Orchestrating Digital Economy to Foster Economic Resilience of Smart Cities: The Soft System Approach

Farid Subkhan[1]*, M. Syamsul Maarif[2], Nurul Taufiqu Rochman[3], Yudhistira Nugraha[4]

[1]Management Program, Perbanas Institute, Jakarta, Indonesia
[2]School of Business, IPB University, Bogor, Indonesia
[3]The National Research and Innovation Agency (BRIN), Jakarta, Indonesia
[4]School of Computing, Telkom University, Bandung, Indonesia
E-mail: [1]farid.subkhan@perbanas.id, [2]syamsul4958@gmail.com, [3]nurul@nano.or.id,
[4]yudhistiranugraha@telkomuniversity.ac.id
*)Corresponding Author

Abstract

Research originality: This study provides new practical knowledge on the digital economy model and strategy to drive the resilient economy of smart cities.

Research objective: This study aims to develop a digital economy management model for smart cities, a resilient economy framework for smart cities, and digital economy strategies for smart cities.

Research methods: This study employed a soft system methodology (SSM)-action approach by involving 30 digital economy and smart city experts from Jakarta, Bandung, Semarang, Surabaya, Banyuwangi, and Makassar.

Empirical result: This study has successfully developed the digital economy model for smart cities by which digital technology, digital services, and digital finance are the keys. The resilient economy of smart cities is primarily characterized by economies of scale, economic structure, and economic stability. Moreover, the strategies should mainly focus on developing infrastructure and application, digital governance and policy, and digital society.

Implication: The policy maker must consider critical policy interventions of the digital economy model and economic resilience goals, including budget priorities to the key digital economy strategies.

Keywords:

Digital Economy; Digital Strategy; Economic Resilience; Smart City; Soft System-Action Approach

INTRODUCTION

The "smart city" concept has gained global attention in modern urban development. Smart city practices include various elements such as smart governance, smart economy, smart living, smart mobility, smart society, smart people, smart infrastructure, and smart environment (Ahad et al., 2020; Appio et al., 2019; Sharifi, 2019). Smart cities optimize municipal operations for the welfare of city inhabitants through the utilization of data, digital technology, and telecommunications. As a result, networks and services become more adaptable, effective, and long-lasting (Guo *et al.*, 2019). The percentage of the population living in cities worldwide has increased rapidly in recent decades (Xie et al., 2019). Nearly half of the world's population lives in cities; by 2030, that percentage is expected to increase to 66% (Camero & Alba, 2019). Population expansion, exacerbated by excessive concentration in cities, requires the adaptation of cities to meet the minimum quality of life in society (Guimaráes et al., 2020).

One of the fundamental pillars of developing smart cities is the digital economy. Digitization is the fundamental focus of economic activities (Stavytskyy *et al.*, 2019). It can be developed through the utilization of local supplies of goods and services to suit consumer needs or increasing innovative entrepreneurial in local cities (Kesar, 2022; W. Wang et al., 2021). The digital economy is characterized by economic activities such as the sharing economy, business innovation, financial technology, productivity improvement, digital skills, and SME engagement (Arsić, 2020; Murinde et al., 2022; Prima Lita et al., 2020; Rozak et al., 2021; Živojinović & Zornić, 2022). Digital economy practices in Indonesia include various digital technology-based economic activities for various purposes such as entrepreneurship support, MSMEs management, digital marketing, fintech adoption, e-business or e-commerce, and micropayments (Hadi Putra & Santoso, 2020; Haer et al., 2024; Nugraha et al., 2024; Primadita Karina & Dewi Astuti, 2022).

Digital technology is the primary enabler that drives the digital economy of smart cities. Technology penetration and digitalization can affect competitiveness, finance, and sustainable market performance (Haer et al., 2024). The digital economy practice in smart cities will boost economic growth beyond geographical boundaries. In more developed countries, adopting sophisticated digital technology has become a distinctive feature of digital economic practices (Haer et al., 2024). Digital technology may also support Sharia business services, including fintech adoption (Hariyanto et al., 2024; Nugraha et al., 2024). There is no clear research on digital economy strategies to strengthen smart cities' economic resilience. According to Živojinović and Zornić (2022), sharing economy practices will encourage customers to join the digital economy activities. Other studies demonstrate numerous strategies that must be addressed to help improve the digital economy practice, such as financial service innovation, digital leadership, digital inclusion strategy, and digital orientation (Bencsik, 2020; Kindermann et al., 2021; Yang et al., 2022; Zhao et al., 2019).

