee the potential societal consequences that may emerge from the widespread adoption of Ring doorbells, as it could contribute to the collective detriment of jeopardizing human rights. The following reflects youth concerns on the use of FRT in Amazon Ring doorbell:

A. The Deployment of Amazon Ring Infringes Upon the Privacy Rights of Nonusers

The installation of FRT in Amazon Ring poses a threat to non-users privacy rights due to the involuntary collection and distribution of facial information.25 Amazon neglecting the negative liability coming from the usage of Ring equals

disregarding the protection of civil liberties.[26] Irrespective of international, regional, and national regulatory measures, Amazon has the liberty to use FRT to access and utilize facial information without being held responsible for the collection process, including granting law enforcement access to facial information related to criminal investigations.[27] Regardless of being a helpful preliminary investigation tool, Ring has the potential of false accusations or misuse within the system28 which enables the possibility of innocent individuals' images being wrongly matched for the purposes of law enforcement.29 Finally, there is the possibility of Amazon misusing facial information by utilizing recorded videos to produce online TV shows and documentaries.30 In conclusion, despite following the necessary procedures to ensure dependability, FRT may still be utilized by entities and for objectives beyond its original purpose.31

Amazon, being a multinational corporation, is obligated to adhere to regulations at the global, regional, and local scales that govern the right to privacy. The UN High Commissioner for Human Rights stated the right to privacy is applicable when a government conducts surveillance in public spaces32 such as streets (including pavements and bicycle paths), open spaces, and public facilities.33 Correspondingly, Article 17 of the International Covenant on Civil and Political Rights (ICCPR) implied that any interference with privacy must adhere to the principles of legality, legitimacy, necessity, and proportionality.

B. The Deployment of Amazon Ring Infringes Upon the Non-Discrimination Rights of Non-Users

Amazon has asserted that FRT's racial bias and potential for error decrease over time as the algorithm interacts with consumer data. Due to the encouragement given by Amazon Ring's FRT features towards users' apprehension of home burglary, property theft, and other minor offenses, people are more likely to make negative judgments about suspicious activities on the basis of existing biases related to race, gender, and social class. The unequal application of FRT within a neighborhood could have a discriminatory impact on minority groups, particularly in light of the heightened anxiety about exaggerated crime rates. Consequently, this results in users employing such technologies for profiling and reporting others as suspicious, even in instances where these individuals have a legitimate right to be part of these communities.

A biased system combined with institutional or individual racism within law enforcement has the potential to increase the mistreatment of marginalized communities, and legitimize legal action against them, resulting in an increase in racial disparities and greater social control over these communities.40

Consequently, Amazon Ring shall prevent the presence of systematic bias in FRT that arises from both the developer's and the technology's tendency to replicate patterns and biases that are inherent in human behavior.

It is crucial for Amazon to respect international and national provisions regulating the right to non-discrimination, as the Ring involves classifying individuals based on their traits.42 The international prevention of discriminatory practices outlined in the International Bill of Human Rights is elaborated in three treaties: Article 1 of the Universal Declaration of Human Rights (UDHR) emphasizes the importance of freedom and equality in dignity and rights, while Article 24(1) of the International Covenant on Civil and Political Rights (ICCPR)44 and Article 2(1) of the International Covenant on Economic, Social and Cultural Rights (ICESCR) prohibit discrimination based on race, color, and national origin.45 The UN Declaration on the Elimination of All Forms of Racial Discrimination highlights the global significance of eradicating racial discrimination,46 while the International Convention on the Elimination of All Forms of Racial Discrimination (ICERD) specifies the requirement for taking active steps to eliminate policies that foster racial divisions or prolong discrimination.47 These conventions can be a valuable tool in countering the vague terms of "bias" or "discrimination" by offering a way to discern when bias and discrimination are illegal. IHRL offers a clear definition of harm that is universally applicable and capable of identifying forms of bias and discrimination that are prohibited and unlawful.

3. Role of youth

To tackle this issue, it is crucial to reference UNICEF's framework of protection, provision, and participation as a basis for developing an AI strategy focused on young individuals.50 Active involvement of youth should be highlighted to prevent any harmful consequences, to secure interactions between AI and human, and to maximize the use of AI.51 Although universal guidelines such as the UN Guiding Principles on Business and Human Rights (UNGPs)52 and the OECD's guidance on "Human Rights Due Diligence (HRDD) through responsible AI,"53 encourage corporations to prioritize human rights, it has failed to fully integrate the perspective and voices of young individual. To maximize the role of youth means providing children with the capacity and opportunities to exert influence over the development of FRT in Amazon Ring, enabling them to make well-informed decisions regarding their use of AI in the present and future.54 Empowerment of youths will lead to the establishment of a responsible digital future for corporations, governments, and the international community.55 Accordingly, young individuals will establish a platform for stakeholders to

participate in comprehensive discussions on inclusive AI policy approaches and applications.56 These dialogues should aim to highlight the development of Amazon Ring in accordance with local context by considering the backgrounds of youth and the operations of corporations.57 Thus, regulations should evolve to accommodate the requirements and entitlements of youth as they are entitled to the rights outlined in ICCPR and ICESCR.

4. Conclusion

In conclusion, the current global initiative surrounding FRT in Amazon Ring emphasizes the immediate need to prioritize human rights by involving young people in shaping the development of AI. The youth-centered approach stresses the importance of protection, provision and participation for responsible AI usage. Despite existing global directives, the viewpoints of young people are frequently overlooked, underscoring the need for inclusive discussions and regulatory modifications to safeguard the rights enshrined in the ICCPR and ICESCR. As technologies like Amazon Ring with facial recognition raise concerns about privacy, bias, discrimination, and human rights, it's crucial to embed human rights principles in development and deployment. Hence, the involvement of young individuals is crucial for companies like Amazon to conform to these guidelines and diligently ensure the ethical and rights-based use of facial recognition technology, promoting a responsible and transparent AI environment.

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DIGITALTRANSFORMATION: RESHAPING ECOTOURISM IN VIETNAM FOR A SUSTAINABLE FUTURE

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INFORMATION

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Digital Transformation, Ecotourism, Mobile Applications, Internet of Things(IoT), Tourist Experience

ABSTRACT

The tourism industry in Vietnam is experiencing a transformative shift with the advent of digital technologies. This paper explores the role of digital platforms and mobile applications in enhancing the overall experience of tourists engaging in ecotourism in Vietnam. These technologies offer multifaceted support before, during, and after travel.

From itinerary planning to real-time updates and feedback mechanisms, digital tools make eco-travels more efficient and personalized. One significant development is using integrated map-based applications that offer real-time tracking, safety alerts, and personalized suggestions related to local attractions, transportation, dining, lodging, and shopping. Furthermore, this study delves into how Internet of Things (IoT) technologies like global positioning systems (GPS) and integrated surveillance cameras enhance tourists' safety and facilitate seamless travel. IoT technologies are fortifying the security infrastructure around ecotourism by connecting data points such as traffic, weather, and critical locations. Through these advancements, digital transformation is not only elevating the tourist experience but also contributes to making ecotourism more sustainable and secure in Vietnam.

1. Introduction

In the wake of the Fourth Industrial Revolution and the profound impacts of the COVID-19 pandemic, a seismic shift is transforming global industries. Among them, the tourism sector stands at a crossroads, being compelled to

reconsider its traditional business models to meet changing customer demands and maintain competitive resilience. The term "digital transformation" in tourism signifies this shift—from conventional methods to datadriven, customer-focused modern business models, leveraging a digital value chain (Kitchin R, 2013). Vietnam's burgeoning tourism industry, characterized by its rapid growth and dynamism, is no exception to this trend. But what happens when the principles of digital transformation are explicitly employed within the context of ecotourism in Vietnam? The answer involves business innovation and promises a route to a more sustainable future. This is the impetus for the article "*Digital Transformation: Reshaping Ecotourism in Vietnam for a Sustainable Future*".

Introducing digital tools and platforms is not just a technology upgrade but a paradigm shift in the industry's operations. It is an answer to meet the ever-growing and diversifying customer needs optimally. For example, intelligent room management systems at accommodation facilities, electronic ticketing systems, automated entry-exit controls, smart parking lots, and even automated water vending machines are evolving as quintessential parts of the tourism experience. In an era where every second counts, these intelligent technologies work towards providing the most convenient services to tourists, aiming for customer satisfaction, the holy grail of the service industry. Moreover, the rising influence of mobile applications, Artificial Intelligence (AI), Chatbots, customer reviews, and Virtual Reality (VR) offers a whole new array of possibilities and challenges ((DeLyser and Sui, 2013).

The pandemic has also demanded quick adaptations from tourism enterprises. The urgency to apply technology for epidemic prevention and customer convenience is stronger than ever. Vietnam's tourism industry has responded robustly, embracing mobile apps, AI, customer reviews, and even VR innovations to create a more engaging and safer tourism experience.

However, amid this rush to modernize and optimize, the significance of sustainability, especially in ecotourism, must be considered. Ecotourism brings unique challenges and opportunities, requiring a sensitive approach that balances technological advancements with environmental and cultural preservation. As Vietnam aims to align closely with regional and global developmental trends, fostering smart tourism must be coupled with eco-conscious decisions.

Digital transformation is not just about business competitiveness; it's about shaping a resilient and sustainable future. This article explores how Vietnam's ecotourism sector can effectively navigate through the intricacies of digital transformation while reinforcing its commitment to sustainable development. The

journey towards this dual aim of digital agility and sustainable growth has never been more critical, making this investigation not just timely but imperative.

Findings

Definition of Ecotourism and Current Status of Ecotourism Development in Vietnam

Ecotourism is now defined as "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education" (TIES, 2015). Education is meant to be inclusive of both staff and guests.

Currently, Vietnam has made investments to develop an ecotourism model when realizing the potentials that ecotourism brings. The report was published by the International Organization for Conservation of Nature in Vietnam (WWF-Vietnam) and the Department of Nature Conservation and Biodiversity (BCA). Vietnam is one of the 16 most biodiverse countries in the world, with 13,000 species of flowers and more than 15,000 animals, the ratio of national/world species is 6.3%.

Together with the wide range of ecosystems, species diversity and Vietnam's transition to an open economy that promotes the development of smokeless industry2 have made Vietnam a favorable location for the development of ecotourism. Especially after experiencing Covid 19, the Vietnamese government has focused more and more on promoting tourism exploitation as well as considered a key economic sector. This is further evident through Information from the General Department of Tourism (Ministry of Culture, Sports and Tourism) that the Ministry has approved Decision No. 440/QD- BVHTTDL, promulgating the Vietnam Tourism Marketing Strategy to 2030 (see image 1). The strategy is reported in early 2023, with the aim of promoting and positioning Vietnam as the leading attractive tourism destination in Southeast Asia, affirming the brand and competitiveness of our country's tourism, contributing to the implementation of the Vietnam Tourism Development Strategy to 2030.

Based on this strategy, the tourism industry in Vietnam in general and ecotourism has achieved certain achievements, attracting many tourists. According to statistics cotourism in Vietnam has over 30% of international visitors and nearly 50% of domestic visitors. Ecotourism in Vietnam revolves around an area with coastal ecosystems (corals, coral reefs, lagoons, sandy beaches, mangrove habitats), limestone mountains, national ecological parks, orchards and nature reserves. The special feature of ecotourism is the difference from mass tourism or resort tourism because of its lower impact on the

environment as well as the educational role related to nature, environment and cultural values. Therefore, ecotourism in Vietnam is not only about admiring the landscapes but also experiencing rich cultural identities from localities and ethnic groups such as traditional festivals, history, handicrafts, …

Despite such great potential, ecotourism in Vietnam still faces inadequacies in becoming an ideal tourist country. Although, as mentioned above, the government has now made investments in ecotourism when integrating restaurants and hotels, typically in big cities such as Hanoi, Ho Chi Minh City, Nha Trang. But this investment model is only effective when training human resources in the tourism industry with environmental knowledge. Not only that, ecotourism in Vietnam is currently developing largely spontaneously and unregulated, leading to environmental degradation. In addition to improper exploitation that adversely impacts the environment, the current self-discovery will cause tourism policies and management to be scattered. This will make it difficult for tourists to visit ecotourism sites when the necessary information here is still limited.

While businesses are now able to fulfill the demands of technology and technology, there isn't really a digital transformation solution that pays specific attention to ecotourism in Vietnam. Media and internet access are available in all places, including those that are economically disadvantaged. It is therefore quite feasible to strive towards a sustainable development for Vietnam's tourism in the future through digital revolution in ecotourism.

Feasibility of Applying Digital Transformation in Ecotourism

Digital transformation is now a necessary trend to increase corporate competitiveness and satisfy customers' growing expectations because of science and technology's ongoing advancement.

The Covid-19 pandemic ended, and there was a substantial shift in consumer behavior. Instead of making direct contact as they had in the past, they began employing travel services through internet platforms with a variety of integrations. More recently, travelers have chosen ecotourism more frequently than they have in the past because they value experience, discovery, and the desire to be in nature. As a result, the majority of companies have accelerated the trend of digital transformation by continuing to invest in, create, and upgrade management systems via the internet to service customers as well as by fostering communication and tourism marketing operations to expand their client base.

The Vietnamese government has also assisted enterprises in digital transformation, particularly now that it is recognized as a crucial component for companies in the 4.0 age. In February 2023, the Tourism Information Center (Vietnam National Administration of Tourism) will formally introduce the "*Transforming awareness and unified action*" Digital Transformation Guide in the Tourism Industry as well as the "*Vietnam Tourism Digital Transformation platform iTourism*" to offer a digital data system and connect localities, businesses, and organizations involved in tourism.

Additionally, both traditional tourism and ecotourism have become into necessities for everyone. Visitors today are more interested in environmental, conservation, and development issues; they want to learn and practice what they have learned, help with conservation efforts, and contribute to local community development. Visitors also enjoy visiting more remote tourist destinations rather than sticking to the trail, and they frequently seek out natural settings to unwind. Vietnam's ecotourism completely complies with these characteristics as a result of its extensive network of protected areas, national parks with a wide variety of plants and animals, and several unspoiled tourist locations that are close to nature.

While businesses are now able to fulfill the demands of technology and technology, there isn't really a digital transformation solution that pays specific attention to ecotourism in Vietnam. Media and internet access are available in all places, including those that are economically disadvantaged. It is therefore quite feasible to strive towards a sustainable development for Vietnam's tourism in the future through digital revolution in ecotourism.

Assessment of Current Situation and Prospects

For more than two decades, the global travel industry has been at the forefront of digital innovation, also, leading the way in business ecosystem evolution, becoming one of the fastest growth areas in the world (UNWTO, 2018), making an important contribution to socio-economic development. Today, the tourism industry in general and ecotourism in particular in Vietnam has been achieving certain achievements, with the prospect of competing with ASEAN countries such as Singapore, Malaysia and Thailand with the prospect of growth in international visitors. For the tourism sector, information technology has been applied to catch up with the trend of the times, go to the era of digitalization, digital transformation and digital reinvention.

In Vietnam, ecotourism is a new idea, but it has attracted a lot of attention, but there is still no consistency in information around ecotourism sites. We need to understand that ecotourism is synonymous with nature tourism and a sense of

responsibility, environmental friendliness, sustainable tourism development. Therefore, the fact that current ecotourism sites do not have consistent information will easily make it easy for tourists with false knowledge about the environment, local traditional culture, or typically local people, their cultural identity and traditional customs cannot participate much in ecotourism and they do not collect gets its economic benefits. This makes the ecotourism industry in Vietnam not bring economic benefits as well as leading to the lack of a national strategy in the future.

In addition to having natural potential to develop the ecotourism industry, the digital transformation of tourism in Vietnam has also had certain prospects in recent years. According to the report of the Ministry of Information and Communications of Vietnam on the readiness index for the development and application of information and communication technology, the ranking of the Ministry of Culture, Sports and Tourism (Vietnam), in the period from 2016-2020 has increased at a fairly good level. Along with the Strategy, setting a target to 2030, welcoming 35 million international visitors, the growth rate is from 13-15% / year; Serving 160 million domestic visitors, the growth rate of domestic visitors from 4-5% / year, will help the ecotourism industry in Vietnam receive more attention and attract investors.

In addition to the attention of the government, businesses working in the tourism sector are also making improvements in the digital transformation process. According to a survey by the Vietnam National Administration of Tourism, nearly 100% of Vietnamese enterprises in the tourism sector use websites to introduce products to customers, more than 50% of domestic businesses successfully apply online sales and payment methods.

Suggestions for Implementing Digital Transformation Models in Ecotourism

Currently, most businesses and tour operators in Vietnam have applied digital transformation to their services. However, this is not popular in some localities, nor has any software or technology dedicated to ecotourism. Therefore, this article will offer a few solutions as follows.

The first is the application of artificial intelligence to services to increase personalization and enhance customer experience, especially at places such as airports, train stations, and bus stations. In particular, the appearance of robots will bring many benefits when the number of tourists choosing ecotourism is increasing. The application of robots will help save maximum time to complete relevant procedures and papers and improve service quality and experience.

The second is the application of biometrics. In fact, there have been many accommodation establishments in Vietnam applying this technology, but it is really not famous for ecotourism. Biometric identification helps authenticate security and provides a safe travel experience for visitors when they can check in by authenticating their faces and fingerprints combined with identification codes on citizen identity cards with chips.

Third, upgrade the experience with IoT technology. This will create a decisive step forward in the digital transformation of ecotourism; for example, visitors can control the entire device system in the house with just one smartphone. Thus, customers will not have to pay enormous costs for luxury services but can completely experience it through ecotourism.

Finally, there is an intelligent travel application that combines chatbots to accurately analyze the needs and desires of visitors to make appropriate suggestions (see image 2). This application will integrate all the necessary elements for a trip, such as transportation accommodation, tours, restaurants, hotels and suggested combos based on visitors' needs and preferences. The application also allows users to rate and rate their service experience, thereby helping tourism businesses better understand the wants and needs of customers. These reviews will be the basis for businesses to take care of customers. At the same time, businesses can build more reputation and promote their brand by using visitor reviews.

Conclusion

The digital transformation of the tourism industry is indisputably bringing sweeping changes to how we experience travel, and nowhere is this more evident than in Vietnam's burgeoning ecotourism sector. The deployment of advanced technologies - ranging from real-time map-based applications to IoT solutions—significantly optimizes the travel experience for eco-tourists by making it more efficient, personalized, and safe.

This paper underscored the vital role those digital platforms and mobile applications play in enhancing the end-to-end tourist journey. Before embarking on their eco-adventure, travelers can better plan their itinerary through platforms offering comprehensive information using GIS, 3D mapping, AI, and data analytics. This unified database will serve as an invaluable tool, not just for tourists but also for governmental bodies like Vietnam's Ministry of Culture, Sports and Tourism. By utilizing Big Data analytics and AI, policymakers can gain insights into market trends, effectively manage resources, and thus make more informed decisions that align with sustainable practices.

