Journal of Community Dedication e-ISSN: 2808-8204
Vol. 4 No. 3 Agustus 2024, hal., 594-606

STRENGTHENING THE DIGITAL ECONOMY ECOSYSTEM IN SOCIETY: A LITERATURE REVIEW AS A FOUNDATION FOR DEVELOPMENT STRATEGIES

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Abstract

A healthy and resilient digital economy ecosystem is essential for Indonesia to thrive in the digital age. Many studies have shown the importance of improving digital infrastructure, making progressive policies, training tech-savvy human resources, and collaboration between sectors to spur innovation. Advanced infrastructure such as fast networks and secure data centres are needed to support peak technology adoption. Good and fair rules and policies, especially on cybersecurity and data privacy, are necessary for an innovative climate and public trust. Relevant education and training are needed to ensure the availability of skilled digital labour. Cooperation between the government, the business world, the education world, and the technology community can accelerate growth and new breakthroughs in the digital economy ecosystem. By implementing these various strategies, it is hoped that the digital economy ecosystem can be improved and become the main motor for inclusive and sustainable economic growth.

Keywords: Ecosystem, Digital Economy, Development Strategy.

Introduction

In the current era of the industrial revolution 4.0, the role of the digital sector is increasingly decisive. A digital technology-based economy is able to drive growth

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through various innovations. The integration of IT&C in various aspects of the economy opens up new opportunities and improves process efficiency.

The business world is increasingly sophisticated thanks to technology. Businesses can be run more agilely, creatively, and easily accessed thanks to digitalisation. E-commerce, fintech, online education and other tech-enabled sectors optimise costs, increase productivity and expand market reach to the global level. The digital ecosystem provides new opportunities for startups and SMEs to compete in a wider market without the huge barriers that they used to face (Popova et al., 2021); (Muafi, 2021).

On the positive side, economic and social inclusion is increasing. Access to digital finance makes it easier for marginalised communities to participate in economic activities, improve living standards and shrink social gaps. Online education also opens access to quality learning for anyone anywhere, supporting the development of superior human resources. Overall, the digital economy not only boosts the economy but also strengthens social foundations and improves people's quality of life (Oneshko et al., 2021).

However, building and strengthening the digital economy ecosystem does not happen automatically. It requires complex interactions between various components such as technology, regulation, infrastructure, human resources, and cross-sector collaboration. Gaps in any of these components can hinder the development of the digital economy and reduce the benefits that society can enjoy. Furthermore, digital economic development shows significant variations between developed and developing countries (Mazzei & Noble, 2020). Developed countries tend to have better digital infrastructure and regulations that support innovation. Meanwhile, developing countries still face challenges in terms of access to technology, immature regulations, and human resources that are not ready to adopt digital technology optimally (Popkova, 2023).

In Indonesia, despite notable progress in recent years, there are still many challenges that need to be overcome to strengthen the digital economy ecosystem. A major challenge in the development of the digital economy ecosystem is the availability of technological infrastructure (Ilhan, 2021). There are still many regions, especially in developing countries, that face obstacles in accessing fast and stable internet. The lack of technological infrastructure such as fibre-optic networks, adequate cellular towers, and high-speed internet services limits people's ability to engage in the digital economy. Without adequate infrastructure, various digital initiatives such as e-commerce, fintech, and internet-based training cannot be

implemented effectively. Improving this infrastructure requires substantial investment from both the public and private sectors (Fang, 2023).

Furthermore, immature regulations are also a significant obstacle. Unadaptive or overly restrictive regulations can hinder innovation and the development of new technologies. In many countries, regulations governing the protection of personal data, digital transactions and cybersecurity have not been sufficient to keep up with the pace of technological development and new business models (Hong, 2021). The lack of a clear and stable regulatory framework can create uncertainty for businesses and hinder investment in the digital sector. Therefore, there is a need for proactive and flexible policies that can accommodate the dynamics of technological change without compromising user protection (Georgievsky, 2021).

Entering the digital era brings its own challenges to society. Not all citizens are able to utilise technology optimally due to low digital literacy. This condition can widen the gap in access to the benefits of the digital economy. People who are less tech-savvy tend to have difficulty accessing digital services, shopping online, or being aware of cyber threats (Lettner et al., 2022). Therefore, there is a need for continuous empowerment programmes to improve the digital understanding of the wider community through the cooperation of the government, private sector and NGOs. These programmes should target all segments of society including vulnerable groups such as the elderly and rural areas so that everyone can participate in the digital economy.

