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Sustainability of the Digital Economy in Indonesia: Opportunities, Challenges and Future Development

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ABSTRACT

This study **aims** to evaluate the challenges and opportunities arising from digital transformation and the digital economy, as well as their impact on human and physical resource development in the context of Indonesia. **The methods** used were a literature review and a qualitative approach. This study used secondary data obtained from academic articles published in the last 10 years. Data analysis techniques include material collection, data reduction, analysis and synthesis stages, and drawing conclusions. **The results** indicate that digital transformation brings economic and social opportunities. However, challenges also arise, such as digital divides among different groups, the level of human resource development, data and online system security, and taxation issues. Obstacles to be faced include slow regulatory reforms, bureaucratic complexity, government promotion in various regions, and digital infrastructure limitations. Strategic steps that need to be taken include developing appropriate policies, fostering collaboration between the public and private sectors, enhancing cybersecurity capacity, and promoting digital transformation domestically and internationally to advance national and regional economies. **The key conclusion** is that the main impact of the digital economy on the Indonesian economy as a whole includes market share growth, increased brand awareness, expanded customer reach, ease of business transactions, and increased product variety at competitive prices.

Keywords: digital transformation; digital economy; sustainability; human resource development; digitalization; governance; public policy; privacy; security; SME

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Устойчивость цифровой экономики в Индонезии: возможности, вызовы и будущее развитие

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АННОТАЦИЯ

Цель данного исследования — оценить проблемы и возможности, возникающие в результате цифровой трансформации и становления цифровой экономики, а также их влияние на развитие человеческих и физических ресурсов в условиях Индонезии. Использованы такие **методы**, как обзор научной литературы и качественный анализ. В данном исследовании использовались вторичные **данные**, полученные из научных статей, опубликованных за последние 10 лет. Процесс анализа данных включал сбор материала, обработку данных, этапы анализа и синтеза, а также формулирование выводов. **Полученные результаты**

свидетельствуют о том, что цифровая трансформация открывает экономические и социальные возможности. Однако возникают и проблемы, такие как цифровое неравенство между различными группами населения, уровень развития человеческих ресурсов, безопасность данных и онлайн-систем, а также вопросы налогообложения. Среди препятствий, с которыми приходится сталкиваться, медленные реформы в сфере правового регулирования, бюрократические сложности, меры властей в различных регионах и ограничения цифровой инфраструктуры. Стратегические шаги, которые необходимо предпринять, включают разработку соответствующей политики, развитие сотрудничества между государственным и частным секторами, укрепление потенциала кибербезопасности и продвижение цифровой трансформации внутри страны и на международном уровне для развития национальной и региональной экономики. **Главный вывод** заключается в том, что основное влияние цифровизации на индонезийскую экономику включает в себя рост доли рынка, повышение узнаваемости брендов, расширение круга потребителей, упрощение деловых операций и увеличение разнообразия товаров по конкурентоспособным ценам.
Ключевые слова: цифровая трансформация; цифровая экономика; устойчивость; развитие человеческих ресурсов; цифровизация; управление; государственная политика; конфиденциальность; безопасность; малый и средний бизнес

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1. Introduction and literature overview

Eleven countries in the Southeast Asia (SEA) region, including Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Timor-Leste, Thailand and Vietnam, show variations in political regimes and levels of socio-cultural development. Also, these countries differ in their economic structures, progress, levels and patterns of life. However, most of them are making efforts to initiate digital transformation measures to boost their economic growth.

The development and spread of the Internet and advanced technologies such as mobile technology, virtual reality, big data, artificial intelligence and the Internet of Things (IoT) have connected customers, suppliers, businesses, regulators, devices, data and processes in various sectors and countries. It has changed the way we interact with other people and how we generate, market and consume offerings such as information, products, services and experiences. The digital economy, which is also known as the Internet economy, the new economy, the web economy, or the IoT economy [1, 2], refers to economic activities that connect various stakeholders in an economy through online transactions, communications, exchanges, and connectivity.

According to the Asian Development Bank (ADB), the digital economy can be defined as the contribution of every economic transaction involving digital products and industries to the Gross Domestic Product (GDP) [3]. To ensure optimal performance in the digital economy, the information technology/information and communication technology (IT/ICT) sector requires hardware (e.g., information services manufacturing, information systems management), software, as well as consulting and telecommunications services. In addition, social and technical aspects must be considered in the digital transformation process.