In addition to pre-trip planning, digital advancements also address the real-time needs of tourists. With GPS and integrated surveillance systems, tourists can receive realtime safety alerts, weather updates, and crowd-density metrics at popular sites. These IoT technologies form a layered security infrastructure that will reassure travelers and instill confidence in Vietnam's ecotourism offerings. Moreover, using AR and VR technologies allows for a richer, more interactive experience with local attractions, contributing to a unique and memorable travel experience without compromising the natural environment.

One particularly significant finding is the ability of these digital tools to contribute to sustainability - an essential facet of ecotourism. These applications can encourage more evenly distributed tourism by offering personalized suggestions for local attractions, dining, and shopping, alleviating the strain on over-visited sites and fostering sustainable tourism practices.

As Vietnam continues to modernize its tourism sector, digital transformation strategies must align with the broader vision of sustainable and secure ecotourism. Through a cohesive effort involving government agencies, local communities, and technology providers, Vietnam is well-positioned to create an ecotourism model that is highly attractive and sustainably managed.

In conclusion, the paper validates the hypothesis that digital technologies are crucial in elevating the eco-tourism experience while fortifying its sustainability and security measures. As the global tourism landscape continually evolves, it is clear that Vietnam’s digital transformation journey is both a template and a challenge - serving as an example of what can be achieved while setting the stage for further innovation

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SELF-STUDY BY USING DIGITAL RESOURCES AND READING – NOTE – KNOWLEDGED SUMMARY - REPORT

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INFORMATION

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ABSTRACT

Learning has never been easy for everyone. As passionate educators, we continually research and synthesize various learning methods for maximum effectiveness. With the remarkable development of technology, there are now numerous tools available for learning. These digital resources are highly beneficial when used correctly. In this presentation, we will discuss our research and experiments on two aspects: 1) Learning through the 4-step method of Reading – Note-taking – Knowledge Summary – Reporting, and 2) Digital information sources used to complement the aforementioned learning approach.

1. Introduction

The development of Artificial Intelligence has provided us a plethora of tools to support learning. After spending a significant amount of time engaging with these tools, the authors have initiated preliminary research into a self-learning method based on both personal experience and feedback from those around them. Although the sample size for the trial is limited and the initial implementation still has its shortcomings, the authors still aspire to share their work with everyone and hope to conduct larger-scale testing.

2. Theoretical foundation a. Learning aspect

First of all, to clarify the perspective in this essay, we will categorize the process of learning into three main tasks: Memorization, Critical Thinking, and Application.

In terms of memorization, according to the lecture by Mr. Nguyen Thanh Tung at Ton Duc Thang University on August 22 of 2023, memorization becomes

easier and quicker if we engage in the practice of Listening – Reflecting – Writing simultaneously[1]. The engagement of multiple regions in the brain working together has a significantly positive impact on memorization. Specifically, as Dr. Tung suggests, listening triggers one instance of brain activity; reflection helps the brain filter and encode information, constituting the second activity; and finally, note taking supports the brain's third activity. Thus, the brain completes its memorization cycle, involving reception, encoding, retention, and information retrieval.

Concerning Critical Thinking and Application, the authors have proposed the strategy of creating a concise report based on the notes taken. The primary content of this report will encompass the learned theory, effective memorization techniques or tricks, crucial formulas, and most importantly, illustrative examples that enable self-assessment of understanding.

Throughout the learning process, the authors have observed that teaching the material or sharing knowledge with others significantly enhances the level of understanding and retention. The availability of knowledge and experiences shared through the internet further emphasizes the validity of this approach. The necessity to adapt explanations for optimal comprehension compels the presenter to have a deep understanding of the subject matter. Developing explanations, providing examples, and conducting additional research for better comprehension also contribute to improved memorization. On the other hand, envisioning scenarios for applying concepts to examples enhances practical perception, proving invaluable for future real-world application.

3. Using digital resources

There is currently an abundance of digital resources that greatly facilitate access to and search for information. However, there is a significant amount of unverified information on the internet nowadays, which may be inaccurate[3]. Misleading content can have a considerable impact, particularly on individuals who are new to a specific field.

Fortunately, we now have very useful tools to mitigate this issue. The authors propose two tools: ChatGPT and Wikipedia (in all languages that one can read).

ChatGPT is an AI application based on a large language model, trained and refined with information, thus its theoretical accuracy is relatively high, although occasional inaccuracies may still occur. It is an excellent tool for searching for unfamiliar concepts or specialized information. However, as ChatGPT is a multi-disciplinary tool, at times it may respond with more general concepts and lack

specialization. In such cases, refining the question to specify a particular field will yield more accurate answers. Drawbacks of ChatGPT include the difficulty in creating an account and limitations when delving deeply into a specific domain due to its inherent lack of genuine expertise in that area.

On the other hand, Wikipedia is a remarkable tool for gaining an overview of a concept. The presentation on Wikipedia is visually intuitive, easily accessible, and offers relatively in-depth knowledge due to contributions referencing scientific articles. It's an incredibly useful tool for those new to a subject. The content is rich and filled with detailed information. However, Wikipedia's greatest weakness lies in its "openness." Anyone can edit its content, sometimes leading to positive contributions, but other times causing misinformation. This weakness can be addressed by verifying Wikipedia citations for reliability and the quality of the referenced research. It is even better to cross-check with other sources such as official textbooks or alternative tools.

At a higher level, scientific textbooks or research papers will always take top priority. These publications have a high level of accuracy, being subject to reputable peer review processes, ensuring exceptionally standardized knowledge. Nonetheless, occasional minor errors may still arise, although they are generally insignificant. The drawback of scientific textbooks lies in their extensive length and usage of specialized terminology that might not have readily accessible meanings or equivalents in other languages. Moreover, some textbooks assume a foundational level of knowledge in the subject area and might not be suitable for individuals without a basic understanding of the field.

For certain types of knowledge, having visual examples through images or videos is an excellent choice, with platforms like YouTube and various other websites hosting videos proving to be particularly valuable. Take chemistry, for instance learning theoretical concepts has always been a challenge for many students, but with videos, the learning process has improved as students can record each image or step of reactions. Hence, this approach is highly suitable for teaching and learning, especially when considering subjects like chemistry.

3. Initial result

A. Method summary:

- For Self-study: Identify the topic you want to learn about, then use Wikipedia to search for fundamental concepts related to the subject. Next, utilize ChatGPT to understand any unfamiliar concepts and gain a brief overview of the topic. At this point, you can consult experts in the field to verify the knowledge, then engage in active listening, thinking, and note-taking. Finally, consolidate the

acquired knowledge, create a concise report with specific examples, and find someone to explain the material to. This method will exhibit some differences when applied to classroom learning, where the process of listening, thinking, and note-taking will be employed initially, followed by the utilization of tools.

Initial result

Up to the present moment, this method has been tested by the authors as well as their students, yielding quite positive results. One of the two authors experienced a severe injury requiring immediate surgery during a critical study period. As a consequence, the mid-term exam results were unsatisfactory. However, employing the aforementioned method, during the final exam period, the author achieved significantly improved results. Not only did they grasp fundamental knowledge, but they also gained a deeper understanding of the subject matter.

For the students who have applied this method, their academic results have significantly improved. Some students who initially struggled with forgetfulness and lack of confidence have become completely self-assured when facing theoretical questions and math exercises, as well as adept at applying solutions to real-world problems. Particularly noteworthy is their improvement in presentation skills, as they have gained more confidence in preparing presentations and can now confidently speak in front of an audience.

However, it must be acknowledged that this method encounters some challenges when applied for teaching purposes. Some students only cope with the process without genuinely engaging in the critical thinking step, and their report-making tends to involve copying rather than comprehension. Even though these students can remember, their application is not yet strong, and their retention tends to be relatively short (less than 2 months).

Another obstacle is the time-consuming nature of this method, especially for beginners. Introverted students who lack exposure to various people may find it difficult to identify suitable individuals for explanations. This underscores the significance of parental involvement and contribution for these students.

During the experimental phase, the authors realized that the most appropriate subjects to apply this method are students from grade 9 and above. By this point, these students possess more developed thinking abilities and enough experiences to provide examples in their reports.

4. Conclusion

Although it has only been tested on a small scale (<25 students), the method has demonstrated certain effectiveness. It has aided many students in grasping and retaining knowledge quite well. The availability of digital resources has also broadened the scope of practical examples within the subjects, making the process of absorbing knowledge less monotonous than before. With a desire to contribute to society, the authors earnestly hope for the method to be tested on a larger scale in order to refine and yield even better results.

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SCRUTINIZING THE CARBON MARKET MODERNIZATION: AN ASSESSMENT OF CITIZEN-CENTERED DEVELOPMENT THROUGH THE LIVED EXPERIENCES OF THE CARBON MARKET VENDORS

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INFORMATION

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ABSTRACT

In Cebu City, Philippines, the Carbon Market Modernization Project has raised concern among the affected stakeholders. While the project aims to improve the condition of the market and the provision of services, it runs the risk of displacing vendors who are already established there. This begs the basic democratic principle of citizen-centered participatory development in the planning and implementation of the Carbon market project. This study employed a thematic analysis in investigating the lived experiences of the vendors through semi-structured interviews as a primary method of obtaining data. The researchers also utilized secondary data through data mining from credible and reputable government agency reports, journal articles, news articles, policy briefs, and surveys as supplementary resources in the conduct of the case study. This is analyzed using a fishbone diagram developed by Kaoru Ishikawa that aims to identify the potential causes of an identified social problem by dissecting the relevant factors. Findings have yielded three main themes: (1) The modernization process had negative implications for the vendors' businesses; (2) There was a top-down approach to local development planning; and (3) There was a sense of dependency among the vendors on the local government despite the ambiguous modernization plan. These themes have shown that there is an

imbalanced distribution of power between the vendors and the local government that discourages genuine deliberative and participatory discourse.

1. Introduction

The Singapore-like aspirations of the Cebu City administration have been highlighted in the inauguration speech of its incumbent city mayor, Michael Rama on June 30, 2022 (Cordova, 2023). This aspiration is characterized by various extravagant projects that will foster progress and development beneficial to Cebuanos. However, social problems arise despite the long list of benefits that modernization can provide, as illustrated by the ongoing Carbon Market modernization project. Cebu City's Carbon Market is known to be the oldest and biggest marketplace in the Central Visayas region (Saavedra, 2019). Its name originated from the carbon dumping site located in the area for the Philippine Railway System during the American occupation, although the marketplace already existed during the Spanish occupation (Oaminal, 2020).

The modernization of the Carbon Market is a highly disputed issue in the Cebu City area that puts into question what development truly is. The modernization project between Megawide Construction Corporation and the Cebu City government aims to give the market a posh upgrade, but at the cost of potential higher fees for the vendors and the risk of displacement (Sitchon, 2022). While Megawide has previously given its assurance that no vendor will be displaced and that a Memorandum of Agreement (MOA) was signed to protect the vendors in certain ways, the threat of disadvantages for the vendors still remains. While it has been mentioned that the modernization project was an agreement between two major parties, the question can be raised as to just how involved the key constituents of the Carbon market were when it came to the decision-making processes concerning the area. *Carbonhanong Alyansa* Officer Ann Ariosa made a comment about how a contract was signed without consulting with the vendors, indicating a trust issue (Sitchon, 2022). The problem arises as to whether they have benefited at all from the supposed "modernization" of their territory or are viewed as a liability.

As far as numbers regarding the development woes are concerned, the Movement Against Carbon Market Privatization alliance has estimated that 16,000 vendors will bear the brunt of the development project, while about 700 families in the locale worry about the possible demolition of their houses (Obejas, 2021). The impact of the Carbon Market modernization project does not merely

constitute an aesthetic redesign of the area. It goes as far as affecting the livelihood of numerous people and, in turn, their lives.

This case study assesses the state of citizen-centered participatory development in Cebu City, specifically in the Carbon Market modernization project, through the lived experiences of the vendors. It analyzes the involvement of the vendors during the decision-making process and investigates how the local government unit (LGU) responded to the concerns and struggles faced by the vendors during the modernization process. This study only included vendors in the Carbon Market who had been occupying a space in the market before the modernization project took place and should also be currently vending in the interim building to fit the criteria of being key informants in this study and be able to identify the changes before and after the modernization process began.

This study will be significant in furthering the scholarship of the field of deliberative public policy in the context of the Philippines. Throughout the years, numerous research works have been published that aim to enrich the discipline of deliberative public policy. However, most of these scholarships focus on other states, with limited attention provided to contextualizing the discipline to the citizen-centered development aspirations in the Philippines. The Philippine administration allots a generous fiscal budget to infrastructure development in an attempt to achieve a modernized and urbanized societal landscape. The government has allocated

Php 1.196 trillion for its infrastructure spending in 2023 (Department of Budget and Management, 2022). However, there are several issues that arise in the process of modernization that need to be considered, such as the involvement of grassroots citizens.

The conclusion and recommendations of this case study will help policy-makers and legislators craft a more citizen-centered development plan where Filipinos at the grassroots will not be left behind in the process of modernization and genuine deliberation will be fostered. Lastly, the vendors of the Cebu Carbon Market in Cebu City will be one of the direct beneficiaries of this study as it amplifies their experiences with the modernization project. More specifically, this research will be helpful to the local development planning office of Cebu City and the involved private entity in navigating the ongoing phased modernization of the Carbon Market.

The Carbon Market Modernization Project has caused disagreements in Cebu City due to the opposition of several stakeholders in the project who have raised their concerns regarding the marginalization of small businesses in favor of the

interests of established businesses in the city. The decision that has been made regarding the project has led to the question of the state of the democratic processes in the locality. Hence, this study aims to analyze the involvement of Carbon Market vendors in the deliberation and decision-making process of the modernization project. Specifically, this case study aims:

a. To determine the experiences of the Carbon Market vendors in relation to the Carbon Market Modernization project.

b. To analyze the involvement of the vendors during the decision-making process.

c. To investigate how the local government unit (LGU) responds to the concerns and struggles faced by the vendors during the relocation process.

d. To propose recommendations on how to address the lapses in the Carbon Market modernization project that will truly cater to citizen-centered development in the country.

2. Theoretical Perspective

This study used symbolic interactionism as the theoretical perspective of analysis in assessing the experiences of the vendors in the Carbon Market Modernization project. According to Steven Barkan (2013) in his book Social Problems: Continuity and Change, symbolic interactionism focuses on the interaction between individuals and how they give meaning to it. As a social theoretical paradigm, symbolic interactionism asserts that the social world is constructed through the repetitive act of interaction that results in individuals constituting symbolic and shared meanings and socially constructing the reality of the situation (Del Casino and Thien, 2020). Instead of learning the roles that were given to them by society, individuals tend to construct these roles based on their interactions with each other.

Symbolic interactionism then sees social problems as something that arises from the interaction of individuals and how they give meaning to their relationships. This lens of analysis will help the researchers understand how the interactions and socially constructed roles among the involved actors in the carbon market modernization lead to an unequal power distribution when it comes to the decision-making process - with the Carbon Market vendors at the bottom of this power hierarchy. Symbolic interactionism will be able to thoroughly address the notion that an actor's belief that he or she has a higher authority than others enables that actor to monopolize decision-making power. On the other hand, it gives other actors the perception that their roles and participation are limited due to the current social reality.

The emergent themes in this study showed how the imbalance of power during all the interactions between the vendors and local government caused the emergence of a social problem regarding the development of the Carbon Market. The vendors associated their interaction with the local government with passiveness, wherein they are not allowed to provide their input on modernization because they have no authority over the government. They saw the social reality where they have to comply and follow the order of the government in order to benefit from the interaction, as only demerits will come out of dissent because the government has the upper hand, especially in the allocation of vending areas in the modernized carbon market.

3. Citizen-Centered Participatory Development

Owing to the principles of democracy, where power supposedly belongs to the people, citizen-centered participatory development is welcome and needed. In a more general sense, the objective of democratic theory is to have the citizens "own and identify" with institutions, laws and policies (Lafont, 2019, as cited in Mansbridge, 2020). Before delving deeper into the concept of a citizen-centered participatory development, it is important to first acknowledge the idea of deliberative democracy. It attests to the requirement of warranting the decisions made by citizens and their representatives (Gutmann & Thompson, 2004). As discussed by Cohen (2007), the essence of deliberative democracy is to subjugate the application of collective power under reason. He further clarified the point by stating that the reason should be through the "common reason of a democratic public". Additionally, as mentioned in the article of McLaverty and Halpin (2008), Parkinson (2003) states that deliberative democracy has a set of conditions which includes "inclusiveness" and the "willingness" of participants to set aside pre-shaped preferences and to be persuaded, while Elster (1998) views the heart of deliberation as making decisions by and for participants who are rational and impartial.

Returning to the main discussion on citizen-centered participation, it is important to note that the citizens themselves are key in the decision making process. In an article from the Columbia Law Review (1966) titled "Citizen Participation in Urban Renewal", citizen participation includes three factors: (1) a group of persons who are affected by the actions of the government; (2) the aggravated or impulsive expression of the group's ideas concerning the action and (3) the impact upon the government's action through the ideas. The subject itself appears to be multi-layered and showcases the relationship between the government and its people.

On the topic of development, Banerjee and his colleagues (2020) in their work, People-Centered Social Innovation: Global Perspectives on an Emerging Paradigm, argued that an orientation that is citizen-centered when it comes to social innovation is a potent method in dealing with "multidimensional challenges" that affect various groups and individuals. They add that the orientation should theorize the societal context that would allow people to work on the circumstantial aspect concerning social, cultural, economic and political areas at different levels. Fundamentally, the aim of people-centered social innovation is to recognize the problems from the point of view of the actors themselves (Banerjee et al., 2020).

4. Deliberative Policy Analysis

Over the decades, deliberative policy analysis has gained currency among policy scholars in response to the growing shortcomings of the traditional positivist and technocratic forms of policy analysis that dominated the paradigm (Wagenaar, 2022). Deliberative scholars characterize contemporary policy arenas as complex and uncertain, where a divergence of values and understandings collide in what Dijk (2006) coined as an emerging "network society". Given the changing nature of policy analysis, technocratic forms of policy are no longer deemed democratically legitimate by some scholars as it fails to complement modern political decision-making. This results in public policies and services exclusively granted to experts or individuals who possess technical knowledge while other stakeholders involved or affected by the public policy such as the citizens are not accommodated (United Nations Research Institute for Social Development, 2004). Hence, its legitimacy in catering to citizen-centered public policies has been continuously challenged.

Scholars such as Shapiro (2005) argued the incompatibility of democracy and technocracy. In illustrating the tension between democracy and technocracy, the author recognized the transnational developments of post-industrial states - or what he coined as "high-tech states" - in administration and policymaking. The rise of these "high-tech states" resulted in the inevitable necessity of technocrats who possess the necessary specialized and technical skills. Tensions arise as technocrats do not necessarily represent or echo the sentiments of the citizens who make up a democratic society.