A city's economy needs a system's resilience, which is the capacity to withstand shocks first and then bounce back from them (Han & Goetz, 2019). According to

(Ariyani & Fauzi, 2024) study about resilience was related to events that caused risks and shocks to a system. The significance of economic resilience in modern, intricate economies has led to a surge of interest in this concept (Chang & Lin, 2019). Cities face difficulties encompassing chronic pressures and sudden shocks. Thus, resilience is required to deal with any difficulty (Annoni *et al.*, 2019; Bush & Doyon, 2019). Resilience is a term that arose from scientific techniques aiming at identifying elements of equilibrium in various disciplines such as physics, psychology, and others. It highlights the significance of fundamental structural shifts in our life dynamics and helps realize sustainable development aims (Ibn-Mohammed et al., 2021).

Indonesia was selected as the subject of analysis in this study. By the end of 2024, over 250 cities nationwide have been declared smart cities. These cities have developed a 10-year master plan for smart cities, supported and financed by the central government through the Ministry of Communication and Digital. Indeed, dozens of other cities are also self-financing their participation in this program. Indonesia, with a population of more than 281.6 million in 2024 and over 298 million by 2030, is projected by the Central Bureau of Statistics (BPS) to possess substantial digital economic prowess by 2030 (Ayuningrum et al., 2023). An essential requirement for smart city development is the establishment of interconnections among all stakeholders (Ning et al., 2019). Digital economy practice in the local economy of Indonesia spans various fields, such as digital platforms for fisheries, micro, small, and medium enterprises (MSMEs), micro-payment, and community economy (Rahmawati et al., 2019; Syalianda & Kusumastuti, 2021; Tyas et al., 2019). The Coordinating Ministry for Economic Affairs of the Republic of Indonesia has developed a white paper on developing Indonesia's digital economy in 2030. However, this roadmap still needs practical guidelines, particularly in the context of local economies and smart cities. However, in Indonesia, smart cities also include smart branding as a critical factor since most local cities lack the competence to market their potential to global economies. Previous research on the digital economy in Indonesia, conducted by (Subkhan et al., 2024), examines the digital economy in smart cities to enhance economic competitiveness in six aspects: human resource development, financial capital, product competitiveness, innovation capability, economic productivity, and ease of business and investment.

Prior studies have not thoroughly examined the digital economy model for building the resilient economy of smart cities, which encompasses the effective strategies required to maximize outcomes. Research from (Ren et al., 2021) and (Chen et al., 2022) only discusses the digital economy in the government sector. Digital economy practice helps cities to improve their resilience in some areas, such as supply chains, farmer's digital inclusion, employment, trades, and investment (Jiang et al., 2022; Quayson et al., 2020). There is an apparent lack of research in this area, highlighting the need to increase knowledge and support the progress of digital economic governance to enhance cities' economic resilience. The research by (Chacon-Hurtado et al., 2020) provides a clear definition of regional resilience to a lesser extent. It assesses the factors contributing to a region's ability to withstand recessionary shocks.

Referring to previous research, the digital economy is characterized by economic activities such as the sharing economy, business innovation, financial technology, productivity improvement, digital skills, and SME engagement (Arsić, 2020; Murinde et al., 2022; Prima Lita et al., 2020; Rozak et al., 2021; Živojinović & Zornić, 2022). Digital economy practices in Indonesia include various digital technology-based economic activities for various purposes such as entrepreneurship support, MSMEs management, digital marketing, fintech adoption, e-business or e-commerce, and micropayments (Hadi Putra & Santoso, 2020; Haer et al., 2024; Nugraha et al., 2024; Primadita Karina & Dewi Astuti, 2022). Digital technology significantly influences the landscape of human development (Setyowati et al., 2024). In more developed countries, adopting sophisticated digital technology has become a distinctive feature of digital economic practices (Haer et al., 2024). The previous research cited in this study serves as a foundation for understanding the core characteristics and applications of the digital economy, particularly in Indonesia. Moreover, this comparison underscores Indonesia's position in the global digital economy and highlights areas where improvements in digital transformation could enhance economic resilience. This research builds a comprehensive framework for strengthening Indonesia's digital economy to drive the economic resilience of smart cities.

Currently, there is no conceptual model for the digital economy that drives the economic resilience of smart cities, including the strategies required to achieve the economic resilience of digital economies in smart cities. The novelty and implications of this research are the creation of a comprehensive digital economic management model for the economic resilience of smart cities and a digital economic management strategy framework for the economic resilience of smart cities. The key novelty of this research lies in developing a comprehensive digital economic management model for smart cities, along with a strategic framework that directly links digital economy policies to economic resilience. Unlike existing studies, this research provides a comprehensive digital economy model, particularly for smart cities, enabling national and local governments to align and prioritize the digital economy strategy to improve local economic resilience. Specifically, it offers policy-driven insights for key ministries, including the Coordinating Ministry of Economy, the Ministry of Information and Digital, and the Ministry of Creative Economy, to formulate targeted national policies that strengthen local economic resilience.