In recent years, attention to the digital economy in Southeast Asia has been increasing from various public and private organizations because of the potential and significant impact on the economies of the countries in the region, as well as the countries of their trading partners. In addition, a study conducted by Ha and Chuah [4], which explored the potential and impact of digital transformation and the digital economy in Southeast Asia. Schiliro's report [5] includes the views of senior executives from leading organizations on various aspects of the digital economy, such as uncertainties in the external environment, technological growth (such as the metaverse, IoT, Industry 4.0), new economic concepts (such as the circular economy) and sustainability, as well as the steps businesses must take to adapt to the new economy and optimize their potential in the digital age [6].

There is an increasing awareness that digitalization not only alters the cost of information from the transfer of specific company advantages but also transforms the characteristics of these advantages [7]. Observing the rapid pace of technological advancement, this paper proposes a

framework that integrates digitalization into existing theories. In line with the special edition's focus on internalization theory [8, 9], we seek to explore the following questions: How does digitalization impact the assumptions of internalization theory concerning the nature of specific advantages and predictions related to governance choices in cross-border transactions? To develop internalization theory in this digital era, we incorporate insights from the fields of management information systems (MIS) [10], strategic management [11–13], and network theory [14].

In addition to the benefits offered by digital adoption, such as business opportunities and the creation of new jobs, the potential for growth in the digital economy, improving public services, increasing efficiency and productivity in the economy, and so on, there are also challenges such as the threat of job loss due to technological disruption in various sectors, the digital divide, privacy and security issues, etc. Although much research has been conducted to examine the impact of digital adoption in Indonesia, only a few studies have specifically focused on the relationship between digital adoption and the digital economy in Indonesia, as well as the role of various stakeholders, such as the public sector, private sector, and civil society organizations, in the process of digital transformation. In addition, there are no definite answers to the following questions: (1) Can the digital economy be an extraordinary driver of economic development? (2) Can the digital economy drive job creation and sustainable economic growth? (3) What are the challenges and opportunities faced by Indonesia in the digital economy? (4) What is the role of the digital economy in the Indonesian economy?

Therefore, the purpose of this article is to fill this research gap by analyzing the opportunities and challenges arising from digital transformation and the digital economy and their impact on the development of human and physical capital. In addition, this paper provides policy recommendations that involve various sectors and stakeholders to help Indonesia manage digital transformation more effectively. This study is important because it covers various interdisciplinary perspectives, such as economics, digitalization, governance, management, public policy, technology, privacy, security, and human resource development.

2. Methodology

This research is a literature review using qualitative methods. The data sources used in this article are secondary data obtained from articles published in the last 10 years regarding the development of a sustainable digital economy in Indonesia. The data collection process was carried out by searching various sources, such as Google Scholar, Springerlink, ResearchGate, Emerald, etc.

In this literature review, four stages of data analysis are used, which must be carried out sequentially to provide acceptable answers to the questions posed. The first stage is to find and collect materials related to sustainable entrepreneurial intentions in tertiary institutions. The second stage involves simplification and coding, i.e., filtering and grouping material to suit the topics discussed. The third stage is analysis and synthesis, in which detailed information about the material obtained is examined and explored. The last stage is the final stage of the literature review process, which presents the new findings of the research and formulates conclusions.

The academic literature database analysis process was carried out by considering the following criteria: 1) Inclusion of articles related to "digital economy sustainability in Indonesia", published between 2014 and 2023, to obtain the latest information; 2) Research produced in the form of scholar articles, excluding comments, posters and quotations; 3) The use of quantitative data issued by institutions that have the authority and relevance to the intention to continue the digital economy in Indonesia. After the initial screening process, the authors independently reviewed articles that met these criteria on the basis of their titles and abstracts to ensure their relevance to the research objectives. Next, they checked the entire content of each article and matched it with data from authorized government agencies.

3. Results and discussion

3.1. Opportunities presented by digital transformation

The rise of the digital economy provides a number of benefits for individuals, companies and the country as a whole.

First, nationally, the technology sector has experienced an increase in job creation [15]. At the company and individual levels, digital platforms

enable small and medium enterprises (SMEs) to expand their market reach across countries, while aspiring entrepreneurs can start new businesses without the need for a physical office.