Critiques of technocratic public policy also emphasized the implications of the growing "scienticism", "scienticization,", and "depoliticization" of politics. Crick (1962) argued that the "scienticization" brought by technocracy assumes that the pressing issues and problems encountered by human civilization are

technical and that the solutions to these problems are solely based on existing knowledge. With the attempts of technocracy to apply science beyond its sphere, the processes of active decision-making and discursive will formation in contemporary political life are eliminated (Habermas, 1991; Singh, 2012). As a result, arbitrary decisionism dominates political decision-making characterized by a top-down approach to public policy implementation where special interest groups composed of technocrats are the only political actors in society who are granted legitimization to take collective and binding decisions on behalf of the whole citizenry (Pülzl & Treib, 2007). In turn, the affected targets merely respond to the pre-determined decision of the privatized and subjectively recognized needs (Singh, 2012) which fails to legitimately take into account the concerns of other involved actors.

The tendency of technocracy, which has been the dominant paradigm in public policy, to undermine the conception of a political community with its "scienticization", gave prominence to critical approaches and post-positivist policy movements such as Deliberative Public Policy. In brief, deliberative public policy places a premium on deliberation. Fearnon (1998) defines deliberation as a process "allowing a group of actors to receive and exchange information, to critically examine an issue, and to come to an agreement that will form the basis of decision making". Hence, Deliberative Public Policy seeks genuine preference transformation by expanding the role of deliberation in governance based on norms such as inclusive participation, joint problem-solving, publicity, and reason-giving (Badie, Berg-Scholosser, & Morlino, 2011).

Habermas (1991) argued that democratic legitimacy is measured in terms of the discursive quality of the full process of deliberation that led to such a result and not merely in terms of the law being enacted. His "Theory on Deliberative Public Sphere" was heavily anchored in his "Theory of Communicative Action" which he posits can help reach an "uncoerced consensus" where social actions are not products of intimidation or manipulation but rather initiated consensus (Singh, 2012). In his theory, he defined the public sphere as a network for communicating information and points of view where a reasoned debate or dialogue about politics is held. Habermas places great emphasis on the capability of human communication to advance a more reasonable society. In this regard, public audiences have final power since they are responsible for the internal structure and replication of the public realm. Hence, his theory of the deliberative public sphere relies on the process of deliberative argumentation and reflection, where individuals are capable of resolving issues and reaching an agreement.

Moreover, Fisher's (2007) take on deliberative public policy introduces an "argumentative turn" that scrutinizes the failure of the neo-positivist approach in fostering the deliberative processes necessary to address public problems. It recognizes the competing definitions of policy problems and the involvement of multiple perspectives in interpreting and understanding political reality. The author further argued that an argumentative turn in deliberative public policy promotes citizen participation as the citizen's discursive and symbolic construction of their interests is examined in order to understand how they hold such specific interests. Hence, deliberative public policy offers an alternative framework for public policy analysis and citizens that enables them to express their interests and needs. In other words, it opens a deliberative interaction between citizens and decision-makers (Fisher, 2000).

5. Analysis of the Problem: Results and Discussion

This study employed a thematic analysis in investigating the experiences of the key informants through a semi-structured interview prepared by the researchers as a primary method of obtaining data. The researchers also utilized secondary data through data mining from credible and reputable government agency reports, journal articles, news articles, policy briefs, and surveys as supplementary resources in the conduct of the case study. This is analyzed using a fishbone diagram developed by Kaoru Ishikawa that aims to identify the potential causes of an identified social problem by dissecting the relevant factors. Hence, both thematic analysis and fishbone analysis are employed in this case study.

In analyzing the data obtained from the Carbon Market vendors, who are the key informants to this case study, the researchers classified the emergent themes into three categories: (1) Effect of Modernization on Vendors; (2) Consultation Initiatives of the LGU toward Carbon Market Vendors; and (3) Plans and Updates on the Modernization Project. The formulated meanings were derived from relevant statements made by the key informants during the interview. On a similar note, the theme clusters were the consolidated categories of these similar meanings, which were then further categorized into emergent themes.

A. The prolonged modernization process has negative implications for the vendors' small businesses.

The modernization of the historic Carbon Market aims to improve the livelihood of the people and ensure economic development by transforming the area into a multi-purpose commercial district (Sitchon, 2022). However, there have been issues raised by the vendors, who are primarily affected by the modernization.

During the interview, R1V30 revealed that he suffered a decrease in income after the relocation to the interim building exacerbated by the decline in the demand for native products. R2V20 also shared the same sentiment when she expressed that she suffered an inevitable increase in debt after transferring to the interim building, which has less foot traffic. She verbalized:

"We can't help but frown [upon the situation]. When we were in our original location, even though we had debts, it was manageable. Here [in our new location] debts are piling up because we don't have enough money, so it's very difficult."

On the issue of less foot traffic in the interim building that mainly contributed to the decrease in income, R2V20 added:

"The situation before [we got relocated] was better because our stall is near the road and is accessible to customers. Here [in the interim building] it is difficult to access so mostly, only our regular customers come and only a few new clients are coming in."

Considering the emergent themes from the data gathered, it can be implied that despite the positive aspirations geared toward the modernization of the Carbon Market, the vendors were negatively affected, especially during the relocation to the interim building which resulted in a decrease in income.

B. A Top-down Approach to Local Development Planning

The key informants have expressed the fact that they were not consulted regarding the modernization project prior to the signing of the Joint Venture Agreement (JVA) between the city government and Megawide Construction Corporation. Key informants R1V30 and R2V20 have pointed out that although they were called into a meeting with market administrators, they were not necessarily there to be consulted about the development plan. Instead, they were only informed about the already signed JVA and were given reassurance that the modernization will not displace them and that they are guaranteed to have a stall in the developed Carbon Market. This shows that deliberation on public policies and services is exclusively granted to experts or individuals who possess technical knowledge, while other stakeholders involved in or affected by the public policy, such as citizens, are not accommodated (United Nations Research Institute for Social Development, 2004).

Furthermore, the statement of R2V20 has proven the unequal power relations between the vendors and the local government unit (LGU) as she stated:

"We can't impose our will because they [the government and Megawide] already have a plan. If we protest against it, we might lose our stalls and won't be able to sell here [in Carbon Market]."

According to Luskin, Sood, Fishkin, and Hahn (2022), due to the unequal distribution of power among stakeholders, the social dynamics at play tend to homogenize, polarize, or foster dominance, where socially disadvantaged stakeholders are typically less articulate, less assertive, or less heeded than others, and power is positioned among the socially privileged, distorting rather than refining the public will.

C. Plans and Updates on the Modernization Project

Despite the uncertainties imposed upon the vendors' livelihoods because of the Carbon Market modernization project, they still remain somewhat hopeful that it will end well for them when all is said and done. However, this "hope" is hinged upon their total dependency on the higher-ups' plans for the Carbon Market. The aforementioned uncertainty is mainly caused by the lack of information provided as to the final location of where exactly the vendors will be staying. R2V20 states the following:

"We do not know what the plan really is because it is always changing."

R3V10 was also unsure of his stall's future when he said:

"The story of it is, we cannot really say. Why? Because we are just temporarily staying here."

With all the doubt surrounding their individual futures and livelihoods, the vendors have no choice but to totally rely on the market administration and the local government. R1V30 encapsulates the sentiment with his response:

"It's their decision. We did not receive any (deciding power) because they are the government."

An issue identified by the Ministry of Environment (2010) concerning the urban and infrastructure planning system includes "the lack of clarity and consistency of national objectives and standards." With the responses from the key informants, the uncertainty of the Carbon Market's modernization project can prove to be problematic for all its constituents.

Fishbone Analysis

Delving into the modernization of the Carbon Market through an assessment of the lived experiences of the Carbon Market vendors, a fishbone analysis is a helpful tool in analyzing and identifying the root causes of the specified social

problem. A Fishbone Diagram assures that no single potential cause will be overlooked as the analysis allows the researcher to scrutinize the causes divided into six categories - Participants, Process, Intervention, Policy,

Implementation, and Milieu respectively. This section will provide a narrative explanation of the Fishbone Analysis in Figure 1 to further expound the potential causes of developmental aggression and the lack of people-centered development in the Philippines, particularly in the case of the Carbon Market of Cebu City, which has been among the social problems that contribute to the ills in the society.

Participants

Urbanization has been the trend of modernity evident in the influx of population to urban areas and the transformation of lands into commercial, industrial, and residential purposes. The concept of urbanization has usually been associated with economic growth given how the former plays a crucial role in the economic development of every country (Di Clemente & Batty, 2021). The mutual relationship between urbanization and economic productivity generates an expectation of a cycle of economic growth and urbanization regardless of the local conditions. Hence, socioeconomic policies of countries usually include infrastructure projects as a key component. In the Philippines, the Build Build Build Program of the Duterte administration is an excellent illustration of how government officials rely on infrastructure programs to encourage economic growth and development.

Despite the inherent benefits of urbanization and development, issues arise when these are pursued at the expense of the people - specifically the ordinary people who are often marginalized. The Carbon Market Modernization Project is an illustration of how a lack of people-centered development can result in more problems, with ordinary people suffering from the implications the most.

In an attempt to transform the historic Carbon Market characterized by “a warren of cramped alleys and halls” into a first-class multi-use commercial district (Sitchon, 2022), many vendors who mostly relied on their small businesses as their sole source of income were displaced, with no comprehensive relocation plan proposed. In the signed Joint Venture Agreement (JVA) of Cebu City with private developer Megawide Construction Corp. (MCC), a provision regarding a rent increase schedule has been included (Sitchon, 2022) which imposed fear among vendors as there will be a possibility that other businesses who can afford the increased fee will replace them, aside from the impact on their income. Although this specific provision has been suspended with the supplemental Memorandum of Agreement (MOA) later on, this highlights how the planning

process failed to place the vendors as a priority, which should be the heart of a people-centered development.

Issues such as this arise as the individuals involved in the development planning were limited to government officials and private sector proponents (Megawide Corp.), with no first-hand experience with the struggles of ordinary workers and vendors. While their expertise in development planning is acknowledged, this does not entail that the lived experiences of the vendors are no longer important. People-centered development should be at the core of urbanization, which means that all involved actors should be acknowledged and consulted.

Process

This criterion revolves around how a certain process has been performed that has contributed to the problem. In this social problem, the methods include the lack of genuine public consultations with vendors and labor unions. There were contesting claims in regard to the conduct of public consultation before the implementation of the modernization project. On the side of critics and some vendors, it has been claimed that no genuine public consultation was conducted prior to the demolition and during the negotiation process since vendors were merely informed of the decisions. On the other hand, Megawide claims that there have been public consultations as these are "part and parcel of the project development" (Caña, 2022).

A lack of a comprehensive relocation program for affected Carbon Market vendors is also among the causes of development aggression. Although government officials and the involved private proponent assure that no vendor will be left behind in this modernization project and that a relocation space will be provided, the lived experiences of most vendors paint a different picture. The allocated interim market failed to consider the importance of a strategized area to secure customers and income (Caña, 2022). Lastly, a lack of genuine deliberative public policy processes is also evident in the conflicting agendas among involved actors and the lack of continuity in long-term policymaking.

Intervention

In connection with the passage above, the case of the Carbon Market showed how a lack of people-centered development will only benefit a limited few and not the public. The allotted interim market has not been as accessible as the previous space for the vendors, which has resulted in lower foot traffic since customers find it less accessible. As a result of being relocated in 2021 to make

way for construction and site development works, several affected ambulant vendors have decided to quit selling altogether since they are no longer earning due to the lower foot traffic in the interim market. In a separate interview, Erwin Goc-ong, president of the Carbon Market Vendors Development Cooperative (CEMVEDCO), reported that 60 vendors had stopped vending since the clearing of the sidewalk was conducted in 2021, while another 30 had withdrawn membership and decided to stop vending because of lower revenue since the relocation in 2022 (Librea, 2023).

Policy

Among the causes of development aggression is the lack of provisions that safeguard their rights, which in turn makes vendors vulnerable to unjust treatment. This is manifested through the following: First, the lack of amendment to the Cebu City Market Code, which is already considered "pro-private sector". Under the JVA originally signed by former Mayor Labella and Megawide's Louie Ferrer, it allowed Megawide collection powers that went against the Cebu City Market Code (Sitchon, 2022). Second, the Regional Trial Court has dismissed an injunction against the Carbon Market development project. Former Cebu City Mayor Tomas Osmeña filed the petition for an injunction against the modernization project as he considered it to be "anti-poor" since he believes that major businesses will take over the marketplace from the vendors (Tan, 2023). Third, the lack of scrutiny of the JVA and the MOA has proven to be costly. With the loopholes already in the JVA being problematic, the supplemental MOA attempted to fix this yet still made reference to the worrying possibility of a rent increase (Sitchon, 2022).

Implementation

According to Atty. Abraham Rey Acosta, legal counsel of the Carbon Alliance, the Notice to Vacate issued by City Market Administrator Raquel Arce to the vendors has no legal basis given that her notice contained threats against the vendors, wherein the failure to comply with her demand for a voluntary exit from rented market stalls may result in the eviction of the vendors, who have lawful rights to the space that they legally rented from the city government. Moreover, aside from the possibility of yielding to the order of the market administrator out of fear of losing a stall space, the excessive presence of armed forces during the demolition process of the stalls has also forced the vendors to helplessly comply with the order (Malinao, 2022).

Moreover, the Joint Venture Agreement signed by Megawide and the local government has enabled the de facto privatization of the Carbon Market, wherein

the LGU has given Megawide the authority to collect rent and other fees from users of the facilities in the Carbon Market. This is in violation of the Cebu City Market Code and infringes upon the city treasurer's authority over the "direct and immediate supervision, administration, and control over market fee collection" (Sitchon, 2022). The JVA also has provisions for rental increases, which are in violation of the Cebu Market Code of 2017. A supplemental agreement has been released by the local government to address the gaps between the Cebu Market Code and the JVA, wherein the collection duties are retained with the city until the city updates the market code while retaining Annex D or the increased rental prices in the JVA (Sitchon, 2022).

Milieu

This criterion revolves around the conditions, such as political dynamics and culture, in which the social problem operates. The Philippines typically follows a top-down approach to local development planning, where only the experts in the field are consulted. Although this is important, hearing the sentiments of the people on the ground, which is equally important, is usually ignored. Critical theorists on public policy such as Fisher (2007) argue the importance of recognizing the relationship between practices of political analysis and political changes in order to produce wider and better-nuanced interpretations of the discipline of public policy and its development. A critical approach to public policy moves away from the limiting tendency of technocracy, which traps public policy in the confines of scientific terminologies, and recognizes that an argumentative turn surfaces from institutional and political conflicts in society. This results in distrust among vendors over whether the redevelopment project is an initiative catered to their best interests or not. Moreover, in line with the aspirations of local government units to brand a picture of progress, they usually resort to modernization of infrastructure, such as Cebu City's aspirations to make the city a mirror image of Singapore when it comes to development. Issues with this aspiration arise when the modernization toward a first-class market reignites the fear of the vendors about privatization.

The Fishbone Analysis emphasized how the problem of the Carbon Modernization Project involves several key actors who have conflicting opinions and values. Hence, there is a need to assess the lived experiences of the Carbon Market vendors during the planning and decision-making process of the project in order to evaluate whether a deliberative process and people-centered approach have been observed throughout the modernization process of the Carbon Market. The fishbone diagram has been a helpful supplemental analysis tool along with

the thematic analysis conducted by the researchers in assessing the lived experiences of the Carbon Market vendors in the phased modernization project.

5.Conclusion

Through the lens of symbolic interactionism, the emergent themes of this study showed how the interaction characterized by an imbalanced distribution of power between the Carbon Market vendors and the local government creates a perceived reality where the government is meant to solely impose rules and policies while the constituents, such as vendors, are meant to follow the government's order. This trend creates an environment that discourages genuine deliberative and participatory discourse where: (1) the prolonged modernization process has negative implications for the vendors' small businesses as the vendors expressed their dissatisfaction with their relocation to the interim building because of the decrease in sales; (2) the top-down approach to local development planning is led by technocrats where they are the only political actors who are granted legitimization by the government to take collective and binding decisions on behalf of the whole citizenry because of their expertise without consulting the people who will be affected by the modernization; and (3) the hope of the vendors to secure a spot in the modernized carbon market despite uncertainties on the modernization project due to the inadequate dissemination of information regarding their final location in the modernized Carbon Market. The Singapore-like aspirations aim to empower Cebuanos and should place the grassroots at the heart of development. Hence, genuine modernization should be citizen-centered so that democratic processes prevail where power belongs to the people.

Recommendations

The Carbon Market modernization characterized by a phased redevelopment offers promising opportunities for the societal landscape of Cebu, Philippines. However, the initial phase of the development already faces challenges and setbacks in its aim of providing better opportunities for the vendors, which has been emphasized in the analysis of the case study. This shows that there are still many lapses that need to be addressed to mitigate the negative implications of the phased redevelopment. Thus, it is crucial and relevant to critique and provide recommendations for the improvement of public policy as it may serve as a helpful guide in crafting better policies in the next phases of Carbon Market development. With this, the following are the recommendations of the researchers for the ongoing Carbon Market Modernization:

Incorporate a bottom-up and participatory approach to local development planning.

The top-down approach incorporated in the development planning of the Carbon Market resulted in numerous negative impacts on vendors. The researchers recommend a shift in the approach to policy-making characterized by a bottom-up and participatory approach that caters to genuine deliberative public policy processes. This approach recognizes the importance of the grass root individuals - in this case, the vendors - who are usually marginalized during the process. Through a participatory approach in the Carbon Market development, dialogue mechanisms will be strengthened as vendors are empowered to speak their minds and air out their opinions without the fear of losing a spot in the market. A strengthened dialogue mechanism will also mitigate disputes that could arise in the future, fostering a modernization process wherein no one is truly left behind.

Provide a subsidy to vendors during the adjustment period after relocation.

It is inevitable that vendors will suffer a decrease in income during the adjustment period on the provided interim building due to factors such as buyers still needing to renavigate the market. Given how vendors are small-scale sellers who do not have an emergency fund to keep the income rolling, they are at risk of losing their sole source of income. Hence, a subsidy should be provided among vendors during the adjustment period in the new area. This would help lessen the unrest and worries among vendors while the first phase of development is ongoing.