This study is a practical guideline for smart city governments and digital economy stakeholders, both the national and smart city governments, to prioritize the digital economy scopes and strategies that drive local economic resilience. There are three objectives of this study. *First*, to develop a digital economy management framework for smart cities. *Second*, to develop a resilient economy framework for the digital economy of smart cities. *Third*, to develop effective digital economy strategies for smart cities' economic resilience. The results of this study will contribute to improving city management and bringing to life the aspirations of urban populations. It also aligns with the current trend of smart city discussion on various topics at a global scale (Joss *et al.*, 2019).

METHODS

This research comprehensively analyzes complex challenges within Indonesia's digital economy and its role in building economic resilience in smart cities. The study develops a robust conceptual framework while assessing its feasibility and the necessary adaptations for real-world implementation. The research applies the Soft System Methodology (SSM)-Action Approach, which leverages systems thinking to explore and uncover digital economy processes from multiple perspectives (Moumivand *et al.*, 2022). This methodology enables researchers to validate theoretical assumptions through direct observation and interviews, ensuring that findings are grounded in explicit knowledge. Compared to a single qualitative research approach, such as focus group discussions or in-depth interviews, the SSM-Action approach provides researchers greater ease and flexibility in exploring, developing, reviewing, and refining models comprehensively and robustly through an experts-driven approach. Furthermore, the SSM-action approach facilitates epistemic learning, where insights emerge through interaction and real-world experience, allowing researchers to identify practical, actionable strategies for improving digital economy practices in smart cities.

SSM-action approach has an accommodation mechanism that allows users to consider comments and adjust to varying viewpoints, backgrounds, and genetic predispositions (Suryaatmaja et al., 2020). It employs a structured process to comprehend an issue, construct a conceptual model, assess the feasibility and desired modifications, and execute them (Davies & Ledington, 1991). As a soft approach, SSM uses the system notion to conduct research and discover processes from various angles (Moumivand et al., 2022). It is based on explicit forms of knowledge because the goal is to use observation to show whether this is true or incorrect. To produce research findings that better reflect real-world situations based on field practices, this study combines SSM with an action research approach to confirm and criticize the results from expert interviews with practices and evaluations by smart city actors from the cities or district level. Action research solves research problems using practical action and continual evaluation (Li et al., 2022). Researchers identify an action based on epistemic learning that emerges from interaction and experience realized at that level with SSM-action reality.

SSM effectively solves complex problems of multiple participants with the same goal, working with different worldviews. A methodological process does this, clarifying its various implications so that alternative perspectives can be systematically explored, compared, and contrasted to assess their subjectivity. The goal is to create a systematic learning process where participants in the scenario can appreciate other points of view and are allowed to compromise (Suryaatmaja et al., 2020). So, based on this strengthening, the researcher feels that the SSM method is suitable for creating a smart city digital economy model with economic resilience. Through this study, the researchers underline the critical relevance of values and beliefs that examine cities' economies and cultures to discover what changes are doable and acquire participants' support to adopt specific courses of action.

As depicted in Figure 1, the SSM-action approach is a good option for combination with simulation. This study allows the analysis of the learning process to maintain or

improve organizational performance based on the collective learning of each member's knowledge. SSM-Action approach facilitates a systematic conversation about potential improvements to the problematic situation.

SSM-action can be used, on the one hand, to structure the issue, define the boundaries and activities of the system, create an activity-based model, and consider consensus rather than imposition. Conversely, simulation generates dynamic models to investigate interaction. These combinations increase the likelihood of implementation (Moumivand et al., 2022). SSM-action aims to create a systemic learning process whereby participants in problem scenarios learn to respect other points of view and are given the chance to compromise (Suryaatmaja et al., 2020). As illustrated in Figure 1, the data collection of this study was conducted through expert interviews and observation as an enrichment of the literature review. The interviews were conducted with 30 expert participants from six leading smart cities in Indonesia implementing digital economy initiatives. They are Jakarta, Bandung City, Semarang City, Surabaya, Banyuwangi, and Makassar. The expert criteria are those who have worked as researchers, digital economy, or smart city actors within the last five years. Expert participants were chosen to represent the central government (including financial authorities), local government leaders, digital economy actors, academia, associations, and media.