These challenges encourage researchers to dig deeper into the digital economy ecosystem as a basis for developing effective development strategies.

Research Method

The study conducted in this research uses the literature research method, which focuses on collecting information from existing sources to analyse and understand a particular topic or phenomenon. Reference sources consist of books, journal articles, research reports, theses, dissertations, and other scientific publications. (Junaid, 2018); (Abdussamad, 2022); (Wekke, 2020).

Results and Discussion

Definition and Concept of Digital Economy

The digital economy refers to business activities that rely on electronic technology as their central component. It encompasses various aspects, from online transactions to technological innovations that change the way various industries are run. The digital economy is not limited to electronic commerce, but also the use of

digital technology in the financial services sector, education, health, tourism, and other industries (Toh, 2022).

The digital economy is supported by several important pillars. One of them is digital infrastructure, including high-speed internet, data centres, computers and smartphones. This infrastructure ensures reliable connectivity and accessibility of digital services. In addition, digital platforms such as e-commerce, social media and mobile applications play a crucial role in facilitating interactions and transactions between consumers and businesses. These platforms create more efficient markets and new business opportunities such as subscription-based services, on-demand and e-marketplaces (Thomas et al., 2020).

Data and analytics are also important components of the digital economy. Data is collected from various sources such as online transactions, social media interactions and Internet of Things devices. Using smart analytics and artificial intelligence technologies, this data can be processed to provide useful insights for business decision-making (Teslenko et al., 2020). This allows companies to personalise services, improve operational efficiency and develop more effective marketing strategies. Last but not least, digital security ensures that data and electronic transactions are protected from cyber threats while maintaining consumer trust and the integrity of the digital system as a whole (Kvasova et al., 2023).

Thus, the digital economy is a transformational phenomenon that changes the way various sectors of the economy are run through the utilisation of digital technologies. Key components of the digital economy include digital infrastructure, digital platforms and data collection and analysis to support smarter business decision-making. In addition, digital security is important to maintain integrity and trust in the digital ecosystem.

Through the integration of these components, the digital economy offers various benefits such as increased efficiency, wider market reach and continuous innovation opportunities. However, challenges such as data security, the digital divide and responsive regulation also need to be addressed to make digital economic growth sustainable and inclusive. As such, the digital economy is an important pillar in supporting the transformation of the global economy into a more modern and connected era.

Digital Economy Ecosystem

The digital economy ecosystem has brought together various interrelated components to create an innovative and efficient business environment. Within this ecosystem are digital infrastructure providers such as internet networks and data

centres that support digital activities, as well as digital platforms such as e-commerce, social media, and mobile applications that are the main means of interaction and transactions (Koesharijadi et al., 2022). Technology companies and pioneers play an important function in developing creative solutions, while end-users including consumers and businesses utilise these technologies for various purposes. In addition, financial institutions and regulators have a role in providing financial support and policies that support the growth of the digital economy. All of these components work together in a collaborative ecosystem, driving digital transformation, innovation, and increased efficiency across various sectors of the economy (Maryenko, 2022).

The digital economy ecosystem can be categorised into several models based on its characteristics and functions. The Platform/Marketplace model is one of the most prominent, where companies create digital platforms to facilitate interaction between providers and consumers. Well-known examples of this model include e-commerce such as Amazon and Alibaba, and ride-hailing platforms such as Uber and Grab (Atamaniuk, 2023). This model aims to connect various parties in one comprehensive platform, where transactions can occur easily and efficiently. The platform usually takes the role of an intermediary, providing infrastructure and additional services such as payment, logistics, and marketing, making it easier for ecosystem participants to focus on their core business (Malinoshevska, 2021).

The Digital Service Provider Business Model focuses on providing specific digital services that are usually offered on a subscription or freemium model. Examples of this model include streaming services like Netflix and Spotify, and software-as-a-service (SaaS) applications like Salesforce and Slack (Tretyakov, 2022). These services provide solutions that can be accessed anytime and anywhere via the internet, allowing businesses and consumers to access advanced technologies without requiring a large initial investment in infrastructure. This model also often involves collecting and analysing user data to continuously improve services and provide more personalised and relevant experiences (Biloskurskyy, 2020).