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THE ROLE OF THE JOB MAP FRAMEWORK IN EMPOWERING YOUTH FOR DIGITAL TRANSFORMATION

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INFORMATION

Keywords:

Job Map, digital transformation, youth-led initiatives, innovation

ABSTRACT

This In the world of business, the traditional approac often involves asking customers direct questions about their need which can sometimes lead to confusion or biased responses influenced by their surroundings. Enter the Job Ma framework by Ulwick, offering an innovative way to unearth business opportunities. This framework identifies the various "jobs-to-be-done" by dissecting them into specific steps, where challenges and problems can emerge, thereby revealing potential business openings. Now, consider the youth – digital natives and relentless innovators. They possess a unique advantage in seizing these opportunities. Armed with digital prowess, they can address specific problems identified within the Job Map using digital solutions, which are not only more effective but also highly efficient and scalable compared to conventional methods. Moreover, the ever-evolving business landscape has thrust companies into the realm of digital transformation, a journey they must undertake to not just survive but to expand their ecosystem. This study embarks on a mission to explore the intricacies of the Job Map framework, uncover hidden business prospects, and shed light on how the youth harness this framework to supercharge digital transformation and spark innovation. As we delve deeper into this study, we'll unravel the intricacies of the Job Map framework, showcasing how it serves as a treasure trove of business opportunities. We'll also provide compelling evidence of how the younger generation, with their innovative spirit, leverage this framework to

drive digital transformation. And finally, we'll present actionable recommendations for further action, illuminating the path for businesses and youth alike to thrive in the digital age.

1. Introduction

Understanding the customers' needs, business strategists and practitioners usually explore the customers or market needs by asking them questions related to their business. However, it is considered the biggest drawback as sometimes the customers have no idea what to answer and they might follow their surroundings' answers which do not address the expected results. The Job Map framework was introduced to depict what the customers are attempting to get done systematically, leading to structured execution as instead of asking the customer immediately, strategizing the step-by-step of what customers need to be done is important (Bettencourt & Ulwick, 2008). Hence, based on the framework, more opportunity and innovation might emerge due to its practicality and comprehensiveness. One of the significant innovations was the integration of the Job Map framework and the digital transformation, which is developed and accelerated by youths as they are the most connected generation and digital natives (UNICEF Innovation, 2023). Digital transformation connected and integrated the business, technology, society, and planet; hence it has essential contribution to the business growth (Van Veldhoven & Vanthienen, 2021). For instance, the enhancement of business functions such as finance, marketing, and HR could be implemented using digital automation system which might reduce the cost, increase productivity, and expanding the business. Moreover, the business that do not want to accept the digital transformation might be left behind as they cannot catch up with the technology development. Furthermore, most of the roles in planning and executing the digital transformation was initiated by youths as they are the digital natives, the most connected generation, have abundant opportunity, they have positive behaviors in taking a risk (UNICEF Innovation, 2023). Hence, the capability of youths in mapping the job-to-be-done to identify any opportunities as well as their skills in digitalization, bringing new innovations of business approaches that solves specific problems. Therefore, this study is to explore how the Job Map framework can be utilized to harness the unique capabilities of youth in driving digital transformation by understanding the Job Map framework, the youth-led innovation evidence, and recommendations for the further action.

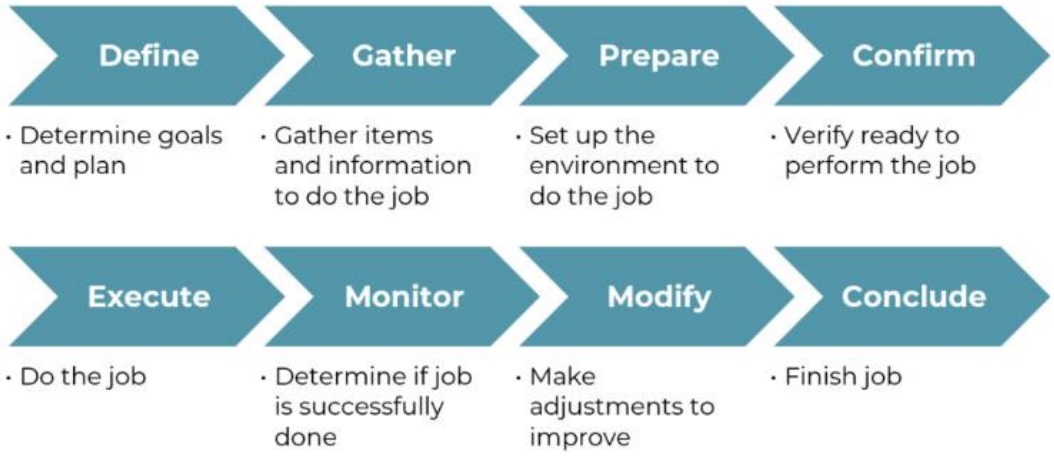
2. Body

Identifying, reviewing, and analyzing the related literatures will be explored in this part to dive deeper into the role of Job Map framework in empowering youth for digital transformation. Let's delve into how the Job Map serves as a strategic catalyst for identifying growth opportunities and nurturing innovation.

2.1. Digital Transformation, Youth, And Innovation

According to Sultan (2020) that 91% of business were engaged in digital initiative, while the success rate of digital transformation was below 30% (Ariella, 2022). Transforming digitally is not as simple as using new technologies into a business ecosystem. It involves the holistic and comprehensive modification of business operation, including its engagement with the employees, shareholders, customers, and overall stakeholders in delivering its values. Moreover, with the existence of digitalization, business culture might be changed due to its effect on the management. Therefore, adopting digital transformation is not an easy as the preparedness of the employees, customers, and stakeholders might be varied and they responded differently, especially for those who feel difficult to adapt with the technology, suspicious with the digital system, or threatened by its existence. On the other hand, businesses should transform digitally due to the evolvement of market situation, technology trends, and competition. Understanding the internal and external factors that push the business to adopt, integrate, and transform digitally, the role of youth as a digital native and most connected generation became more significant in shaping today's business ecosystem. Also, youths have more time to explore more opportunities and take risks due to their small commitment for family or significant health risk.

2.2. The Job Map Framework



Source: (James, 2021) and it is inspired by Bettencourt and Ulwick (2008)

Job Map framework that was elaborated by Bettencourt and Ulwick (2008) was to disrupt business ecosystem by focusing on job-to-be-done of the customers to understand what they need in a systematic way which consists of: define, gather, prepare, confirm, execute, monitor, modify, and conclude. The framework can be used to explore more business opportunities, addressing the customer's problem in each step and taking role as an alternative and support of asking the customer directly for market research.

Define means determining goals and setting up the plan. In any initial activities, customers need to set up their objectives and create a plan to ensure its success. However, it is not an easy task as they might be confused, unsystematic, and have no direction. For instance, students need to plan their study to ensure that they will achieve their study goals at the end of the study period. The challenge comes when they are unable to determine what they need to learn, organize the study plan, understand what they should do to achieve better grades, know their best career based on their passion and personality, and other related issues. Understanding this initial step of what needs to be done by customers, opening more opportunities, especially in digital sphere as the educational technology startup comes to solve this problem by creating automated and integrated student plan creation, and assisting students in determining their best career based on the online psychological test.

Gather is to collect information, utilities, and materials to finish the job. It can be book and study materials for students, teaching materials for teachers, medical utilities for medics, Facebook ads account for digital advertiser and others. In this part, customers might be challenged in finding relevant materials for their job, such as they do not know how to find specific literature to be studied for students and they do not know how to set up the Facebook ads account for digital advertisers. Hence, this can be an opportunity for digital businesses to help the customers in finishing this job.

Next, the meaning of Prepare is to set up the environment to do the job. After the materials are collected, organizing, structuring, and preparing all materials to be ready for execution is important. For example, digital advertisers need to set Facebook ads account, including its credit, strategies, ads materials in a systematic way. The problem might happen when the customers do not know how to structure, systemize, or prepare the materials when all were collected, such as students do not know how to start to learn something. This problem is an opportunity for youths by employing their digital solutions, providing AI in

helping them organize their studies, including their collected learning materials step-by-step.

After the materials were collected, prepared, and structured, confirmation is important to ensure that their preparation is verified and ready for execution. If the execution was implemented without confirmation, missing materials or uncompleted preparation might happen. In this case, using AI to confirm and validate the preparation will assist the customers as it is more productive and efficient.

The most important step is execution after plans and materials were collected, prepared, and verified. It can be running ads for digital advertisers, writing thesis for students, and doing cold calling for telemarketers. The problem might happen when customers cannot execute the job optimally as they have no knowledge, are less informed, face technical issues, or any unprecedented situation. This can be an opportunity for youths to emerge the digital business that solves the specific problems in the job execution, such as providing conversational AI for telemarketers, helping them in closing the deals during the call.

Next, monitoring to ensure that the execution was successfully done and in line with the planning is important. It depicts the importance of setting the key metrics of successful execution during the planning process. Furthermore, the execution is most likely not perfect which needs to be ensured its quality. Some examples that address the problem that might happen in this specific step is the digital tool such as Grammarly to check grammar, syntax, and plagiarism of manuscripts to ensure that it is ethical and acceptable according to academic standards, which is beneficial for academics and students. This step is often associated with the next step, which is modification. It is to modify the corrected job for its enhancement and better quality. Usually, digital tools, such as Grammarly provide suggestions on how to improve the manuscripts, meaning it helps customers to modify their work based on the correction.

Lastly, to conclude, it means ensuring the job is finished properly and able to be improved for further execution. The point of concluding is to fully confirm the completion of the job, such as the well-recovered patient for doctors and achieving first-class degree for students. After the execution was completed and improved, ensuring that the planning, process, challenge, and finishing are well documented is also important to confirm the completion of the total job-to-be-done journey. The challenge comes when customers do not have an opportunity to document or ensure the completion of the job, which affects the further execution. Integrating

AI in the whole process of the job-to-be-done will assist customers in documenting and recording the whole process for further improvement.

2.3. The Youth-Led Innovation

The Job Map framework, with its integration into the realm of digital innovation, finds its most dynamic driving force in the hands of youth. This burgeoning movement is epitomized by the visionary endeavors of young founders who are blazing new trails in problem-solving using the Job Map framework in tandem with digital solutions.

Gibran Huzaifah, a 29-year-old visionary and founder of eFishery, embarked on an entrepreneurial journey that not only disrupted the fish farming industry but also created a unicorn startup (Asmaaysi, 2023). His innovation was two-fold: first, he tackled the crucial execution step in the Job Map framework by introducing automatic feeding machines, relieving fish farmers of the labor-intensive task and significantly enhancing their efficiency. Second, Gibran built a thriving community around eFishery, empowering fish farmers and amplifying their presence in the market. This holistic approach not only streamlined operations but also fostered collaboration and growth, ultimately solidifying eFishery's position as a game-changer in the aqua-tech sector. Tapping into untouched markets and emphasizing the most burdened process among the market (fish farmers) which is feeding fish on-time were the successful strategy executed by Gibran as a youth.

Next, in the dynamic landscape of Indonesian startups, Anderson Sumarli has emerged as a prominent figure, leading the charge with Ajaib, the country's fastest-growing unicorn. Ajaib's mission is to usher in a digital transformation in the financial sector, particularly when it comes to investments. This online brokerage platform caters to stocks, ETFs, and even cryptocurrency, aiming to enhance the investment literacy, attitude, and behavior of Indonesians. What sets Ajaib apart is its disruptive approach – it doesn't just facilitate investments; it monitors and supports the entire investment process, from initial planning to evaluation. Furthermore, the most intriguing aspect of Ajaib's offering lies in its planning and monitoring tools, where the platform offers daily live interactions both before and after the stock market opens. This unique feature adds a dynamic and engaging dimension to the investing experience, making it more accessible and informative for users. Anderson Sumarli and Ajaib are not just redefining the online brokerage market; they're shaping the future of financial empowerment in Indonesia.

Next, addressing the steps in gathering and confirming process in the Job Map framework, Ritesh Agarwal, CEO of OYO Rooms, has been a catalyst for digital transformation in the hospitality industry. Assisting the customers in gathering information about preferred living space, streamlining all OYO services, and standardizing quality and budget, Ritesh found it is an opportunity for innovation as the job-to-be-done by the customers in choosing temporary living space were addressed.

In the ever-evolving business landscape, the active involvement of young entrepreneurs in practices like digital transformation, innovation, and disruption underscores their pivotal role in reshaping industries. By embracing an innovative framework, inspired by Bettencourt and Ulwick (2008), these enterprising youths seize the unique opportunities that often elude others. These opportunities often manifest as unmet needs within a specific audience, and youth founders have proven adept at addressing these challenges with digital solutions, much like their predecessors in the entrepreneurial world. This synergy between youth, innovation, and digital prowess not only highlights their capacity for change but also showcases their ability to unlock untapped potential in the business realm, providing fresh perspectives and novel solutions to age-old problems.

3. Conclusion

The Job Map framework is essential for identifying unexplored opportunities within businesses, fostering innovation by pinpointing specific problems. It emphasizes what needs to be done by the audience to finish their work, hence it is systematic and practical. In relation to the framework, digitalization has emerged as a powerful solution to address issues previously untouched by conventional business methods, and young innovators are driving this transformation. Digital transformation enables businesses to be more effective, efficient, and expansive. Youth plays a pivotal role in the digital age, bringing fresh perspectives, agility, and a keen understanding of technology to drive innovation and transformation as they are digital native and connected. Youth brings digital fluency to the forefront of digital transformation. Their innovative thinking and willingness to embrace technology enable them to identify unmet needs and develop novel solutions. Youth-driven startups like those mentioned earlier illustrate how young entrepreneurs are reshaping industries and addressing specific problems with ingenuity.

As we look ahead to empower and inspire the digital pioneers of tomorrow, introducing, teaching, and applying the Job Map framework within educational institutions stands as a beacon of promise. By equipping young minds with the

tools to observe opportunities and systemize their "jobs-to-be-done," we sow the seeds of innovation that will shape the future. Further, intertwining this framework with specific digital skills like digital marketing, data analysis, and coding adds rocket fuel to the youth-led innovation engine, especially within the dynamic realms of business. This fusion of knowledge and methodology not only unlocks potential but also propels the next generation to chart new horizons, transforming the digital landscape and propelling humanity into an era of unprecedented possibilities.

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TIỂU BAN 3: NÂNG CAO NĂNG LỰC SỐ CHO THANH NIÊN

DIGIYOUTH: THE DEVELOPMENT OF AN INTERACTIVE DASHBOARDFOR MONITORING AND ANALYSING STEM-RELATED STUDENTS INTHAILAND'S EASTERN ECONOMIC CORRIDOR

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INFORMATION

Keywords:

Thailand 4.0, Eastern Economic Corridor (EEC), STEM Education, Youth Development, Data Visualization , Interactive Dashboard

ABSTRACT

TheElevating the country's economy for development, including the Eastern Economic Corridor (EEC), stands as one of the major large-scale economic projects in Thailand's Eastern region. Within this region, the most significant industries are housed, engaging in free trade with ASEAN countries, China, and India, thereby having the capacity to propel Thailand's long-term economic growth. Empowering the youth in this area holds pivotal importance for driving the economy and ensuring project success. Consequently, the advancement of education in Science, Technology, Engineering, and Mathematics (STEM) fields, tailored to cater to the needs of the 10 industries, emerges as a key consideration. However, comprehending the intricate education landscape poses challenges. Hence, the presence of tools that provide support and facilitate decision-making for organizations or policies geared toward fostering a comprehensive understanding of education for youth development holds considerable significance. This study aims to develop an interactive dashboard that provide insight and monitor the characteristics of Science, Technology, Engineering and Mathematics (STEM)-related students within Thailand's Eastern Economic Corridor (EEC). Leveraging government open data including list of universities in Thailand, as

well as student educational data for the years 2020 and 2021. The data was preprocessed and analyzed using two levels of analytics: descriptive, diagnostic and develop DigiYouth interactive dashboard with business intelligence tool. The resulting DigiYouth interactive dashboard comprises three main pages: (1) An overview page that compares the education landscape between the years 2020 and 2021. (2) A detailed analysis of the education landscape in the year 2020. (3) A comprehensive analysis of the education landscape in the year 2021. This dashboard serves as a valuable resource to inform policymaking decisions, aiding policymakers understanding of the education landscape within the Eastern Economic Corridor (EEC) and the research envisions that this innovative dashboard will not only bolster youth comprehension of digital transformation but also play a vital role in fostering economic development within their local communities and on the international stage.

1. Introduction

In globalization era, Digital or technological progress has rapidly evolved, influencing not only education and entertainment but also significantly affecting economic competition in both the Thai and international contexts. Consequently, the government has recognized the importance of implementing diverse policies such as the Tran-Pacific Partnership (TPP), the Regional Comprehensive Economic Partnership (RCEP), and the Eastern Economic Corridor (EEC). The Eastern Economic Corridor (EEC) represents a crucial initiative aimed at fostering economic growth in the Eastern region of Thailand. This endeavor encompasses a three-dimensional industrial strategy, which involves: 1) advancing industries towards innovative production, 2) propelling industries through technological advancements, and 3) elevating industries with an emphasis on the service sector. This project operates in collaboration with relevant entities from the public, private, and civil sectors, aligning with the principles of "Thailand 4.0.". This refers to an economy driven by innovation. The Eastern region, being home to the country's largest industrial hub, boasts diverse sectors such as automotive, logistics, and construction, bolstered by comprehensive transportation networks encompassing maritime, land, and air routes.

Furthermore, it facilitates unrestricted trade with neighboring countries, the ASEAN community, including nations such as Myanmar, Vietnam, Cambodia, and Laos, as well as China and India.

To ensure the successful realization of the Eastern Economic Corridor (EEC), it is imperative to harness the potential of the workforce, particularly the youth, who play a pivotal role in driving transformative changes. However, a substantial portion of this workforce lacks the requisite skills in modern science and technology, necessary for thriving in industrial sectors. To address this challenge, this research has been developing a dashboard named "DigiYouth." This innovative platform takes the form of an interactive dashboard designed for monitoring and visualizing the educational landscape of students specializing in Science, Technology, Engineering, and Mathematics (STEM) disciplines within the eastern region. These students possess the potential to significantly contribute to Thailand's economic growth, both domestically and on a global scale. By providing data-driven insights, the platform, referred to as DigiYouth, empowers decision-makers with informed choices, ultimately leading to the refinement of targeted curricula that align with the contemporary demands of the technological era. This strategic approach is expected to capture the attention of governmental authorities, prompting the formulation of policies that foster youth engagement in digitally oriented fields. The underlying belief is that such engagement will act as a catalyst for the advancement of the global economy.

2. Objective

1. To delve into and analyze data concerning students studying in Science,

Technology, Engineering and Mathematics (STEM) disciplines within Thailand's

Eastern Economic Corridor (EEC) region.

2. To design and develop interactive dashboard to provide insight and monitor the

characteristics of Science, Technology, Engineering and Mathematics (STEM) -

related students within Thailand's Eastern Economic Corridor (EEC).

3. To generate insightful recommendations aimed at informing education

policymakers operating within the Eastern Economic Corridor (EEC) region.

3. Methodology

Data Acquisition

Interactive Dashboard

An interactive dashboard was created utilizing business intelligence tools, as the facilitation of user-friendly access to insights and the attainment of answers to their inquiries were deemed crucial. In this study, Microsoft Power BI was employed as the chosen tool for dashboard development, and it has three pages, including an overview page, an educational landscape for 2020, and an educational landscape for 2021.

4. Result and discussion

Data Acquisition

The result of data acquisition from various government data sources includes three datasets: University List in Thailand, Educational landscape for 2020, and Educational landscape for 2021. The detail of data is shown in Table 1-2

Table 1: Result variable Name , data type and meaning of each column in Educational landscape for 2020-2021 dataset.