Figure 1. Soft System Method (SSM)-Action Stages
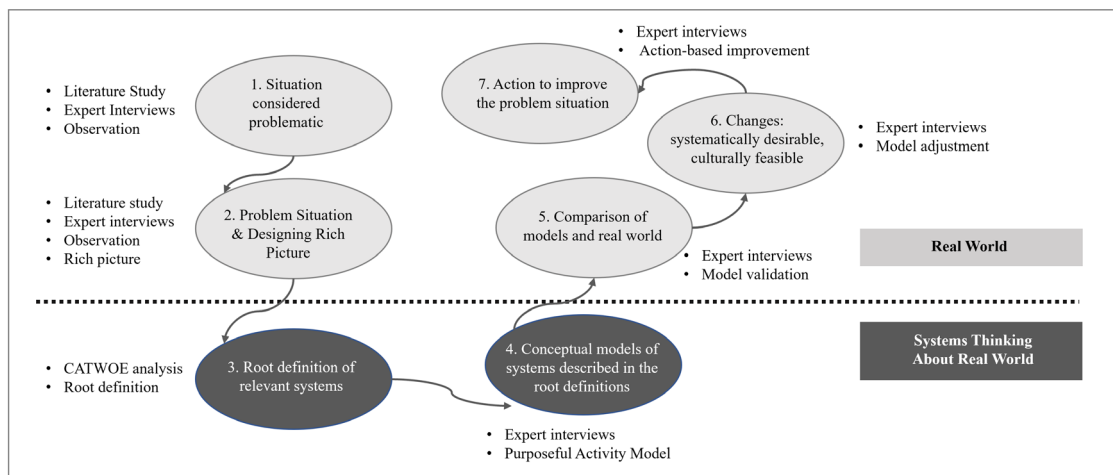
Source: Checkland & Poulter (Checkland & Poulter, 2010) and researcher analysis (2024)

There are seven steps in the Soft System Method (SSM)-Action approach (Checkland & Poulter, 2010; Suryaatmaja et al., 2020):

Step 1 starts by determining the phenomenon that occurs and is related to the research raised. This can be done by searching through literature studies, interviews, and observation.

Step 2 continues with determining the phenomenon being raised and forming a rich picture; this is useful for knowing the direction of future research.

Step 3 determines the root definition of the relevant system using CATWOE analysis.

Step 4 involved expert interviews with 30 experts from several backgrounds and with characteristics relevant to smart cities and the digital economy in Indonesia.

Step 5 compares the model, developed using interview data, with the actual conditions to validate its accuracy. The findings from expert interviews were examined and validated by six prominent local leaders of smart city initiatives from six smart cities in Indonesia: Jakarta, Bandung City, Semarang City, Surabaya, Banyuwangi, and Makassar.

Step 6 formulates strategic actions in real terms according to expert experiences, knowledge, and insights from city perspectives.

Step 7 is an assessment to evaluate the model that has been designed and implemented to identify areas for further enhancement in the digital economy of smart cities.

The first stage (data collection) is carried out using literature review, observation, and in-depth interviews. Then, the second stage is data transcription & coding using NVivo 12 software. The third stage is data reading, whereby the researcher re-scanning the transcript and the data coding results in the previous stage. The fourth stage is thematic coding, whereby the researcher carries out thematic grouping. The fifth stage is thematic analysis to answer the 7 (seven) stages of SSM. The sixth stage is thematic evaluation and review for analysis improvement. The researcher may return to stage four, thematic coding when researchers need to make realignments or adjustments.

This study has undertaken interviews with 30 experts on the digital economy and smart cities in Indonesia. Table 1 provides a comprehensive overview of the participants' background information, including area of expertise, position, education level, and year of experience.

Table 1. Participants Profile

| No	Position	Education Level			Years of Experience			Total
		Bachelor	Master	PhD	11-20	21-30	31-40	
1	National Government Leader		6	3	1	6	2	9
2	Local Government Leader		4	2		4	2	6
3	Digital Economy Players	1	4	1		5	1	6
4	University Professor			4		2	2	4
5	Association	1	1		1	1		2
6	Media		3			3		3
	Total	2	18	10	2	21	7	30

RESULT AND DISCUSSION

A rich picture is a comprehensive endeavor to gather all pertinent elements about the complex situations of smart cities' digital economy issues. As illustrated in Figure 2, each actor contributes an issue to be resolved and a solution necessary to facilitate the successful adoption of the digital economy. National government actors

that have contributed to planning and budgeting include the Ministry of National Planning, the Coordinating Ministry of Economic Affairs, and the Ministry of Finance. Other vertical governments must be highly involved at the program level are the Ministry of Communication and Information, the Ministry of Tourism & Creative Economy, the Ministry of Cooperative & SMEs, the Ministry of Education, Culture, Research, & Technology, the Ministry of Manpower & Transmigration, the Ministry of Industry, and the Ministry of Trade, as well as collaboration with provincial government. Other vital actors at the national level are the Financial Service Authority (OJK), the Central Bank (BI), and the Commodity Futures Trading Authority (BAPPEBTI). Schools, universities, private education, and media play vital roles in digital literacy and acceleration.