Second, digital transformation facilitated business recovery after the COVID-19 pandemic. Due to the disruption caused by the worldwide COVID-19 pandemic, the process of digitization has accelerated in all sectors of the economy [16], and has played a crucial role in the recovery from the crisis [17], had a significant impact on individuals, businesses and society [18]. For example, demand for digital infrastructure and connectivity, information and communication technology (ICT) services, online learning, telemedicine, and e-commerce platforms is increasing due to policies on remote work, virtual collaboration, online learning, and social distancing restrictions [17]. In addition, the implementation of digital solutions has also provided great benefits to SMEs [19, 20].

Third, digital transformation can encourage creativity and innovation. Digital transformation involves the relationship between humans and technology in an economic context [21]. In fact, successful digital transformation projects require a combination of the latest technologies, relevant human capabilities, creativity, innovative mindsets and sustainable business models, among other factors [21]. Successful transformation in this regard can increase productivity in various sectors, improve public services, and contribute to improving people's welfare through better access to information, knowledge, and data.

Fourth, digital transformation can contribute to overcoming policy challenges, both in meeting current and future energy, food and clean water needs, as well as in increasing the provision of quality health and education services [22]. This transformation enables more effective implementation and enforcement of policies and improves the provision of public services through the use of digital platforms. At the corporate level, digital transformation helps improve organizational performance through optimizing processes and procedures that are more efficient.

Fifth, digital technology can also promote social inclusion by increasing access to quality education, public health care, financial services, employment opportunities, and training and skills development, especially for older workers and individuals who wish to have more job opportunities elsewhere [22, 23]. Digital technologies enable the implementation and evaluation of policies that promote inclusive innovation, as well as provide opportunities to present solutions that promote social inclusion more broadly.

3.2. Challenges raised by digital transformation

One of the main challenges faced is the digital divide that occurs between various groups of people, such as differences in the speed of broadband Internet access. There are various factors that cause this digital divide, such as age, information technology literacy level, income level, skills, Internet access, and so on. However, on the positive side, there is potential for those who do not have Internet access or are not yet involved in online marketplaces to initiate digital transformation and benefit from digitalization and the digital revolution.

The second challenge is the level of human resource development. To measure a country's efforts and capabilities in developing and utilizing its human resources, the Human Capital Index adopted by the World Economic Forum is used. This index evaluates various variables such as the level of education, skills, employment, and the extent to which the country is able to utilize its human capital to boost the economy. The main components of this index consist of capacity, development, dissemination, and knowledge [15].

The third challenge is the issue of maintaining data privacy and online system security. Cybersecurity and crime have become a serious concern for the online community, including consumers, merchants and governments. In fact, the COVID-19 pandemic has created a favorable situation for cybercriminals [24]. Threats in cyberspace not only impact online businesses but also have a significant economic impact.

The fourth challenge is taxation issues related to jurisdictions. In accordance with the explanation provided by the OECD, the digital economy provides opportunities for companies to operate outside the territory of the country where they are registered. This results in "non-resident companies operating in market jurisdictions in a fundamentally different way than when international tax rules were drafted" [6]. Traditional companies must comply with the taxation and regulatory rules of the countries where they are

registered and operate, while digital companies may not be required to pay taxes due to not having a physical presence in certain countries. In addition to administrative complexities, this creates challenges for policymakers to ensure fair and balanced competition in both online and offline markets.

3.3. Digital economy impact

First, there are opportunities for millions of people to connect and conduct both commercial and non-commercial transactions online [25]. However, this requires an appropriate policy framework and effective law enforcement. During the COVID-19 pandemic, an increasing number of consumers in Indonesia turned to digital services and made purchases online. For those who are not yet fully familiar with the benefits of the digital economy, they will be on board soon as they can enjoy the convenience of transacting online, have access to a wide range of goods and services, and get better prices and value than through traditional channels [26].

Second, digital adoption will reduce operational costs, which can increase competitiveness in the manufacturing, supply chain and procurement management sectors [25, 27]. Companies can become more responsive and focused on customer needs by implementing e-commerce and digital marketing strategies, leveraging social media platforms, and using software to manage customers efficiently, both domestically and internationally. In addition, digitization can improve operational efficiency and supply chain management, especially in the face of the COVID-19 pandemic [28, 29]. During this pandemic, cost reductions and operational sustainability were clearly seen when most business activities shifted from offline to online.