Variable Name	**Data type**	**Meaning**
Academic Year	Numeric	Academic Year
Semester	Numeric	Semester
Univ_type_Name	Category text	Type of University Example : National University , Private university etc.
Univ_Name_TH	Text	Name of University
Fac_Name	Text	Name of Faculty
Group_name	Category text	Main Category of Study program including• Science & Technology• Humanities and Social Sciences• Health Science
STEM	Category text	STEM: Science, Technology, Engineering, and Mathematics.Yes : Study programs related to STEM. No: Study programs not related to STEM.
Program_Name	Text	Study programs name

In this study, the dataset was acquired from government open data sources in Thailand, including the Ministry of Higher Education, Science, Research and Innovation and Open Government Data of Thailand. Accessible through

https://data.go.th/ and https://data.mhesi.go.th/dataset/, these platforms provide a wealth of information.

Data Understanding

In the data understanding process, we employed two methods to comprehensively analyze the data from the previous step, which included (1) Descriptive statistics, which involves the application of statistical measures such as mean, median, count and so on. These calculations help us grasp the nature and characteristics of the dataset. (2) Data visualization is an approach that leverages visual representations to delve deeper into data comprehension.

Data Preprocessing

Data preprocessing is an important step in data preparation for research. In this step include correcting data, removing unnecessary, transforming data, and integrating data sources. For this study we are focusing on the educational landscape of students in the Eastern Economic Corridor (EEC) area data which were acquired data from the open source. The process involves the following steps:

Data Integration: This step involved the consolidation of data from diverse sources into a single file. As an illustration, we combined university locations with the educational landscape of students, utilizing the university name as the linking key.

Data Filtering: This step was executed to exclusively select the data pertinent to this study. Consequently, we filtered the data related to the educational landscape of students in the Eastern Economic Corridor (EEC) area, focusing solely on provinces within the Eastern region, comprising Chonburi, Rayong, Chanthaburi, Trat, Chachoengsao, Nakhon Nayok, Prachinburi, and Sa Kaeo.

Data Reduction: This phase aims to minimize the storage footprint by eliminating extraneous columns and duplicate rows within the dataset.

Dashboard Design

In this process, a Dashboard was meticulously crafted to align with the pertinent business inquiries, or the specific informational requisites articulated by the dashboard's end-users. After this, we used the common layout of the dashboard with three main sections included.

(1) Summarize section, which provides rapid statistics and concise summaries derived from the dataset.

(2) Filtering section, which contains tools to filter data and interact with dashboards.

(3) The visualization section contains an assortment of graphical renditions, charts, and visual representations, all synergistically aimed at disseminating analytical findings and affording discerning insights to the users of the dashboard.

Data Understanding and Preprocessing

After finishing the previous step, simultaneously comprehend and preprocess the data and example result of data understanding process with two methods include descriptive analysis and data visualization are show.

Interaction Dashboard

The result of the Interaction Dashboard, developed for monitoring and analyzing the educational landscape of students in the Eastern Economic Corridor (EEC) region, comprise three pages: an overview page, an educational landscape depiction for the year 2020, and a similar depiction for the year 2021. The layout of these interactive dashboards adheres to the design detailed in the Methodologies section.

3.Conclusion and Discussion

In conclusion, this research presents the development of an Interactive Dashboard for monitoring and analyzing the educational landscape of students within the Eastern Economic Corridor area (EEC). We acquired and utilized datasets from government open sources, including information about the list of universities in Thailand, as well as student educational data for the years 2020 and 2021. Following this, we designed the layout of the interactive dashboards, prepared the data, and loaded it into business intelligence tools for analysis and visualization. The DigiYouth dashboard comprises three main pages: (1) An overview page that compares the education landscape between the years 2020 and 2021. (2) A detailed analysis of the education landscape in the year 2020. (3) A comprehensive analysis of the education landscape in the year 2021.

The researcher anticipates that DigiYouth will facilitate seamless and more efficient user access to in-depth educational data relevant to students within the Eastern Economic Corridor (EEC) region. Furthermore, the researcher envisions the platform's potential to leverage the analytical outcomes for future policy planning in the realm of education within the economically burgeoning Eastern Economic Corridor (EEC) area and recommendations derived from the analytical results could be follow :

1. Promoting and raising awareness of further education in the field of Science and Technology to a higher level.

The results dashboard shows that the number of science and technology students has increased sequentially in 2020-2021, but the increment doesn't exhibit a distinct difference, and most students tend to cluster in large provincial areas such as Chonburi. Therefore, to drive the growth of all 10 core industries within the Eastern Economic Corridor (EEC) region, governance must place increased emphasis on fostering education in the field of science and technology. This aligns with the policies and strategies of the Ministry of Higher Education, Science, Research, and Innovation in Thailand for 2020-2027, which focus on high-level workforce development to support industries within the Eastern Economic Corridor (EEC) region. This approach would enable a broader distribution of learners, creating a human resource pool capable of driving the growth of the Eastern Economic Corridor (EEC) project across all areas.

Enhancing Skills, Understanding, and Digital Technology Utilization for Students in Other Disciplines Beyond Science and Technology.

The results of the dashboard show that most students in the Eastern Economic Corridor (EEC) aren't enrolled in science and technology programs, such as Health science and Human and Social Science. However, all students are important human resources for driving the economy in the Eastern Economic Corridor (EEC) Area. Therefore, we recommend implementing reskilling, upskilling, and work-integrated policies to enhance students in other science and technology fields, enabling them to acquire skills and understanding in utilizing digital technology. This aligns with the policy and strategy for educational advancement, science, research, and innovation for 2020-2027.

Finally, a future development strategy calls for a heightened emphasis on gathering data from multiple perspectives, promoting more diverse and effective data analysis approaches. Additionally, advanced analytical techniques could complement the existing descriptive and diagnostic methods in research efforts. If the potential of machine learning or artificial intelligence can be harnessed for predictive analysis in the future, the implications might lead to even more captivating and notably advantageous outcomes for the enhancement of youth education policy planning in the Eastern

Economic Corridor of Thailand. This adaptation would empower young individuals to proficiently embrace the ongoing digital transformation, ensuring their optimal adaptability and effectiveness in addressing these transformative shifts.

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MECHANISMS AND FAVOURABLE POLICY FRAMEWORKS FOR ENHANCING DIGITAL CAPABILITIES AMONG YOUTH

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Mechanisms and favourablem Frameworks, enhancing digital câpbilities.

SUMMARY

ABSTRACT

Nowadays, the youth population is a driving force behind digital innovation and advancement. Their distinct viewpoints and creative thinking are vital assets that propel new ideas to the forefront of digital change. The UN E-Government Survey 2020 highlighted the critical role that young people play in moving digitalization and innovation ahead, notably contributing to the development of numerous digital initiatives. The younger generation is leading the charge in digital transformation by actively investing in programming skills and adopting new technologies. This enthusiasm and skill convert into youth-led projects with the potential to affect significant change in society. Numerous examples already show the real influence of youth-led efforts on digital transformation. The ITU's Digital change Centres initiative, for example, enables young data scientists to develop into professionals capable of leading inclusive digital change in their communities.

1. Introduction

Nowadays, the youth population is a driving force behind digital innovation and advancement. Their distinct viewpoints and creative thinking are vital assets that propel new ideas to the forefront of digital change. The UN E-Government Survey 2020 highlighted the critical role that young people play in moving digitalization and innovation ahead, notably contributing to the development of numerous digital initiatives.

The younger generation is leading the charge in digital transformation by actively investing in programming skills and adopting new technologies. This

enthusiasm and skill convert into youth-led projects with the potential to affect significant change in society. Numerous examples already show the real influence of youth-led efforts on digital transformation. The ITU's Digital change Centres initiative, for example, enables young data scientists to develop into professionals capable of leading inclusive digital change in their communities.

Furthermore, government assistance for digital transformation among small service firms opens up the possibility of developing a digital platform for these organisations. Customer attractiveness, operational efficiency, and overall competitiveness are all enhanced by such platforms. As a result, it is critical to empower young people to lead digital transformation efforts by providing them with the resources they need to accelerate change. This empowerment helps not only young people directly, but also greatly contributes to the establishment of a more inclusive and sustainable digital society.

Therefore, in the ever-changing digital world, youth play a critical role in driving innovation and transforming industries. Their natural familiarity with technology, versatility, and proclivity for new thinking enable them to drive breakthroughs in a variety of industries. This generation brings fresh insights, innovative solutions, and unrivalled energy, transforming industries, pioneering new technologies, and harnessing digital tools to address complicated problems. While issues like the digital skills gap exist, empowering young people via education, training, and opportunity is critical for a bright digital future. Society can fully capitalize on the promise of digital transformation to build a more equitable, efficient, and sustainable world by harnessing the power of youth-led projects and using their inventive spirit.

2. Mechanisms and favourable policy frameworks

The digital age has ushered in a transformative era, revolutionizing industries, economies, and societies worldwide. At the forefront of this dynamic change are the youth, who, as "digital natives," wield an unparalleled influence in shaping the trajectory of digital transformation and the digital industrial revolution. This essay delves into the pivotal role that young people play in this transformative landscape, exploring their inherent advantages, their innovative contributions, and the need to empower them with essential digital skills. The revolutionary power of technology is apparent in an increasingly digital society. As societies change, the younger generation's role in driving digital innovation and advancement becomes more important. However, in order to completely realise their potential, they must be equipped with the required digital skills. This responsibility not only

lies on governments and organizations, but also on the implementation of effective methods and favourable policy frameworks such as:

Integrating digital literacy initiatives into school curricula is a fundamental method for improving young digital capabilities. These courses go beyond fundamental computer skills to include critical thinking about digital information, cybersecurity, and appropriate online behaviour. Educational institutions set the scene for a generation that can traverse the complexity of the digital realm with confidence and intelligence by imparting digital literacy at a young age.

To fully equip the youth with digital skills, access to technology is a necessary condition for digital empowerment. To bridge the digital gap, proactive measures such as providing inexpensive and accessible technology infrastructure are required.

Governments may guarantee that all young people, regardless of socioeconomic background, have equitable access to the tools needed to hone digital skills by providing subsidies to low-income families and creating community technology centres. This will not only help the youth acquire the necessary digital skills but will also foster innovation and growth in the digital economy.

Furthermore, practical experience is required to develop digital competency. Emerging technology training and seminars provide a dynamic tool for empowering youngsters. Partnerships between educational institutions and industries can provide possibilities for practical training, while internet platforms provide flexible and accessible learning settings. Initiatives such as coding boot camps and seminars on artificial intelligence and blockchain enable young minds to not only improve their abilities but also actively participate in the digital transformation. These programmes help the youth develop practical skills and gain experience in the digital sector, which can lead to better employment opportunities and also contribute to the growth of the digital economy.

In addition, cultivating a culture of creativity and entrepreneurship is critical in enhancing young digital capacities. Initiatives like innovation challenges and business incubators give opportunities for young people to ideate, collaborate, and turn digital inventions into reality by building an ecosystem that stimulates creativity and problemsolving. These programmes not only develop the digital skills of the youth but also provide a platform for them to showcase their creativity and innovation, which can lead to the development of new digital products and services.

Policy frameworks support these processes by laying the groundwork for systemic change. Open data and open government policies, for example, encourage the creation of innovative digital tools and services, promoting a climate of innovation and growth. The current COVID-19 epidemic has highlighted the need to provide youngsters with digital skills. As remote learning and virtual interactions have grown more widespread, digital skills have progressed from being useful to being required for educational continuity and personal improvement. Policy frameworks can play a critical role in ensuring that youth have access to the necessary digital infrastructure, training, and support, which can help them realise their full potential and become valuable contributors to the digital economy. In order to support digital transformation initiatives, it is crucial to strengthen legal frameworks related to the development, testing, and application of products, solutions, services, and models in information technology. One of the main objectives of this effort is to enable the growth of digital capabilities among youth, which is essential for building a sustainable and competitive digital economy. Improving legal frameworks involves creating policies and regulations that promote innovation while ensuring that digital technologies are safe, secure, and respectful of human rights. It also involves establishing clear guidelines for the development, testing, and deployment of new products and services, as well as mechanisms for monitoring compliance and enforcing accountability among stakeholders. By enhancing legal frameworks for information technology, we can encourage investment in digital infrastructure, promote entrepreneurship and innovation, and create new job opportunities for youth.

Moreover, governments and organisations can encourage the development of digital skills among youths by promoting mentorship programmes. These programmes can help youths develop a better understanding of the digital industry and provide them with guidance and support from established professionals. Mentors can offer insights into the industry, provide advice on how to navigate the digital landscape, and offer practical tips on how to gain employment in the industry.

Another way governments and organisations can help enhance digital capabilities among youths is by providing access to online learning resources. Online learning resources can be accessed from anywhere, making them ideal for youths who may not have access to traditional learning environments. Additionally, online learning resources can be tailored to suit the needs of individual students, allowing them to learn at their own pace and in their own time.

Lastly, governments and organisations can help enhance digital capabilities among youths by providing funding for research and development. Research and development can help drive innovation in the digital industry, leading to the

creation of new products and services. Governments and organisations can provide funding to help youths develop their ideas, providing them with the resources they need to bring their ideas to life.

In conclusion, the development of digital capabilities among youths is critical for future growth and success. Governments and organizations can help enhance digital capabilities among youths by introducing mechanisms such as digital literacy programmes, accessible technological infrastructure, training efforts, mentorship programmes, access to online learning resources, and funding for research and development. By investing in the digital skills and capabilities of the youth, we can create a more prosperous and equitable future for all.

PROPOSAL FOR BUILDING A GLOBAL COMMUNITY AND NETWORK FOR YOUTH IN THE DIGITAL ENVIRONMENT

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INFORMATION

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community building, global network, youth, digital environment.

ABSTRACT

This scientific paper presents a solution for building a global community and network for youth in the digital environment. The rapid development of digital technology has created numerous opportunities for young people, but it has also brought about various challenges. To ensure the holistic development of youth in the digital environment, it is crucial to establish a positive and secure interactive community and network. To implement this solution, it is essential to create dedicated platforms, forums, and social networks specifically tailored to young individuals, where they can interact, share information, and collaborate on common projects. Additionally, there should be educational and training programs aimed at helping youth develop life skills and communication skills in the digital environment. In conclusion, to build a global community and network for youth in the digital environment, it is imperative to establish platforms that promote positive interaction and safety, along with educational programs and opportunities for social engagement. Only through these steps can we ensure the growth and maturation of youth in the digital age.

1. Introduction

Today, young people are undergoing significant transformations in their lives due to the powerful impact of the digital environment. The rapid development of

information technology and the internet has created a digital world, altering how young individuals access information, education, and communication. The digital environment brings many opportunities but also poses numerous challenges, including the risk of isolation, misinformation, and a lack of mental support. Youth are facing pressures related to social media usage, online community engagement, and effective time management in this context.

In this context, the establishment of a global community and network for youth becomes critically important. This community and network not only assist young individuals in overcoming the challenges of the digital environment but also offer invaluable benefits. They provide a safe space for sharing ideas, experiences, and knowledge. This is where youth can learn, interact with people from different perspectives and cultures, and develop international social relationships. The global connectivity within this network helps youth become global citizens capable of contributing to addressing global issues such as climate change, social inequality, and various other challenges. It also plays a crucial role in creating a generation of confident, creative youth capable of adapting to the constantly changing digital environment.

2. Concepts of community and global network for youth

2.1. Definition of a Digital Community

A digital community is a gathering of members with shared interests, goals, or common interests who interact online through digital platforms such as forums, websites, social applications, or online chat groups. Digital communities are often built around specific fields such as creative arts, technology, science, or social areas, aiming to facilitate the exchange of information, experiences, and ideas within an online environment.

2.2. Definition of a Global Network for Youth

A global network for youth is a system that connects young individuals from all around the world through online channels and social networks with the goal of promoting collaboration, knowledge sharing, and creating a multicultural environment. A global network for youth is not limited by geographical borders and frequently links youth from different countries and regions, enabling them to access diverse perspectives and experiences.

2.3. The Integration of Community and Global Network

The integration of community and global network for youth is the process of creating a diverse digital environment where youth can engage in specialized communities related to their interests while simultaneously connecting with

members from various countries. Global networks often provide opportunities for youth to participate in multiple communities, expanding their social relationships, learning about different cultures, and fostering international cooperation.

Both the community and global network for youth aim to establish a sustainable digital space for creative development, where youth can participate and contribute to societal and scientific progress.

3. Benefits of community and global network for youth

Firstly, Encouraging Creativity and Idea Sharing

Community and global networks for youth provide an environment that fosters creativity by allowing young individuals to express their new and unique ideas. Youth have the opportunity to share their ideas with a wide audience, gather feedback from different countries, and develop diverse creative projects.

Secondly, Learning and Skill Development

Youth participating in these communities and global networks have the opportunity to learn from experienced individuals with diverse knowledge. They can access resources, guides, and online courses to develop new skills, ranging from computer programming to foreign languages and many other fields.

Thirdly, Creating Collaboration Opportunities and Promoting International Integration.

These communities and networks connect youth from different countries, creating opportunities for collaboration in global projects and cultural exchanges. Youth can engage in international activities such as collaborating with non-profit organizations or participating in global social projects.

Fourthly, Boosting Confidence and Self-Esteem in Youth

Participation in a global network and recognition for their contributions to the community can boost the self-esteem and confidence of youth. When they feel valued and capable of making an impact on the world, they become more confident in facing challenges and personal growth.

4. Building a community and global network for youth

4.1. Creating an Appropriate Environment for Communication and Information Sharing

Establish online forums or information-sharing websites where youth can interact and discuss important topics.

Promote the use of polite language and respect in discussions to ensure a comfortable and safe environment for all members.

Encourage the creation of creative content, articles, and useful resources to share with the community.

Organize high-quality discussions and encourage member engagement by using thought-provoking questions and in-depth discussions on important issues.

4.2. Utilizing Technology and Digital Apps to Connect Youth Worldwide

Leverage social media, online chat applications, and video platforms to create global connections for youth.

Develop mobile apps and user-friendly interfaces for convenient participation and information access.

Use cloud technology to store and share documents, content, and resources among community members.

Utilize emerging technologies like virtual reality (VR) and augmented reality (AR) to create more diverse interactive learning experiences.

4.3. Designing Activities and Events to Encourage Youth Participation

Organize competitions, workshops, and online events to create opportunities for youth to showcase their ideas and skills.

Develop online learning and hands-on programs to help youth develop skills and knowledge.

Create interactive activities such as discussion groups, online chats, or special online events to stimulate member participation.

Support time management and planning for youth to participate in online activities and events.

4.4. Developing Guidelines and Instructions to Ensure Safety and Respect in the Community and Network

Establish principles and rules of ethics and online behavior, ensuring that all members must adhere to them.