As illustrated in Figure 2, the successful establishment of the digital economy in smart cities requires substantial backing from the national government. Unfortunately, they have various challenges at the national level, including constrained budget allocation, a weak long-term plan, and an absence of a particular guideline. At the city level, there is still a lack of coordination between different ministries' intervention programs, insufficient emphasis on the digital economy initiative, and limited local government involvement. Thus, municipal governments, as crucial actors in smart cities, are expected to take action in formulating local policies, expediting execution, offering incentives and resources, and collaborating with stakeholders in the digital economy.

Figure 2. Rich Picture Analysis
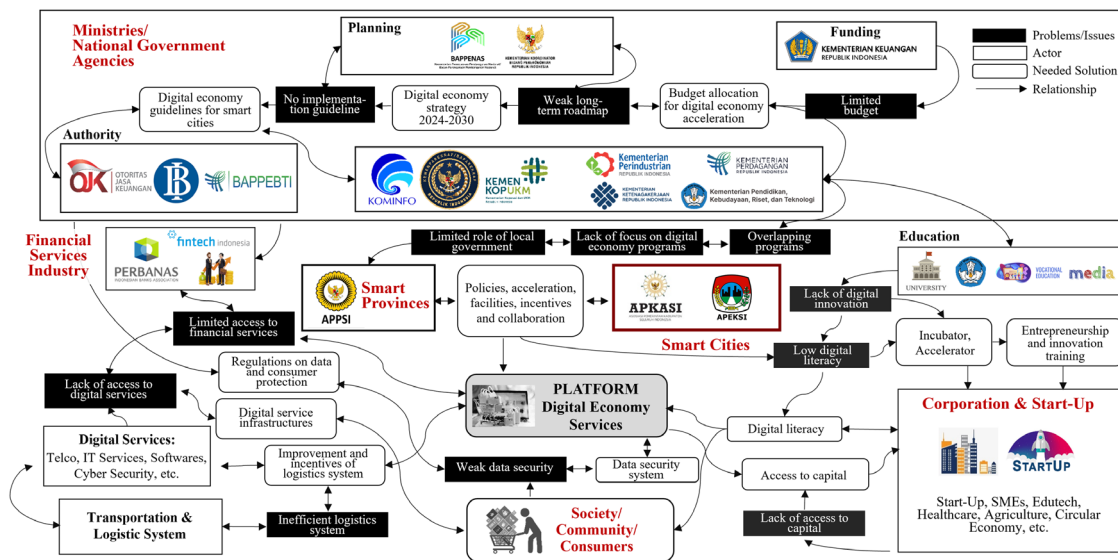
Source: Primary data and researcher analysis (2024)

In the industrial context, the digital economy of smart cities requires strong support from many industry players, including banking and fintech services, digital service providers, transportation and logistics companies, commercial enterprises, and

investors. However, digital economy service platforms facilitate the interaction between digital economy providers and consumers, which serve as a means for economic collaboration and sharing. Meanwhile, the success of commercial businesses in the digital economy at the city level depends heavily on an effective supporting ecosystem. This includes digital literacy support, business incubators and acceleration programs, entrepreneurship and innovation initiatives, and funding support from investors and other financial institutions. Immediate regulations and action from authorities are necessary to ensure consumers have secure and convenient access to digital economy platforms.

CATWOE analyses were used to determine the modeling process's root definition and explain the system's properties (Moumivand *et al.*, 2022). The CATWOE analysis is as follows:

Customers are users of digital economy services, both personal and organizational.

Actors are city and regency government, provincial government, ministries/national agencies, and digital economy industry & society, including financial service providers, companies and start-ups, customers, and communities.

Transformation is a digital economy governance that contributes to the resilient economy of smart cities.

World view is synergy and collaboration between stakeholders.

Owner is the cities and regencies' government in Indonesia.

Environment is digital technology, digital services, sharing economy and platforms, digital economy activities, digital financial services, and comparative advantage.