The Shared Economy model is another model that is rapidly evolving in the digital era. This model allows individuals and businesses to utilise unused assets or skills by sharing or renting them to each other. Well-known examples of the sharing economy include Airbnb in the hospitality industry and WeWork in the provision of co-working spaces. This model brings new efficiencies by reducing waste and maximising the use of existing resources (Abdullah et al., 2022). The shared economy also often fosters sustainability and community development, as these platforms allow individuals to support each other and gain economic benefits from the assets they own. Nonetheless, regulation and security remain challenges that need to be

addressed to ensure these ecosystems are viable and fair for all participants (Shkarupeta et al., 2020).

The P2P/B2C/B2B Payment Model is a crucial component of the digital economy ecosystem, where financial transactions are conducted on a peer-to-peer (P2P), Business-to-Consumer (B2C), or Business-to-Business (B2B) basis. Examples of this model include digital and mobile payment services such as PayPal, Stripe, and Square. These payment services offer convenience and security in making transactions, supporting e-commerce and work economy services more effectively. In addition, fintech companies adopting digital payment models often provide real-time financial reporting and analysis, assisting businesses in more efficient financial management (Krivý, 2023).

The Data & Analytics model also plays an important role in the digital economy, where companies use big data and analytics to gain a deeper understanding of consumers and markets. Companies like Google and Facebook rely on this model to provide highly targeted and personalised advertising services. Businesses that adopt the data & analytics model are able to create smarter marketing and operational strategies that are responsive to market changes. In addition, the use of data and analytics helps in product and service innovation that is more tailored to consumer needs, thereby increasing customer satisfaction and loyalty (Ovodenko et al., 2020).

Thus, the digital economy ecosystem is an interconnected network of various digital business models that complement each other to support business transformation and increasingly sophisticated and innovative economic interactions. From platform models that facilitate the exchange of goods or services between service providers and service users, to digital solutions that provide specialised solutions economically, each model plays a role in the dynamics and development of the digital economy. In addition, cooperation-based economic models enable more efficient utilisation of resources, while digital payment systems accelerate the secure flow of financial transactions. The use of data and analytics enables companies to operate with smart strategies and be responsive to changing market needs. Thus, the digital economy ecosystem is an important foothold in driving the acceleration of today's economy towards a more productive, inclusive and sustainable era.

Factors Fuelling the Digital Economy Ecosystem

The main pillar that supports the digital economy ecosystem is technological infrastructure. A reliable high-speed internet network is the backbone of enabling digital transactions to happen in real time. In addition, the presence of secure and customisable data centres is also essential to support the processing of big data

required by digital enterprises (Tijani et al., 2023). Cloud computing technology allows businesses to store and process data more efficiently without having to invest heavily in physical infrastructure. Together with the development of 5G, IoT (Internet of Things), and AI (Artificial Intelligence) technologies, this infrastructure opens up new opportunities for innovation and increased efficiency in various sectors (Bowen, 2021).

Proactive government regulations and policies also play an important role in strengthening the digital economy ecosystem. A clear regulatory framework that is friendly to technological innovation creates a conducive environment for startups and tech companies to thrive. Strong consumer data protection and cybersecurity increase public trust in digital transactions (Haq & Huo, 2023). In addition, incentives such as tax deductions for tech companies, funding for research and development (R&D), and startup incubation and acceleration programmes also encourage the growth of this ecosystem. Regulations that are adaptive to new technological trends, such as blockchain and fintech, also ensure that the digital economy can adapt quickly to changes (Lebedev, 2021).

Skilled and competent human resources in the field of digital technology is another key driver. Education and training that is relevant to industry needs ensures graduates have ready-to-use skills. Education programmes that integrate technology, coding and data management subjects at the school and college level play an important role (Mihardjo & Sasmoko, 2020). In addition, collaboration between educational institutions and industry helps create a curriculum that is relevant to market needs. Certification programmes and continuous training for employees also help to improve HR competencies, making them adaptive to the latest technological developments (Sokolovska, 2020).

Most recently, co-operation and synergy among various stakeholders such as the government, private sector, educational institutions and the tech community strengthened the digital economy ecosystem. Strategic partnerships between technology companies and traditional industries pave the way for digital transformation in sectors such as manufacturing, healthcare and agriculture (Laptev, 2022). A tech community that is active in knowledge sharing and innovation creates a dynamic and constantly evolving ecosystem. Events such as hackathons, tech conferences, and startup competitions bring together innovators, investors, and academic experts, building mutually supportive networks for sustainable growth of the digital economy (Yang et al., 2022).