Create reporting mechanisms and processes for addressing rule violations quickly and fairly.

Ensure member privacy and the safety of personal information, adhering to data security and privacy regulations.

Create instructional materials for youth on safe use of the network and community, as well as how to avoid online risks.

5. Implementing and sustaining community and global network for youth

5.1. Develop Detailed Plans

Establish clear goals and mission for the community and network:

Set specific objectives you aim to achieve with the community and network, such as creating a quality learning environment, promoting global social interaction, or supporting the personal development of youth.

Identify the mission of the community and network, i.e., why it exists and how it will help youth.

Define specific performance indicators to measure the level of achievement of your goals, e.g., the number of participating members, online interactions, or content creation.

Analyze the target audience and youth needs:

Research the target audience, including age, nationality, interests, and specific needs of the youth that the community and network are targeting.

Identify challenges or difficulties that youth may face in the digital environment and how the community can help address these issues.

Collect feedback from potential or current members to better understand their needs and desires.

Identify the necessary resources and budget for plan implementation:

Identify human resources, including community managers, experts, and volunteers that may be needed to support the community and network activities.

Estimate the budget required for maintaining technical infrastructure, content development, and implementation of activities. Ensure there is a financial contingency plan for unforeseen circumstances.

Seek potential funding sources or partners to support the financial and developmental needs of the community and network.

5.2. Create Engaging and Valuable Content

Produce and deliver diverse and engaging content:

Create various types of content such as articles, videos, podcasts, study materials, and other reference materials to cater to the interests and information consumption styles of youth.

Ensure that content is of high quality both in terms of visuals and substance to capture the interest of youth.

Ensure content reflects the diversity of the community and network:

Encourage community members to contribute content based on their experiences and specific fields of expertise to create diversity and richness in information.

Ensure content reflects the diverse values, perspectives, and cultures of community members.

Promote interaction with content through comments, feedback, and discussion:

Encourage members to engage in conversation and discussion by asking questions, soliciting feedback, and fostering contributions.

Create a safe and supportive interactive space where members can freely exchange opinions and experiences.

Monitor and evaluate feedback and opinions to adjust content and ensure it continuously meets the needs and desires of youth.

5.3. Foster Participation and Interaction

Create participation activities such as contests, Q&A sessions, surveys, and online events to stimulate member involvement:

Organize contests or challenges with attractive prizes to incentivize member participation and creative contributions.

Use polling systems to gather input from members on important topics or to involve them in community decisions.

Organize online events like meetings, webinars, or discussions to create opportunities for members to meet and discuss important subjects.

Encourage member communication and interaction by creating opportunities for online meetings, chats, and collaborations in joint projects:

Establish online forums or chat groups for members to communicate, share opinions, and collaborate.

Encourage members to form working groups to carry out projects or common endeavors.

Create opportunities for members to meet offline if feasible, such as organizing offline events or community gatherings.

Evaluate and address interaction barriers, such as isolation or conflicts, to create a friendly and supportive environment:

Monitor interaction status among members and promptly address any conflicts or issues that arise.

Promote psychological support and counseling in cases where members face difficulties in interacting or feel isolated.

Establish rules and principles for interaction and ensure all members adhere to them to maintain a friendly and supportive environment.

5.4. Ensure the Sustainability of the Community and Network

Develop a long-term plan to maintain and grow the community and network for the future:

Establish a detailed plan with long-term goals and specific steps to achieve those goals.

Identify challenges and opportunities that may arise in the future and develop strategies to address them.

Include a community and network development plan over time, including expansion and sustainability efforts.

Create opportunities for members to participate in the community and network management and shaping:

Build a management structure in which members can participate and contribute ideas, such as a council of members or diverse working groups.

Encourage member involvement in making important decisions and community and network development strategies.

Continuously assess performance, gather feedback from members, and adjust the plan based on results and community progress:

Monitor performance indicators and measure progress over time to ensure that the community and network are growing and meeting initial goals.

Conduct surveys and gather feedback from members to understand what they want and how to improve services and activities.

Seek funding sources and partners to support the financial and developmental needs of the community and network:

Explore opportunities for collaboration with non-profit organizations, businesses, or government organizations to secure additional funding and financial support.

Build relationships with relevant partners to share resources and expertise, helping the community and network to develop more sustainably.

6. Testing and evaluating the effectiveness of the community and global network

6.1. Data Collection and Measurement of Achievements

Identify specific metrics and data to measure the effectiveness of the community and network, including:

The number of members participating in online activities.

The level of interaction and engagement of members in activities and events.

Personal development and skills acquired by youth through their participation in the community.

The generation of creative ideas and projects by youth with the support of the network.

The creation of learning and international integration opportunities.

Collect data using methods such as online surveys, tracking online activities, and analyzing data from social media platforms.

6.2. Assessing Impact on Youth

Conduct interviews and surveys with youth involved in the community and network to assess specific impacts on them:

Measure personal development and skills gained after participating in the community and network.

Identify how they leverage the opportunities and resources provided.

Gather success stories and examples of achievements and personal success driven by the community and network.

Measure changes in the thinking, knowledge, and behavior of youth after their participation in the community and network.

6.3. Propose Adjustments and Improvements

Based on the data and information collected, identify aspects where the community and network can be improved:

Identify ineffective activities or projects and propose ways to enhance them.

Consider feedback from members and address issues or difficulties they encounter.

Propose adjustments to the strategy or plan based on evaluation results and feedback from youth and the community:

Adjust goals and plans to ensure they truly reflect the needs and goals of youth.

Improve the organizational structure and community management if necessary to optimize performance.

Promote sustainability and long-term development of the community and network by proposing a development strategy.

7. Conclusion

In this scientific paper, we have covered various aspects of creating a global community and network for youth in the digital environment. Below is a summary of the key points discussed:

The current status of youth in the digital environment presents numerous opportunities and challenges, and building a community and network can help them leverage these opportunities and address the challenges.

A global community and network for youth holds significant importance by encouraging creativity, learning, collaboration, and enhancing the confidence and self-esteem of young people.

The concept of a digital community refers to creating an online or offline environment where youth can interact and learn from each other. A global network involves connecting youth with others worldwide to share knowledge and experiences.

The benefits of a global community and network for youth include promoting creativity, learning, skill development, fostering international integration, and boosting confidence and self-esteem.

To build a global community and network for youth, we need to create a conducive environment for communication and information sharing, utilize technology and digital applications to connect youth worldwide, design activities and events to encourage youth participation, and develop regulations and guidelines to ensure safety and respect within the community.

Building and sustaining a global community and network for youth is of great importance for their development and success in the current and future digital age.

In the future, we need to continue researching and developing effective methods to build and maintain a global community and network for youth. Potential research directions include studying interaction and engagement strategies within the community and network to optimize youth participation, assessing the impact of the community and network on the personal and social development of youth, analyzing community management models for improvements in organization and management, researching finances and funding to ensure the sustainability of the youth community and network, and surveying new trends and challenges in the digital environment to ensure effective adaptation and response by the community and network.

THE GAP BETWEEN YOUTH AND POLITICS: YOUTHS' (DIS)ENGAGEMENT IN FORMAL FORMS OF POLITICAL PARTICIPATION IN CEBU CITY

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INFORMATION

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Youth, disengagement, formal political participation, Sangguniang Kabataan, Local Government Unit

ABSTRACT

Political participation serves as a driving force in motivating individuals to become more engaged and active citizens within a democratic society. This study attempts to analyze the different factors that affect the youths' engagement in formal forms of political participation such as voting and involvement in youth and civil society organizations. Using questionnaires for the data-gathering process and thematic analysis, youth engagement in the formal political processes in Cebu City is analyzed. The findings indicate that the perspectives of the youth and their decision to engage in formal forms of political participation are dependent on how they interpret the political meanings and symbols that they received through their interaction and communication with others, the role of SK and LGU in promoting engagement, and the socio-cultural factors that surround them. With this, the researchers suggest two main recommendations: (1) strengthen and promote permanent mechanisms of political awareness, as well as (2) adopt a people-centric approach in the local governance of LGU and SK as enhancing grassroots participation and young capacity skills will provide for direct interaction, build trust, and encourage responsibility.

1. Introduction

Political participation can be comprehended as both formal and informal participation. Both of these factors have the potential to be advantageous for the establishment of a tough and enduring democratic system. According to Nneka (2018), informal political participation includes online and media participation, engaging in protests and demonstrations, youth councils, signing petitions, attending forums, and opinion polls, among many others. In contrast, formal forms of political participation include civic participation, such as voting, joining political parties, and funding campaigns, that were employed by previous generations to become active members of their community (Nneka, 2018).

The importance of the involvement of young individuals in formal political procedures is prioritized to effect lasting change in a democratic society. The act of engaging in political participation that is inclusive is not only a fundamental right in the realm of politics and democracy, but it is also of utmost importance in the creation of stable and peaceful societies, as well as the development of policies that cater to the needs of younger generations. For the youth to be adequately represented in political institutions, processes, and decision-making, they must possess a comprehensive understanding of their rights and be equipped with the requisite knowledge and skills to engage in a meaningful manner across all tiers of governance (Goudie, 2018).

Although youths' growing sense of involvement is an indication of political engagement, a significant number have been politically disengaged. Youth disengagement is a concern for one reason: youth is found to be less involved than the elders. According to Zhang (2022), there is a global observation that youths are less interested in political activities, such as voting, political activism, and community engagement. Such a pattern is evident in both established and emerging democracies, as well as developed and developing countries. Specifically, formal forms of political participation seem to lose their appeal to the younger generation. Zhang (2022) further stated that the younger generations are less engaged in formal politics such as elections, which has worried many politicians and scholars.

Recognizing the role of youth in formal political processes, this study analyzes the different factors that affect the youths' engagement in formal forms of political participation such as voting and involvement in youth and civil society organizations. This study seeks to: first, analyze youths' perspectives towards formal political participation such as voting and involvement in youth and civil society organizations; second, identify the role of Cebu City local government and

SK in influencing the political participation of the youth sector; third, determine the challenges encountered by the youth in Cebu City with regard to political involvement and participation.

2. Literature Review

Status of Youths' Political Participation

Youth engagement is crucial for national development as they are future leaders and catalysts for change. However, young people (ages 18-30) are often excluded from politics and decision-making, facing a lack of confidence and perceived skills needed for meaningful participation. This marginalization, along with limited educational and economic opportunities, can lead to complacency and dissatisfaction. Global research highlights alarming instances of political indifference and disengagement among young people, evident in low voter turnout. Academics argue that young people's civic and political involvement is in crisis, with lower voting rates compared to older generations (Bunquin, 2020). Various academics have stated that young people's civic and political involvement is in crisis.

Political disengagement can result from mistrust in the competence and integrity of public servants and institutions, as well as in the meaningfulness and relevance of political discussion, along with the complexity of political systems, cynicism, negative perceptions, a lack of political education, structural barriers, and other factors. These tendencies have been used to imply that democracy's future is jeopardized, because political involvement in later life is founded on habits formed in youth, and today's young will inevitably become the next generation of adults. Whilst the capacity of the youth to effect change through informal political actions and social media is obvious, their formal participation must be encouraged since it has clear societal effects (Barrett, 2018). In Asian democracies, there is a pattern of both youth political participation and disengagement. According to studies, Indian youths are unwilling to participate in politics. Political indifference among Japanese youths causes them to disengage from political involvement. South Korean youth, on the other hand, have become more politically engaged as they move away from traditional Korean ideals (Reyes and Polias, 2019).

In the Philippines, political patronage and political leadership by elites have weakened Filipino youths' political involvement. Furthermore, the long-held belief that Filipino youths are indifferent, if not disinterested, in politics goes unquestioned. According to a poll of Filipino youths, being politically engaged is the least essential aspect of their lives, second only to having a decent relationship,

family life, a solid job, and a proper education. Other findings indicated that youths' attitudes about being responsible voters, limited social activity, and being ignorant about the government had not changed over time. Even when they vote in elections, youths prefer to remain followers and recipients of information, rarely acting as activists, initiators, or leaders on political topics (Cabo, 2018).

The Role of Philippine Local Government in Youths' Engagement

To reinforce democratic engagement—and ultimately democracy itself, it is necessary to stimulate the broad political engagement of the youth and to advance a better grasp in promoting such engagement (Levy & Akiva, 2019). In the Philippines, youth participation is recognized by the government in the National Commission of Youth and the Philippines Youth Development Plan (PYDP) 2017-2022. Moreover, Article II, Section 13 of the 1987 Philippine Constitution emphasizes the vital role of youth in nation-building and thus, the state shall promote youth involvement in public and civic affairs.

The enactment of the 1991 Local Government Code, also known as RA 7160 grants power to the youth and promotes participation in the democratic process in the country through the youth council, Sangguniang Kabataan (SK). The code mandates the creation and election of the Sangguniang Kabataan. To name a few of its powers and functions, under the code, SK can carry out the goals of the youth in the barangay in consonance with the code's provisions, start programs that will improve the members' social, political, economic, cultural, intellectual, and other aspects of development, initiates activities such as the fundraiser ones, establish working committees for events, collaborate with all the youth organizations in the barangay for the creation of policies and the execution of programs, etc.

Although young Filipinos have historically been active in informal forms of political participation, such as volunteerism, student and street activism, and social media campaigns (David, 2013), their journey toward more formal government constitutions is still weak or stunted. One of the many reasons is the lack of opportunities that could be used to foster stronger coordination and collaboration of youth organizations in the country. According to Flores et al., (2022), although youth leaders positively received the collaboration of the Local Youth Development Councils (LYDC), many Local Government Units in the Philippines still lack LYDCs. Hence, the Department of the Interior and Local Government (DILG) and the National Youth Commission (NYC) encourage LGUs to create their LYDCs (Flores et al., 2022).

The country's support for youth organizations and youth-serving organizations is also low or weak. In the recent PYDP, all state actors at the national and local levels are pushed by the plan to maximize the participation of the youth in nation-building as responsible and proactive citizens. However, research conducted by Torres (2022) in Region X, XI, XIII, and Mainland BARMM shows that despite having the PYDP, most local government units from these regions down to the barangay level have not included measures that ensure and strengthen meaningful youth engagement.

Contextual Realities of Youth Political Participation in the Philippines

An individual**s** participation in politics can be associated with demographic factors, such as age and level of education, which can impact social connections and individual personality traits. It is commonly posited that exposure to diverse environments can influence one's beliefs, views, conduct, and manners. According to (Levy & Akiva, 2019), political participation in youth can often be associated with societal factors such as levels of social trust, degree of social connection, and spirituality. Starting as an individual, political interest is very important in fostering political participation. When youths exhibit a keen interest in political matters and possess a sense of assurance in their political acumen, their likelihood of engaging in political endeavors is further heightened.

The impact of age on political participation is also crucial in understanding what it means to be engaged in youth activities. As youth attain the age of liberty, they may experience a heightened sense of involvement in politics. More mature individuals are prone to perceive the significance of their prospective engagement in the political procedure. Concerning economic factors, income levels can also be associated with political participation. According to (Aleliamat, 2019), individuals with high income and wealth are more likely to participate in political activities and engage with the government. Individuals with low income tend to abstain from voting due to a perceived lack of motivation to engage in the electoral process.

The cultural race of individuals within the country is also one factor of political participation. The intersectionality of belonging to a minority racial or ethnic group and identifying as female may result in a compounded negative effect on the development of self-assurance in one's political proficiency. The influence of ethnic diversity on cultural and political orientations is significant (Levy & Akiva, 2019). Moreover, ethnic groups perceive themselves as being marginalized in society, lacking sufficient political attention, resulting in their disinclination to engage in the voting process (Aleliamat, 2019).

3. Theoretical Framework

This study utilizes the Symbolic Interactionism Theory in analyzing the behavior of identified youths in terms of their political participation. Symbolic Interactionism is a social theoretical framework that holds that people respond to elements of their environments based on the subjective meanings they attach to those elements, with meanings created and modified through social interaction involving symbolic communication with other people. In this sense, this theory will aid the researchers in analyzing the youth's political engagement in Cebu City and the factors that affect their engagement in political discussions and any democratic processes in the country.

4. Results and Discussion

This section of the paper presents the data gathered on the engagement of youth in formal forms of political participation in Cebu City. The researchers specifically employed interview questionnaires for the data-gathering process. Moreover, the identification of key respondents was done through probability sampling. The data gathered is then analyzed using thematic analysis. The discussion is structured in three (3) segments: (1) Determining factors that influence youth engagement in formal forms of political participation; (2) Government initiatives that influence youth engagement in formal forms of political participation; and (3) Challenges that affect youth engagement in formal forms of political participation.

Table 1. Determining Factors that Influence Youth Engagement

Axial Codes	Initial Themes	Sub-Themes	Theme
Respondents perceive formal forms of political participation as important and relevant since it is a democratic right, a responsibility, the most accessible expression, and a	Engaging in formal forms of political participation is important and relevant as it is a democratic right and a good contribution to society. Some are willing to participate in	Positive perspectives of youth with regards to formal forms of political participation.	Internal factors that influence youth engagement in formal forms of political participation.

good contribution to society. Respondents perceive formal forms of political participation to be important and relevant since those are the most accessible expression and participation in society. Respondents are willing to participate in the coming 2023 local elections to exercise their democratic rights.	the coming elections to exercise their rights as it is the most accessible expression and participation in society.		
Respondents perceive political participation as complicated and do not bear any significance. Respondents are not actively involved in any youth or civil society organizations due to their academic responsibilities and negative perception of these organizations. Respondents are not willing to participate in the coming elections because they	Involving any formal forms of political participation is less important because it is too complicated. Their negative perceptions of youth and civil society organizations affect their involvement in such other forms of political participation. Hence, some are not willing to participate in the coming local elections as there is something	Negative perspectives of youth with regards to formal forms of political participation.	

believe that there is something wrong with either the system or the officials themselves.	wrong with either the system or the officials themselves.		
Respondents' perceptions concerning formal forms of political participation are heavily influenced by their parents as they are the immediate source of their information. Respondents' perceptions with regard to formal forms of political participation are also influenced by their group of friends due to their interaction on a level that is most appropriate and aligned with their age and personal interests. Respondents' perceptions about formal forms of political participation are reliant on what they hear, see, and share on social media. Some are also heavily influenced by	The perceptions of the respondents are heavily influenced as they interact/communicate daily with their parents and friends. Their engagements in social media and how they interpret any information coming from it influenced their perceptions of formal forms of political participation.	Formation of youths' perceptions through transactional and symbolic communication.	External factors that influence youth engagement in formal forms of political participation.

their critical thinking.			

Symbolic interaction theory asserts that people derive understanding and interpretation of their environment based on the meanings they assign to elements through communication and social interactions. Bunquin (2020) suggests that youth engagement is vital for national development. To understand this, it is important to examine how young people interact and communicate, as it influences their interpretation of political meanings, formation of perspectives, and connections with others.

Table 1 categorizes the determining factors that influence respondents' engagement in formal forms of political participation into two themes: Internal Factors that Influence Youth Political Participation and External Factors that Influence Youth Political Participation.