Third, according to [30, 31], SMEs make a significant contribution in ASEAN member countries (AMS), covering between 88.8% and 99.9% of the total business entities and providing employment for 51.7% to 97.2% of the workforce. In addition, SMEs also play a role in contributing around 30% to 53% of the gross domestic product (GDP). In a situation where consumer demand is increasing, digitization has improved the manufacturing supply chain and financial infrastructure, providing greater opportunities for SMEs to expand their businesses regionally and internationally. With online platforms and digital technology, SMEs and other businesses have the opportunity to continue operating during the COVID-19 pandemic, which otherwise may have been forced to stop operating.

Fourth, digitalization provides opportunities for financial institutions to develop innovations and thrive in an ever-changing external environment. For example, blockchain technology, digital banking, internet banking services, e-wallets, e-payments, mobile banking, and banking applications have been introduced. This allows commercial and e-commerce transactions to be carried out digitally at lower costs and faster.

However, there are some negative consequences associated with the digital economy. Indonesia may face challenges in reviewing and harmonizing regulations and policies to keep up with the rapid development of digitalization and technology. Conventionally, regulatory costs are often seen as a heavy burden on businesses. In addition, there are several obstacles to entering the digital economy sector, such as the slow pace of regulatory reform, complex bureaucracy, and the lack of incentives and promotions from the government in various regions [4].

An additional challenge is ensuring the availability of digital infrastructure, including networks, hardware, and software, across regions to promote effective and efficient connectivity between regions in Indonesia. Apart from that, social and human aspects of the digital economy also need to be considered, especially in terms of the readiness of the workforce to face technological changes, including older workers.

3.4. Strategic steps to face the digital economy

To consider various views regarding the development of the digital economy, the following policy recommendations are proposed. There is a need to develop a shared data policy that follows a policy framework aligned with regional and international requirements. The development of this policy must be focused on three main areas: digital finance, digital training and development, as well as digital infrastructure, both physically and institutionally [32]. Understanding the importance of effective training and development policies will help address the digital literacy gap and increase digital inclusion.

Furthermore, cooperation between the public and private sectors is essential for building a solid

digital infrastructure foundation that will facilitate integration, cooperation, and development at both regional and national levels. In order to achieve this, it is important for the public and private sectors to work together, pool resources, and develop the necessary infrastructure, with the aim of creating mutually beneficial partnerships. In addition, the third sector or civil society organizations also have a significant role in public education, increasing awareness of the importance and benefits of digital adoption, and carrying out check and balance functions. As part of this effort, the third sector should also encourage public participation and contribute to relevant digital projects, with the aim of supporting public and private sector efforts [33].

Cyber security cooperation and capacity building at the regional level are very important. At the national level, it is necessary to increase trust and security in online platforms and markets, given that security and privacy incidents often hinder consumers from engaging in online activities [34]. To overcome cyber threats, all sectors should work together to fight hackers. Civil society organizations can play an important role in raising awareness about cyber security among the public, promoting the implementation of effective cyber security management, and participating in relevant cyber security projects. In addition, civil society organizations can also contribute to building cyber security capacity as well as building partnerships to improve overall cyber security [35].

Overall, Indonesia needs to encourage internal and external digital transformation to develop the national and regional economies. To achieve this digital transformation, it is important to align and address the gap between "Industry 4.0", "Technology 4.0", "Education and Training 4.0" and "Policy 4.0" at local, national and regional levels [22]. In addition, Indonesia should develop and implement a fair competition policy, invest adequate resources in digital education (human resources) and digital infrastructure to encourage digital innovation and inclusivity, and play an active role in building a "connected, safe, and secure digital region." [4].

4. Conclusion

The conclusion of this article is that the main impact of the digital economy on the Indonesian economy as a whole includes increasing market share, increasing brand awareness, wider reach to customers, ease of commercial transactions, and increasing product choices and competitive prices. This also contributes to overall economic and GDP growth. However, Indonesia is still faced with challenges such as the digital divide, different levels of economic development and human resource development, cybersecurity threats, privacy issues, taxation, financial infrastructure, technical skills, technological capabilities, and jurisdictions, which remain the focus of attention.

According to the recommendations that the authors provide, it is hoped that by reducing the digital divide, more and more people will be able to adopt digital technology and participate in the digital transformation process. Communities and economic actors are expected to increase their human and digital literacy in order to encourage economic growth. In addition, it is hoped that policymakers can adopt regulations that are adaptable and responsive to developments in technology and the digital economy. This becomes important in maintaining the balance between consumer protection, innovation and economic progress.

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