Thus, a strong and sustainable digital economy ecosystem is the result of the synergy of many important factors. Advanced technological infrastructure, including

internet networks, data centres and cloud computing, ensures efficient and innovative operations. Supportive regulations and policies, along with strong data protection, create a conducive environment for technology companies to thrive and innovate. Skilled manpower and human resources in digital technology are the key drivers that ensure the sustainability and adaptability of the ecosystem to the latest technological developments. In addition, co-operation and synergy between the government, private sector, educational institutions and the tech community accelerate technology adoption and digital transformation in various sectors of the economy.

By optimising these factors, the digital economy is able to create new opportunities that increase productivity and efficiency. This not only benefits businesses, but also contributes significantly to national economic growth. A well-developed digital economy ecosystem will be an important foundation for sustainable innovation, inclusiveness and technological advancement in the future.

Strategies for Strengthening the Digital Economy Ecosystem

An important step in strengthening the digital economy ecosystem is to improve technology infrastructure and collaboration between various sectors. The government needs to work together with private industry to ensure that all regions are connected to fast and affordable internet networks, including remote areas. The construction of secure and efficient data centres is a prerequisite to accommodate future digital needs. In addition, cutting-edge technologies such as 5G, the internet of things, and artificial intelligence need to be deployed faster to unlock new innovations and increase the productivity of various economic sectors (Chaplin, 2023).

Proactive and technology innovation-friendly regulations are essential to create a conducive environment for the growth of the digital economy. The government needs to establish a legal framework on cybersecurity and data privacy to increase public trust in digital services (Tarjáni et al., 2023). Fiscal incentives such as tax incentives for tech startups and research and development funds can encourage the spirit of innovation. The establishment of a flexible legal foundation for future technologies such as blockchain and fintech is also needed to ensure sustainability and adaptability to technological developments (Ruohomaa & Salminen, 2024).

The development of competent human resources is key to supporting a sustainable digital economy ecosystem. Investment in education and training according to the needs of the technology industry needs to be prioritised. The integration of digital curricula in schools and colleges will prepare young people with digital-age skills. Certification programmes and continuous training for employees allow them to continue adapting to changes. Cooperation between education and

industry is important to ensure the curriculum is relevant to market needs (Vedernikova, 2021).

Collaboration and partnering between government, industry, education, and the tech community need to be enhanced to build a dynamic and innovative ecosystem. Initiatives such as hackathons, technology seminars and startup competitions can provide a platform for innovators to share new ideas and solutions (Ekimova, 2020). Strategic partnerships between technology companies and traditional industries can also accelerate digital transformation in various economic sectors such as manufacturing, healthcare, and agriculture. Through this collaboration, all stakeholders can support each other to accelerate inclusive and sustainable growth of the digital economy (Short et al., 2022).

By implementing these strategies, the digital economy ecosystem will be stronger and able to become the main motor for future economic growth.

Conclusion

Improving technology infrastructure is absolutely necessary to support the digital economy ecosystem Without robust internet networks and digital facilities, the adoption of advanced technology will be hampered. Strong infrastructure not only supports online businesses but also ensures inclusion through equal access across regions. Therefore, upgrading networks and data centres deserves major attention.

Equally important are regulations and policies that support the growth of the digital economy. The government should ensure that data protection and cybersecurity are seamlessly realised so that people can trust digital services more. Fiscal incentives for startups and improvements to the adaptive legal framework will boost innovation and growth in the sector. Policies that support inclusion such as internet subsidies for the underprivileged should also not be ignored.

The progress of the digital economy ecosystem is highly dependent on the availability of competent human resources. Education and training according to technological needs need to be integrated into formal and vocational curricula. Continuous training for the workforce is also important to ensure they are always updated. Collaboration between educators and industry is also highly recommended for the relevance and quality of education.

Finally, the importance of collaboration and synergy between all stakeholders in the digital economy ecosystem. The government, private sector, academia and the tech community must work together for a favourable environment for innovation. Initiatives such as hackathons, co-operation between technology companies and

industries, and technology conferences can accelerate the adoption and dissemination of new technologies.

By realising the recommendations of this study, the digital economy ecosystem will become more established, provide opportunities for new innovations, and contribute significantly to inclusive and sustainable economic growth.

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