Internal Factors that Influence Youth Political Participation

Internal factors are those elements that the respondents have control of and come from within them. There are two sub-themes under this theme: (1) Positive perspectives of youth on formal forms of political participation and (2) Negative perspectives of youth on formal forms of political participation.

Positive Perspectives of Youth on Formal Forms of Political Participation

Few of the respondents have a positive perspective about the significance and relevance of engaging in formal forms of political participation such as voting and involvement in youth and civil society organizations. They asserted that youth engagement is a democratic right and it serves as a good contribution to society. They further believed in the capability of the young in shaping the future and starting the change within the current political system of the country. Barrett (2018) also argued this in his study and emphasized that political involvement in later life is founded on habits formed in youth, and today's young will inevitably become the next generation of adults. Whilst the capacity of the youth to effect change through informal political actions and social media is obvious, their formal participation must be encouraged since it has clear societal effects.

One of the respondents stated that *"Formal methods of political participation remain to be important and everso relevant at a time when the era of good governance politics has come and gone. In the end, leaders – whether installed by democratic rule or through lies and deceit– and their proximity to power rely solely upon the mass of people that will continue to follow them throughout their*

careers and stints. Voting remains to be a popular, accessible expression of one's contribution to how society should be governed. For those who can stomach more, youth organizations and civil society organizations are key institutions where social change may be enacted through the earnest efforts of volunteers and activists in a battle to win minds and hearts. They remain relevant because they are the most accessible expression and participation into society, and they will remain that way."

With this in mind, some of the interviewed respondents are willing to participate in the upcoming December 2023 Barangay and SK Elections to exercise their rights since they can express their opinion in this way, their assertions, what they believe, and who they think is the best leader to lead the local government. Generally, some of the respondents still have the hope that engagement in formal forms of political participation has a significant use and value in the current political environment in the country, specifically in Cebu City. This shows that their positive perspective somehow influenced their decision to engage in such democratic processes.

Negative Perspectives of Youth on Formal Forms of Political Participation

One of the reasons youths' has a negative perception of formal political participation is through their experiences on local ground. One of the respondents said, *"I have experienced it myself, there is wrong either in the system or the officials itself. I was once so eager to make a change to our barangay however my very eagerness was put to trash or not taken seriously."* It can be noticed that from this response, youths do not see any positive perception in engaging in formal forms of political participation. They claim that participating is not that important given that there is something wrong in the system where even if they participate, the effort that they exerted towards their barangay is being neglected or put to waste.

Further, in engaging in formal forms of political participation, one of the respondents said, *"I don't see the significance of the election because our nation is still not improving and what's worse is that our country's state is worsening. The majority of voters keep on electing corrupt leaders. In terms of youth organizations and civil organizations, for me, they are not real and are not important because I think they are complicated. I see no hope for this nation."* This statement creates a negative notion that even an election means nothing because corrupt leaders are always in the position of being elected officials. They also perceived involvement in any political organization as complicated, hence, they also do not see any significance in it. Nonetheless, this implies the negative

perception of youths in formal forms of political participation as stated that young individuals do not see any hope for this nation.

Although engagement of the youth in any formal form of political participation is vital in any democratic institutions and processes as they represent a huge portion of the population of society, the negative perceptions of the youth in formal forms of political participation creates a huge impact in shaping their perspectives in engaging in formal forms of political participation.

External Factors that Influence Youth Political Participation

External factors are outward influences that do not come from the individual which affects the participation of the youth in formal forms of political participation. There is one sub-theme under this theme: (1) Formation of youths' perceptions through transactional and symbolic communication.

Formation of Youths' Perceptions Through Transactional and Symbolic Communication

Most of the respondents' perceptions of political participation are formed through the influences of their day-to-day interaction and transactional communication with their parents and group of friends. They considered their parents as their immediate source of information and with whom they can freely initiate a discourse on socio-political issues and topics. According to several experts, family is the biggest factor in the process of political socialization of children and the shaping of political party identification (Turan & Tiras, 2017). One of the respondents, when asked who or what influenced his perspective on youth political participation, expressed, "*Of course, my family. Since I only depend on their decision on who to vote for. I often run to them to ask for advice on whether something is right or something is not right*." His statement clearly shows two things: first, the heavy influence of parents on their child's development of perceptions, and second, how the formation of political beliefs and opinions starts at home.

Furthermore, the frequent transactional communication and social interaction that occur between the respondents and their group of friends also contribute to the development of their understanding of the importance and relevance of engaging in any democratic processes in the locality. A respondent shared, *"My peers also do have a significant influence on my way of thinking because they are the ones who I interact with daily and communicate with on a level that is most appropriate and aligned with my age and personal interests."* An article published by Campos et. al. (2017) argues that individuals who belong to the same group

frequently behave similarly. They also found out that engagement with peers influences political identification: a more politically involved peer group helps individuals to shift from the extremes to the center.

On the other hand, in this digital world wherein individuals can now freely conduct an exchange of ideas with other people through online engagements, most of the respondents are reliant on what they hear, see, and share on social media because knowing different perspectives from different individuals help them realize what matters most and what would be their stand in certain social issues. One of the respondents expressed, *"Who and what influences my perceptions, I think mainly myself and a little bit of what the media thinks because there's a lot of opinion coming from [social] media and it makes you think about your assertions as well."* Shah (2022) asserts that social media is one of the big factors that influence youth's views on politics as it has become a progressively significant source of political information for younger generations. With its great influence, the respondents also recognized the need for critical thinking by verifying any information that they received from others and social media.

Overall, the perspectives of the youth and their decision to engage in formal forms of political participation are dependent on how they interpret the political meanings and symbols that they received through their interaction and communication with others. In the identification of the external factors that influence the respondents' engagement in formal forms of political participation, we can now understand the context of their (dis)engagement as well as the development of their understanding of politics.

Table 2. Government Initiatives Influencing Youth Political Engagement

Axial Codes	Initial Themes	Sub-Themes	Theme
The respondents do not have involvement in SK and LGU-related programs. The respondents have limited to no knowledge about SK and LGU-initiated programs for the youths aside from	There is limited to no involvement and awareness regarding SK and LGU-initiated programs and activities for youths SK and LGU are ineffective as they are not participatory and	Ineffectiveness of SK and LGU in engaging the youths in formal forms of political participation	Government initiatives that influence youth engagement in formal forms of political participation.

basketball leagues. The respondent does not see improvements in SK and LGU. They do not feel the presence of SK officials in their barangays. Respondents believe that SK as an institution remains latched in ineffective leadership. The respondent believes that the SK and LGU officers should strive to become more participatory as they believe that the youths are not encouraged enough to participate.	have no improvements in their programs. SK and LGU are not doing an adequate task of disseminating information about their programs and projects to increase awareness among youths.		
SK and LGU should strengthen the information drive regarding their programs The respondent is aware of the SK and LGU-initiated programs for the youths. The respondents believe that SK	SK and LGU are influential in shaping youths' perspectives	Influence of SK and LGU-initiated programs and activities in youth engagement in formal forms of political participation.	

and LGU hold significant influence in shaping youth perspectives.			

Table 2 shows the results of the analysis of the government initiatives that influence youth engagement in formal forms of political participation. There are two sub-themes under this theme: (1) the influence of SK and LGU-initiated programs and activities in youth engagement in formal forms of political participation and (2) the ineffectiveness of SK and LGU in engaging the youths in formal forms of political participation.

Government Initiatives Influencing Youth Political Engagement

Following the notion that the Theory of Symbolic Interactionism posits, the interaction between individuals and the creation of meanings constructed the social world. Using this theoretical lens in this case study, it is imperative to note that the involvement of the youths in the SK and LGU-initiated programs also influenced the (dis)engagement of the youths in the formal forms of political participation.

Influence of SK and LGU-initiated Programs and Activities in Youth Engagement

The decree of the Local Government Code of 1991, or Republic Act 7160 mandates that SKs must carry out initiatives that support the development of the youths who represent their constituency on the social, political, economic, cultural, and spiritual fronts and lead the way in enacting barangay resolutions about youth development. The SK is essential to the commitment to promote youth involvement in governance, according to the 2017 Philippine Youth Development Program. A primary goal is to give children the chance to interact and work with SKs. Beyond this program, SKs also contribute to the PYDP's goal to promote youth-led development in peacekeeping and environmental preservation (Ramirez & Sicangco, 2023).

In line with this, a respondent expressed the significant influence of SK and LGU-initiated activities in youth political engagement: “I believe that supporting SK and LGU is crucial as they hold significant influence over the youth including shaping our ahm perspectives”. In addition to that, another respondent stated, “There are programs that are beneficial to the youths being implemented in our barangay that helped the youths to be more engaged”. This result is in agreement

with the mandates of the SK in LGC that SK should carry out initiatives that will improve, in this case, the social and political development of the members.

Ineffectiveness of SK and LGU in Engaging Youth Participation

However, despite the existence of SK and LGU initiatives, youths in Cebu City are still disengaged in formal forms of political participation, especially participating in youth and civil society organizations. The majority of the respondents admitted that they are not aware of the SK and LGU-initiated programs and activities for the youths. The most recurring response from the respondents, when asked about the SK and LGU-initiated programs for the youths in their barangay, stated, "*Oh my! I don't know anything or hear news about them*", *"I don't know, I don't have any knowledge about any SK projects in our local government", "I am not aware of any programs or projects in our barangay especially those that would be aimed towards engaging the youth sector".* Others have limited knowledge and involvement regarding the aforementioned programs while some said they cannot feel the presence of the SK in their respective barangays: "*I can't feel the presence of our SK here in our place*", *"I can't feel their presence".* The results of the analysis are in agreement with the findings of the study conducted by Bautista (2021) which also found that the youths "cannot feel the presence of SK" and have shallow awareness regarding the related programs and activities.

Moreover, a respondent explicitly expressed that SK and LGU are ineffective as they are not participatory and their programs show no improvements. When asked, one respondent stated, *"I don't have any knowledge about SK projects, I mean, aside from the basketball league".* Another respondent stated, *"SK as an institution remains latched to ineffective leadership".* This only suggests that SK projects are recurring which is supported by Ladia (2014) emphasizing the need for an overhaul in SK because it has been generally weak, lacks concrete youth development programs, and has recurring programs focusing on sports festivals and pageantry only.

Thus, a respondent expressed the need for SK and LGU to adequately disseminate information regarding their programs for the youth to reach more youths. And going back to symbolic interactionism as the theoretical lens, the limited to no involvement and awareness of the youths about the SK and LGU-initiated programs for the youths promotes less interaction among the youths and hence, influenced their disengagement in these specific forms of formal political participation.

Table 3. Challenges that Affect Youth Political Engagement

Axial Codes	Initial Themes	Sub-Themes	Theme
Respondents see lack of time due to school responsibilities as a factor that hinders them from engaging in any formal forms of political participation. Respondents see location as a factor that hinders them from engaging in any formal form of political participation. Respondents see family's perception of politics as a factor that hinders them from engaging in any formal forms of political participation. Respondents see people's views on their academic background as a factor that hinders them from engaging in any formal forms	Youths face several challenges such as lack of time due to school responsibilities in engaging in any formal form of political participation Youths' engagement in any formal form of political participation is hindered due to their political environment. Youths' engagement in any formal form of political participation is hindered due to the influence of family and other people's perceptions towards politics. Lack of awareness about formal forms of political participation and lack of interest in engaging in any political discourse.	Socio-cultural factors that affect youths in engaging in formal forms of political participation.	Challenges that affect youth engagement in formal forms of political participation.

of political participation. Respondents see a lack of awareness about formal forms of political participation and a lack of interest in engaging in any political discourse that hinders them from engaging in any formal forms of political participation. Respondents see lack of time due to work responsibilities as a factor that hinders them from engaging in any formal forms of political participation.	Prioritizing work is another identified factor that hindered youth participation in formal forms of political participation.	Economic factors that affect youths in engaging in formal forms of political participation.	

Table 3 presents the findings of the analysis of factors that hinder youth from participating in formal political activities. The study asked participants about challenges they encountered that could impede their involvement in such activities. It was observed that various external factors, including socio-cultural and economic factors, influence youth participation in voting, youth organizations, and civil society organizations. Overall, the analysis demonstrates the impact of these factors on youth engagement in the political process.

Socio-cultural Factors

School Responsibilities

When asked about the challenges that affect their engagement in formal forms of political participation, most of the respondents stated that lack of time due to school activities, family's perception towards politics, and lack of knowledge

about political processes hinder them from engaging in formal forms of political participation. The biggest perceived challenge of youths was the pressure to perform well in school to lay a strong foundation for a great career; hence the lack of time to engage in formal forms of political participation. A majority of the respondents noted that they will prioritize their academic responsibilities more than their civic responsibilities: *"I'm busy in school and I don't have extra time for other things which leads to a point where I don't know what are the existing activities that are offered here in our place or somewhere."*

In this context, formal political engagement is perceived as less of a priority by the youths as it competes against more pressing personal concerns, such as getting a diploma and a stable job). According to Weiss (2020), as people have a limited amount of time, taking part in politics is more costly for those who have not yet sorted out their lives, especially the younger generation.

Place of Residence

It was also noted that social context can affect youth participation in formal political processes. Baez et al., (2018) demonstrate that human behavior is influenced by the context in which you do it. In terms of youths' behavior and attitude towards formal forms of political participation, the analysis shows that the situation that surrounds them, such as other youths' active participation, influences youths' willingness to engage. One of the respondents pointed out that: 'the youths in my place are not active.'

Political Environment

In connection with the place of residence, the analysis shows that the political environment is also perceived as a challenge to youths' engagement in formal political processes. This analysis is typified by the following response:'It can be challenging if you're in a Barangay that is in a different political party. You have to persevere and sell yourself to the constituents to choose you (if you're running as an official)'

Family and Peers' Perceptions

Many have stated that their family and other people's attitude toward politics affect their engagement in formal forms of political participation. According to Turan and Tiras (2017), family is quite important in terms of creating a social and political model for the individual. This view is epitomized by the following response: "I think my family is one of the challenges I face since they set this kind of practice to not actively engage in politics as they believe that this might just cause trouble. Thus, I only participate through voting."

Lack of Access to Knowledge about Political Processes

Some respondents mentioned that lack of access to or knowledge about the formal forms of political participation is one of the challenges that hinder them from participating in formal political processes. One said that: *"I don't know anything about politics. I'm scared of participating in anything like that without any knowledge as it might affect me and other people."*

This could say that young people are struggling to understand the complexities of democracy and formal political processes. A weak understanding of democratic principles and electoral processes makes it more difficult for young generations to perceive formal forms of participation, such as voting and joining a civil society organization, as important (Goudie, 2018).

Economic Factors

The data from the young respondents' responses indicate that economic factors can hinder youths from engaging in formal forms of political participation– this lends support to findings reported in other studies and provides insight into young people's apparent disconnection from formal politics. The analysis revealed that some youths have little or no time to participate in any formal forms of political processes as they are currently working to earn money. That is to say, youths prioritize making money more than participating in formal politics. One of the respondents said that it would be hard for them to take part in formal forms of political participation because: *"I don't have time because of work".*

To sum up, this study aimed to identify the challenges that prevent youth from participating in formal political processes. The findings indicate that difficulties in achieving adulthood milestones like education and employment significantly delay youth engagement in formal political participation. Negative attitudes towards participation, organizational procedures, and cultural values that discourage youth involvement also emerged as obstacles. These findings highlight the impact of external factors on youth participation, emphasizing the influential role of the social environment and interpersonal interactions in shaping political behavior, particularly among young individuals.

Conclusion and Recommendations

Participating in any of the formal forms of political participation is both a right and a responsibility in democratic institutions and processes because it can create significant change in a democratic society. Hence, the lack of political participation among young individuals results in a considerable segment of the population being marginalized and unable to exert a significant impact on the welfare of the collective.

In Cebu City, youth disengagement from formal political activities is evident. It highlights a decreased inclination towards involvement in governmental procedures. Addressing this issue is crucial to foster an environment that promotes young political participation. Young people have historically played a critical role in driving social and political change, advocating for important causes, and influencing policy changes, social justice, and human rights.

With this, the researchers suggest two main recommendations. First, permanent mechanisms of political awareness must be promoted and strengthened through providing comprehensive civic education and political literacy and enhancing collaboration with youth organizations, student organizations, and community groups to create political awareness programs and projects that will allow young people to express themselves, learn from others, and develop critical thinking abilities. Second, a people-centric approach must be adopted in the local governance of LGU and SK as it is critical for developing meaningful and relevant programs. Enhancing grassroots participation and young capacity skills will provide for direct interaction, build trust, and encourage responsibility. Moreover, collaboration among local governments and other stakeholders like non-governmental organizations, educational institutions, and enterprises must be encouraged as this will build a comprehensive and long-lasting youth engagement ecosystem. Collaboration may bring varied viewpoints together, boost program efficacy, and build a more robust support structure for youth projects. By using a people-centric approach, SK and LGUs can create an atmosphere in which young people feel respected, supported, and empowered. This strategy increases the relevance and effectiveness of youth engagement activities, encourages active citizenship, and develops a generation of responsible and participative leaders.

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YOUTH WITH THE ISSUE OF INFORMATION SECURITY AND CYBERSECURITY IN THE PERIOD OF DIGITAL TRANSFORMATION

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INFORMATION

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ABSTRACT

Along with the explosion of the Industrial Revolution 4.0 taking place globally, the digitization of personal information and data is gradually becoming a trend applied in the world and Vietnam. Therefore, the emergence of cybercriminals with large-scale cyber attacks and data theft also occurs with more frequency and complexity. Therefore, it is necessary to understand the expression of the cyber security law and be conscious in ensuring information security, especially for young people - the generation associated with digital technology in the process of growing up and coming into contact with the Internet, digital environment with a fairly high average amount of time. According to a survey by the Ministry of Labour, Invalids and Social Affairs, only 36% of children, most of whom are aged 16-17, are taught about online safety. Therefore, young people need to train themselves and improve their understanding of information safety and network security. In addition, the school, society, and Youth Union organizations are also important factors contributing to promoting the awareness of young people in this field.

1. Introduction

The great innovation of digital technology today is creating a clear impact on a global scale. Seizing the opportunities and potentials of breakthrough technology trends, Vietnam is also in the process of integrating with the world in all fields and in which, the young people - the generation that have access to Rich

and diverse knowledge sources always play an important role in the digital transformation era. According to the report on digital technology in Vietnam published by Vnetwork, in early 2023, there were 77.93 million Internet users, accounting for 79.1% of the total population and number of social network users. also reached 70 million, equivalent to 71% of the total population, so the volume of information, articles, etc accessed on cyberspace is very large, in besides information with valuable sources, reliable and useful, bringing great benefits to society, there are also cultural products that are not suitable and do not meet community standards that are uploaded with malicious purposes. At the same time, the fact that users allow websites to access or actively provide personal information in a carefree and unguarded manner is also increasing and complicated, leading to unforeseen harm. Therefore, proactively raising the responsibility for ensuring network security is a practical and urgent issue that the young generation - the people who will take on the responsibility of developing and building the country needs to have an awareness. Right awareness in the idea that ensures network security and personal information posted in cyberspace needs to be under control to protect the safety of those who are participating in cyber activities.