In the fourth stage, as described in Figure 3, SSM-Action research formulates a conceptual model of a system derived from the preceding root definition. Within the concept of a digital economy for the resilient economy of smart cities, four distinct categories of actors exist, each of which plays a crucial role. The entities mentioned include municipal and regional administrations, provincial governments, the national government, and the digital economy industry and society. The latter actor encompasses financial service providers, corporations, start-ups, customers, and the wider community. Each actor plays a distinct function that complements one another, encompassing areas such as digital economy planning, policy development, financial support, digital literacy, digital economy programs, the establishment of infrastructure and technology, provision of data services, digital services delivery, digital platforms development, fostering of digitalized economy, entrepreneurship and innovation initiative, and monitoring systems. Each of these functions is interdependent and ineligible for elimination.

Figure 3. Conceptual Model of The Digital Economy for Smart Cities
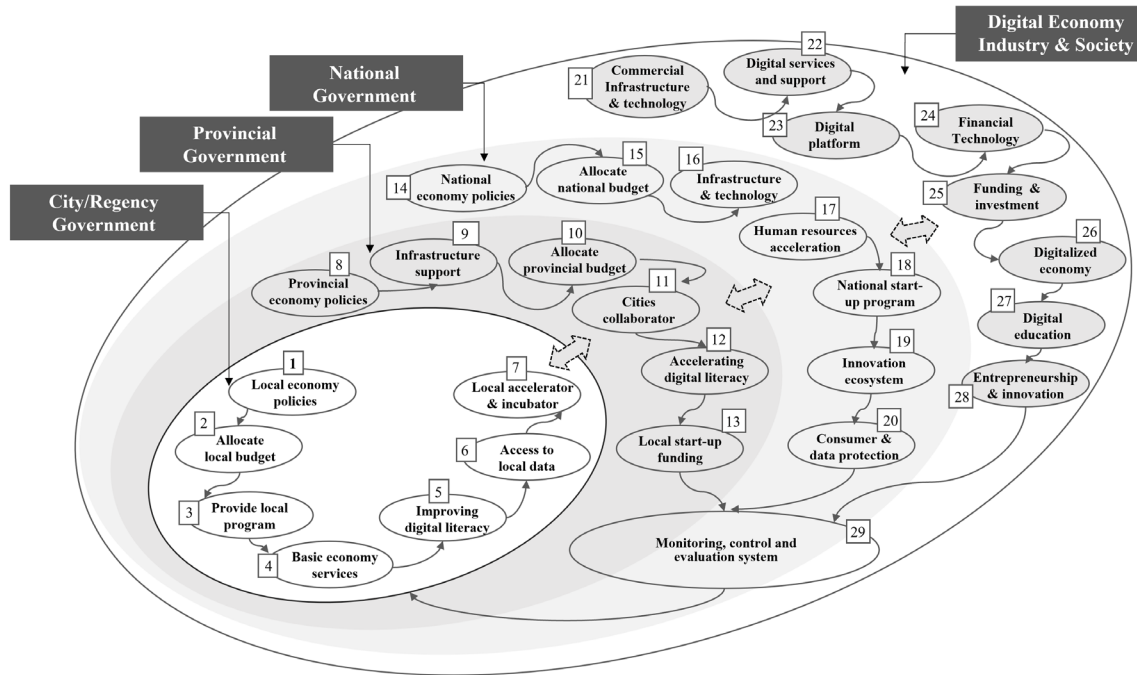
Source: Primary data and researcher analysis (2024)

In the fifth step of the SSM-action approach, as depicted in Figure 4, we formulate a conceptual model comparison, drawing upon real-world events. This explanation led to the creation of a framework that enables the investigation of learning processes necessary to preserve or enhance the performance of the organization based on individual, collective learning tacit knowledge through team discussions about their experiences and an explanation of their divergent opinions (Suryaatmaja et al., 2020). The expert panels in this study evaluated smart cities that play a crucial role in the digital economy, with the support of both the provincial and central governments. Their strategic responsibilities include formulating digital economy policies, fostering economic collaboration, and implementing digital marketing campaigns for digital economic programs. The critical steps in developing a smart city's digital economy involve establishing digital economy readiness, building a digital society, and delivering digital economy services. Ultimately, implementing a digital economy in smart cities is expected to enhance the economic resilience of a city. Five primary criteria determine the resilience of a city's economy: substantial economic size, a robust economic structure, entrepreneurial drive, income equality, and sound economic stability. Continuous digital literacy initiatives, robust cyber security systems, and consumer and data protection assurances are essential for supporting digital economic services to consumers and society.

**Figure 4. Model Comparison of the Digital Economy**
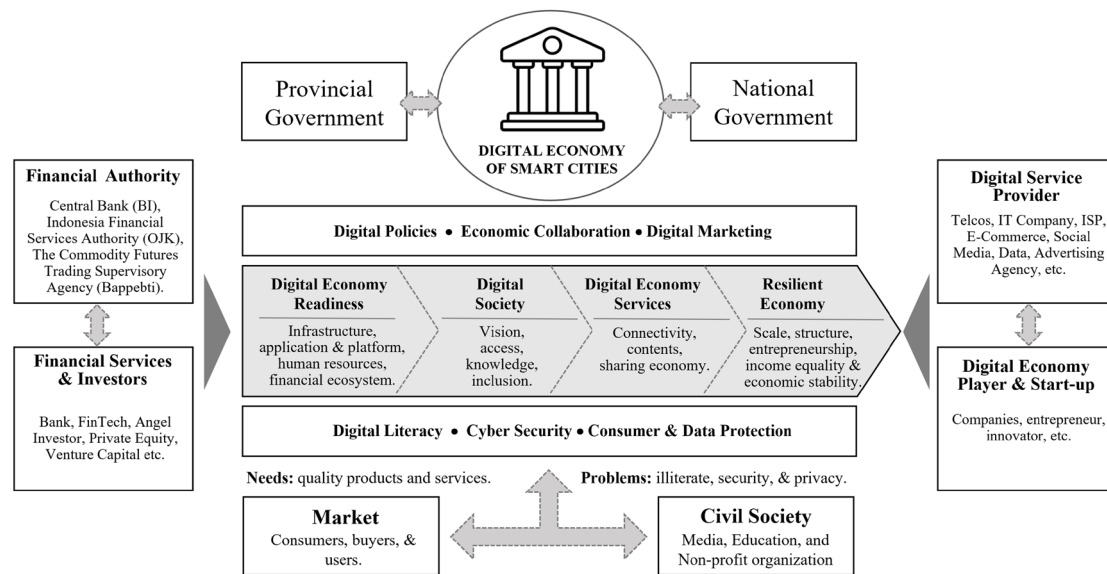
Source: Primary data and researcher analysis (2024)

In the sixth and seventh steps, this SSM-action approach modifies and enhances the digital economy model by incorporating the practical measures required by municipal and regency governments when executing smart city initiatives. In addition to the viewpoints of 30 expert panels specializing in the digital economy and smart cities, the SSM-action study conducted clarification and interviews with prominent leaders in the field of smart cities and digital economy from six cities: Jakarta, Bandung, Semarang, Surabaya, Banyuwangi, and Makassar. The concept of the region as a new policy approach to regional development has been increasingly widely used in various countries (Kharisma & Hadiyanto, 2019). The objective is to finalize a robust model for the digital economy in smart cities, devise effective strategies for fostering the digital economy practice, and establish resilient economic indicators.

As illustrated in Figure 5, this research defines the digital economy as economic services mainly enabled by information technology. The influence of the digital economy in enhancing the resilience of smart cities depends on the ability to develop priorities of the digital economy strategies at the local and national levels. The digital economy has five essential elements: digital technology, digital services, sharing economy and platform, digitalized economy, and digital financial services. The digital economy is characterized by economic activities such as the sharing economy, business innovation, financial technology, productivity improvement, digital skills, and SME engagement (Arsić, 2020; Murinde et al., 2022; Prima Lita et al., 2020; Rozak et al., 2021; Živojinović & Zornić, 2022). Digital economy practices in Indonesia include various digital technology-based economic activities for various purposes such as entrepreneurship support, MSMEs management, digital marketing, fintech adoption, e-commerce, and micropayments (Hadi Putra & Santoso, 2020; Haer et al., 2024; Nugraha et al., 2024; Primadita Karina & Dewi Astuti, 2022). Digital technology significantly influences the landscape of human development (Setyowati

et al., 2024). In more developed countries, adopting sophisticated digital technology has become a distinctive feature of digital economic practices (Haer et al., 2024).