According to an article published by VnExpress, technology expert - director of Vietnam Cybersecurity Joint Stock Company Truong Duc Luong shared: “47% of individual users have fraud problems; data theft cases are on the rise, causing a cost of handling consequences up to 4.24 million USD per case. In addition, at the seminar, organized by the Center for Performing Arts and Cultural Events of the Hanoi Opera House (Ministry of Culture, Sports and Tourism) in collaboration with Vietnam Media Joint Stock Company Like and LeBros Company pointed out: “Vietnam is currently one of the countries with the most active population using social networks in the world with about 76.95 million users, accounting for 78.1% of the population”. This has shown the positive side of Vietnam's development in digital technology development. However, it also brings unpredictable consequences for everyone, especially young people because of the problem of "cultural garbage". Currently, according to a new survey published by Microsoft on the occasion of International Internet Safety Day, Vietnam is in the top 5 countries with the lowest civility index in cyberspace (DCI) after Russia, Colombia, Peru and South Africa. Microsoft's survey shows that our Vietnamese culture is gradually disappearing. This has inadvertently poisoned and infected the future of the younger generation. Therefore, young people need to have the right awareness to ensure information safety and security in cyberspace from an

early age. This plays an important role in the current era of rapid, powerful, and comprehensive digital transformation.

2. Theoretical foundations

2.1. Cybersecurity

The development of information technology not only brings people good benefits but also causes a lot of harm that affects learning and working activities, both individually and collectively when storing information in a digital environment. Cybersecurityrelated breaches have been legalized when their frequency is frequent and cause heavy damage. In the past, when information technology was not yet developed, network security was known as "information security" and was a term used to describe the physical security measures used to keep information secure government or businesscritical information from being accessed by the public and to protect it against alteration or destruction. Currently, with the popularity of computers, and the development of the internet, the way to access and store data is gradually being digitized; Computer systems are interconnected to form a computer network, allowing systems to share resources, including data. In Clause 1, Article 2 of the Law on Cybersecurity, it is stated that: "Cybersecurity is the assurance that operations in cyberspace do not cause harm to national security, social order and safety, rights and interests of the public legitimate interests of agencies, organizations, and individuals". Cyberspace is characterized by its cross-border nature, so the cybersecurity law is proposed to secure information technology, protect businesses and individuals from unauthorized access to data centers and other computer systems. It is also a tool to prevent attacks aimed at disabling or disrupting the operation of a system or device.

2.2. Information security

"Information security" is a term that appears when network security becomes more and more urgent and is also a problem that brings serious consequences. The term can be simply defined as the protection of information and information systems from unauthorized access, use, disclosure, interruption, modification, or destruction to provide confidentiality, integrity, integrity and availability. Any data storage and transfer point is considered an "information system", which means that this application can be applied in a variety of environments, including the external environment of cyberspace. In Clause 1, Article 3 of the 2015 Law on Cyber Information Security, it is stated: "Clinical information security is the protection of information and information systems on the network from being accessed, used, disclosed, or interrupted, unauthorized modification or destruction

to ensure the integrity, confidentiality, and availability of information". The issue of ensuring information security both inside and outside the network is extremely important. For young people, cyberinformation security includes the following aspects: Protecting personal safety against unhealthy information on social networks, personal information not being disclosed, unauthorized use or leakage; not be scammed, fake information such as fake identity, fraudulent appropriation of information, and properties of social network users. Thereby, it can be seen that in the process of digitization, network information security has been added to the law by its seriousness.

3. The real situation in activities and awareness of young people

3.1. The current status of young people's online activities in Vietnam

In the context that the world and Vietnam are entering a period of widespread digital transformation, the young generation became global digital citizens very early, surrounded by digital technology from the moment they were born. In the online environment, young people have completely different social interaction experiences compared to the previous generation as from studying, working, and making friends and the way they communicate, all aspects of life are affected by the use of social networks, smartphones, tablets, and the Internet. According to the report on the state of digital technology in Vietnam in 2023, the number of Internet users accounts for 79.1% of the total population; The number of social network users reached 70 million, equivalent to 71% of the Vietnamese citizens. Mr. Nguyen Quoc Huy - Deputy Head of the Propaganda Department, Central Committee of the Ho Chi Minh Communist Youth Union informed at the online exchange "Discussing the behavior of young people in cyberspace" that Vietnam is the 18th ranked country in the world in terms of the percentage of people using the Internet and is one of the 10 countries with the highest number of Facebook and YouTube users in the world, in which teenagers account for a large proportion.

According to UNICEF's preliminary survey, 1 in 3 Internet users is under 18, and 71% of 15-24 years old are online, indicating that this age group is the most connected worldwide. The average time using social networks in a day for Vietnamese young people is 7 hours, quite high compared to the region and the world, causing an increasingly popular "addiction" to social networks. It has also been evident when new "careers" are born on digital platforms, social networks are gradually becoming a trend for Gen Z and possibly the next generations such as gamer, streamer, and KOL - people who have expertise in various fields and influence the community operating on social networking sites, etc. The developed

world goes with new industries that will develop more and more choices for young people. The development of the Internet network also helps young people, specifically, become more active, connect with friends around the world, find study materials easily, and express themselves freely on social networks. more association.

In addition to outstanding utilities, cyberspace also has many potential risks and dangers, bringing negative influences on young people because the problem of posting their personal information on social networking forums will partly have a great effect on them. Some young people who want to boost their view count, and want to be famous but lack the knowledge and skills to use social networks, have taken actions that go against the accepted code of conduct. This will cause a lot of consequences, adversely affecting adolescents in cognitive maturity. Social networks are like a double-edged sword, young people post personal information to express themselves or simply to keep a good memory. However, that information can be used for some bad purposes, affecting the psyche of young people, leading to depression and then saying goodbye to life, leaving behind a family and a wide future. The problem of "cultural garbage" if not cleaned up by sanctions from the law to the consciousness of the participants' actions will probably distort the beautiful cultural values of the nation that his fathers have included. Life builds and preserves for today and for the future. Therefore, building a healthy and safe online environment for young people becomes more urgent and nece

3.2. The reality of young people's awareness of cybersecurity issues

The term "cyber security" may be familiar to young people because in the digital age, information about fraud, cyber violence or personal information being hacked by malicious code in cyberspace is no longer available. strange. However, "cyber security" is still quite strange to them. Thao Mai & Andrea Tick (2021) pointed out that students not only lack background knowledge about cyber security but also the use of smartphones every day. Importantly, those surveyed have also shown a lack of interest in protecting themselves from cybersecurity threats by ignoring the small potential risks of using their smartphones when connecting to the Internet. It shows that the concept is still pretty new and this problem may have led to the consequence that they will not be sure that when their phone behaves abnormally, it is a sign of a virus infection or not. Besides, young people are very ignorant about cyber security laws. In November 2006: a young "hacker" (grade 12) attacked the website of the Ministry of Education and ssary than ever.

Training, changing the minister's photo, just because "we have warned many times but the website administrator still ignores it". More than 10 years later, an almost identical incident happened again. This time, it is two young people who are only in 9th grade. This is an action that comes from the young people's ignorance and lack of understanding of the law on cyber security. According to the Information Security Department, Ministry of Public Security, both young people have admitted their wrongdoing with the attack motive stemming from the purpose of discovering, wanting to show off, and bragging about their achievements in the field "hacker" world. Although their warning is good, this is illegal and is an alarm bell for the need to take measures to strengthen cybersecurity knowledge, protect the safety of personal and community information in cyberspace. Young people need to have an understanding and awareness of responsibility for their actions, thereby being able to protect their interests and avoid harming the community by their immaturity.

4. The causes of the current situation

According to the report "We are Social", as of January 2023, Vietnam has up to 70 million people using social networks. With a large number of users and increasingly diverse sources of information, including fake, fabricated, misrepresented, or datacollecting information, posted in different forms to reach millions of users, causing information insecurity and network security, increasing cyber-attacks. Many reasons for this situation have been pointed out.

According to Mr. Pham Minh Tuan (Deputy Head of Cyber Security Assessment Department, Center for Information Technology and Cyber Security Monitoring), one of the reasons is the investment in security equipment. All information has not been paid much attention to. In addition, the objective reasons mentioned are that the policies issued to ensure information, network safety, and security are not strict, and the building of an appropriate policy system has not been established. The strong implementation has led to the failure to ensure the information control process and the safety of users in cyberspace. “Lack of a legal framework for personal data protection and sanctions. The law on personal data protection in our country has some provisions on sanctions for violations of personal information protection, but there is no regulation on personal data protection. Regarding criminal sanctions, there are no criminal sanctions on personal data. For illegal acts of buying, selling, exchanging, and publicizing personal information without the consent of the subject, the Penal Code has not mentioned the concept of personal data. Cybersecurity and high-tech crime prevention (A05) - Ministry of Public Security, Vietnam. The Ministry of

Information and Communications has pointed out that the loss of information insecurity and network security is also caused by large-scale cyber attacks aimed at stealing and trading user data or storing information without control. On the other hand, it may be because users have visited strange links that cause electrical equipment to be infected with malicious code to steal information.

On the other hand, the awareness of information security of social network users is not high, directly becoming the object of phishing attacks and information theft. According to the Department of Cybersecurity and High-Tech Crime Prevention (A05) - Ministry of Public Security, Vietnam, in fact, awareness and awareness in ensuring the safety of people's personal information, especially young people, some still keep a subjective mentality, do not attach importance to the protection of personal information when participating in the online environment. This is the cause that leads to sensitive personal information and data such as assets, family, and personal papers, being leaked out, appropriated, and illegally traded on parts data collection software. Lieutenant Colonel Trieu Manh Tung commented: “The low awareness and awareness of personal data protection not only affects the rights and interests of data subjects but also directly affects national security and sovereignty. In the long term, it is impossible to predict when personal data will be made public, and how it will affect data subjects when the ability to exploit, analyze, and process personal data is increasingly developed.

5. The role of youth

The explosion in digital transformation, especially in cyberspace, not only brings great benefits to the country in many aspects, but also creates incalculable challenges, requiring regulatory agencies, and especially the young generation, it is necessary to be aware of their duties and roles in the current work of ensuring information safety and network security. According to the Quang Ninh Tuoi Tre newspaper, "the youth force must be the basic, the core and the pioneer to contribute to "cleaning" information in cyberspace". Teenagers are a large force in society, being creative and agile in accessing and mastering high technology is a significant part of the national workforce, contributing to the creation motivation for digital transformation development of the digital economy and digital society. However, youthful enthusiasm and flexibility are both advantages and challenges when participating in cyberspace. If they are ignorant and alert enough, some young people easily become the target of cyber attacks, revealing important information, non-selective access to anti-state news sources, and fake news, indirectly affecting the perception of the importance of the role assumed and high

determination, contributing to protection the ideological foundation of the Party in the new situation.

Currently, the role of youth is increasingly emphasized and shown to be important through the campaigns of the Youth Union, the Party, and local agencies, targeting young people. The first step has shown the youth's active participation and effectiveness in fighting and preventing hackers, ensuring security, and controlling information traffic on the network. The integration and interlacing of tasks related to learning, politics, implementation, and sharing, spreading the Party's resolutions and directives, and raising awareness about the current legal regulations. actively carried out by young people. Whether the digital transformation is effective or not, information security, and building a civilized culture in cyberspace, contributing to the creation of a legal corridor will all be done by young people and promote their preeminence of youth, whether they are aware of their core role. In order to continue to fight effectively, it is necessary to promote the role of the Youth Union as well as the sense of responsibility of each young person.

6. Discussion and proposal

6.1. Discussion

According to a piece of news posted on Vnetwork, Vietnam's population has an average age of 32.7; which shows a young and dynamic population. This means that ensuring the safety and security of network information is a challenge for businesses and organizations as well as the responsibility that comes from the role of the young generation itself. In the 4.0 technology revolution, information is a form of resource. Therefore, the issue of correct awareness of the law when participating in cyberspace, and understanding the law of cyber security is extremely necessary. The era is increasingly developing, and the maturity of young generations is closely associated with digital technology from a very early age without being equipped with enough knowledge about skills to use social networks and secure personal information, knowledgeable about network security. Social networks are not only a means of conveying information, but also an effective tool in spreading cultural products, preserving traditional cultural values, and disseminating new cultural values. Therefore, the role of young people is considered key because of their strength in youth, unlimited creativity and always wanting to receive new challenges to develop themselves. Although teenagers are aware of the issue of ensuring information safety and network security, it is still not enough and complete. Therefore, in addition to the youth themselves needing to actively supplement their own knowledge of information

safety and cyber security, the coordination and support of schools, unions, youth associations, etc. Students and social organizations, departments, and functional branches of the state also play an equally important role.

6.2. Proposal

Young people with the task of promoting their pioneering role in participating in digital transformation, especially in the work of ensuring information safety, have been identified as the theme for Youth Month 2023. To spread the results achieved and promote, highlighting the role of youth in particular and the guiding agencies and society in general, a number of proposals have been made.

6.2.1. For the teenagers themselves

The youth always need to remember that they will be a principal factor in strengthening the network security barrier, and repelling cyber-attacks of different scales, which is the key to building a safe cyberspace, ensuring that all data, and information is kept confidential.

As the country's enthusiastic generation, young people need to take advantage of their youth, flexibility, and ability to learn quickly, cultivate new and modern development trends, participate in refresher courses, and take advantage of new developments, training on security policies and cyber security laws to enhance information security. In addition, young people need to maximize their enterprising spirit, actively contribute to management units, and offer solutions to propagate and promote information security and safety network security. Enthusiastic coordination and participation with officials and youth union members at all levels in implementing digital literacy campaigns, thereby raising awareness of dangers, especially in cyberspace. Each young person participating in the online environment needs to create for themselves "resistance" - raise awareness, consider before receiving information, and be cautious before speaking, commenting, and sharing on social networks. Because information on social networks spreads quickly, false information will have an incalculable impact on the reputation and honor of individuals and groups, even affecting socio-political security. Individual young people - as youth union members, need to keep their spirits up, raise awareness, and be wary of objects that steal, buy, and sell data, and hackers in cyberspace. It is necessary to promote the spirit of pioneering, be proactive in innovation, creatively research sustainable high-tech solutions, actively reasonably apply the obtained results, and combine with the achievements achieved in the field of science and technology. Information technology research is at the forefront so that the most effective method is available and ready for practical application.

6.2.2. For schools, unions, youth associations and the state

It cannot be denied that cyberspace brings many good benefits to young people. If the internet does not develop, it will mean that the development of the country will slow down, and the youth will lose a lot of opportunities to learn and practice in a professional environment. On the other hand, it also brings unpredictable consequences on security and information security issues in the digital environment. To be able to improve young people's understanding of this issue, it is not enough for young people to train themselves, but support from the cooperation schools, Youth Unions, and Youth Associations plays an important role. Schools play an indirect role in consolidating and educating the provisions of the law on cyberspace management for students and students in general informatics in addition to basic office computer skills. Along with that, training institutions should also coordinate with some digital technology experts to organize seminars to help students experience and raise awareness about cybercrimes. The school should also cooperate with parents for those of you who are at an age of cognitive and spiritual development to propagate and disseminate the law on cyber security, the sense of protecting personal information when operating in cyberspace. Family also plays a very important role in accompanying children in safe operation in the digital environment. Parents will be role models for their children to learn, so first of all, they must learn and supplement their knowledge of cybersecurity regulations and laws. Therefore, based on age, parents will have guidelines and limit the information that can be accessed and accessed on social networks for children. Moreover, children's curiosity about new things in cyberspace, parents should be the ones to directly share such content so that their children can understand and avoid accessing it. From there, you will be more proactive and conscious when operating in the digital environment. Youth unions and student unions cooperate with the school in organizing contests to learn knowledge about cyber security, poster drawing contests, and creating meaningful slogans about network security concepts. Rewards to encourage students, and the scholars who actively participate can include extra points in appropriate subjects, certificates, or small material rewards to encourage them to take part and stir up the general movement. The winning “posters” can be hung in conspicuous locations that are allowed by the governing bodies to spread meaningful messages about network security. Similarly, the "slogan" sentences in incentive contests are replicated through various information channels to raise the awareness of all citizens in general and young people in particular so that they use everyone's network as safely and efficiently as possible. In addition to accompanying the school, the Union at all levels should focus on improving

organizational management; digitizing documents, and exploiting applications on online platforms to deploy youth movements and activities, contribute to professionalism and modernization of the Union's work and youth movements and raise awareness of the youth about the nation's digital transformation. Thereby, the young generation is exposed to knowledge related to cyber security from an early age combined with exposure to developed cultures through information sources in the digital space, which will partly contribute to their development thinking when participating in the "virtual environment". This can be considered a key factor in the digital transformation of the role of the Youth Union or youth organization today.

In addition, the organization of research and training on cybersecurity for staff and lecturers is also one of the necessary factors to put into practice and replicate. The first step to consolidate and promote the feasibility of this proposal is to issue circulars and resolutions to build a legal corridor. In particular, there is a need for ongoing assessments of activities in cyberspace among competent agencies. Since then, the government should make continuous additions to perfect the cybersecurity law, building operational networks to ensure cyber safety and law enforcement. When the legal framework is consolidated and perfected, ensuring its consistency and relevance to practice, the competent authorities can issue guidelines for organizing separate training classes for lecturers on issues of cybersecurity law methodically and ensure the effectiveness of training plans.

The family, the state, the school, and the Union organizations are the places to nurture and train the personality and cultural lifestyle of the youth. Therefore, it is necessary to approach young people in a diverse, flexible, and psychologically appropriate manner, and to develop separate criteria for revolutionary ideal education for each young person.

7. Conclusion

The development of digital technology needs to be associated with an increase in people's knowledge about the digital environment, the sense of ensuring information safety, and network security when they are directly involved in the digital space every day, especially young people. Young people will have to be the generation that understands the legal provisions on network security, assesses potential risks and dangers in exploiting, and uses the "virtual world" to take preventive measures. Avoid and protect yourself. At the same time, young people must also be the generation that bears the responsibility of propagandizing and leading in the field of cyber security because one of the advantages of young people is digital and information technology. However, at present, young people's

awareness and understanding of cyber security law is still limited, leading to the fact that information and articles posted or shared are not elective between right and wrong, appropriate and inconsistent with the legal framework. Therefore, the main purpose of this presentation is to help young people pay more attention to the legal corridor on information safety and network security as well as become more aware of their role in the digital era. Thereby, proposing some practical solutions for young people themselves, schools, Union organizations, Youth Unions, and society to propagate, innovate educational methods, and access to official information sources in the era of digital transformation so that digital resources are exploited effectively, serving the interests of people and society in all areas of life.

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