Figure 5. Digital Economy Scope, Strategy, Resilient Impact
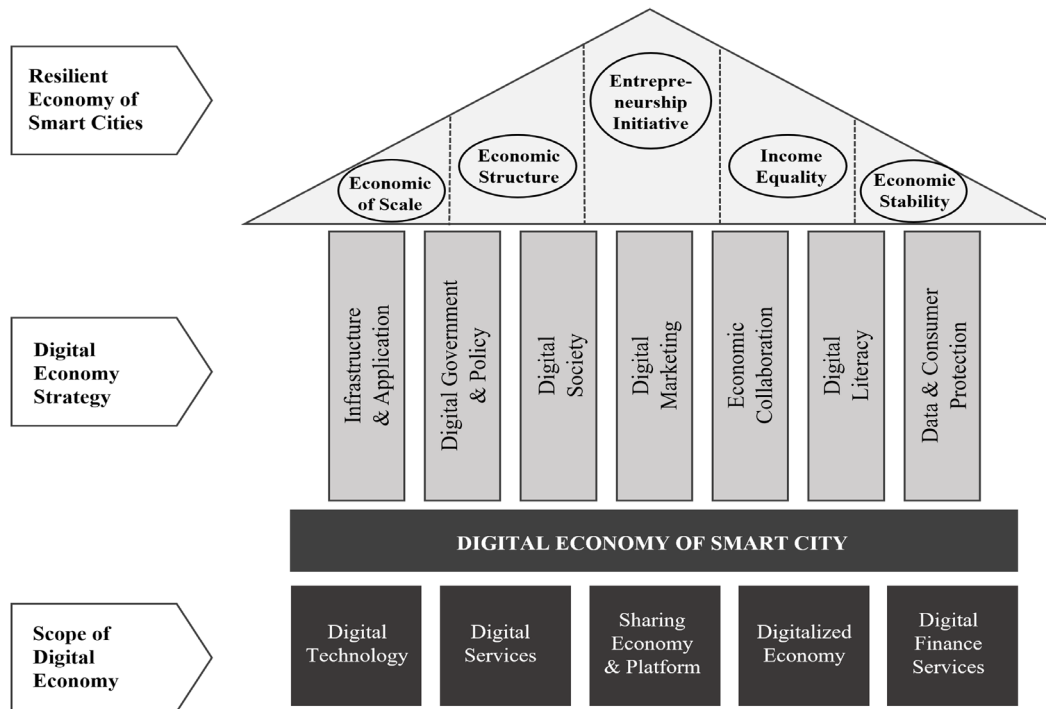
Source: Primary data and researcher analysis (2024)

Every country's ultimate goal is a strong economy with steadily rising economic growth. By deliberately and strategically concentrating on the elements that promote rapid economic growth, every government aims to accomplish this goal (Nketia & Kong, 2021). *First*, digital technology produces ICT consumer goods, software, infrastructure, retail, and content (Bukht & Heeks, 2019). The growth of digital technology and globalization served as the primary drivers for the younger generations of humans to look for more responsible and intelligent ways to consume (Lyaskovskaya & Khudyakova, 2021). *Second,* digital services refer to products or services supplied to customers or society to enhance their quality of life, promote economic improvement, or fulfill customer delight. It includes communication services, IT services, IT consulting, retail services, and content. Digital services refer to the extended range of utilities offered to society by leveraging digital infrastructure and technology. *Third,* the sharing economy and platform, an economy of sharing, characterizes digital economic practices. Seven characteristics of the sharing economy include platforms for teamwork, inadequately employed resources, peer-to-peer communication, cooperative leadership, driven by a mission, alternative funding sources, and use of technology (Šiuškaitė et al., 2019). *Fourth,* in a digitalized economy, enhancing technological capability refers to the method by which businesses progressively gain expertise and understanding, boosting their

capacity to oversee essential technology advancements (Rozkwitalska & Lis, 2022). Fifth, financial services are directly tied to businesses participating in transactions, such as many successful joint ventures supported by alternative funding sources such as crowdsourcing (Šiuškaitė et al., 2019).

Economic resilience refers to a region's ability to cope with, recover from, and adapt to economic shocks. Because resilience is such a broad topic, numerous indicators can be utilized based on the chosen paradigms (Chacon-Hurtado et al., 2020). *First,* the size of the economy plays a crucial role in achieving the economic resilience of a city. Population increase directly impacts economic growth, broadening the market and leading to heightened economic specialization (Pavel et al., 2020). *Second,* economic structure is a crucial component of achieving the economy's transition to high-quality development in the modernization and change of its structure (Su et al., 2021). *Third,* entrepreneurship initiative, according to the Organization for Economic Co-operation and Development (OECD), entrepreneurship is creating or generating economic activity based on new goods, services, or markets to create value (Chacon-Hurtado et al., 2020). *Fourth*, income equality, the income balance is crucial in the economy of smart cities; significant disparities in citizens' wealth should be avoided (Wang & Li, 2022). *Fifth*, economic stability: the stability of the economic condition is essential for ensuring smooth commercial business operations in a city may benefit commercially from all activities, depending on whether there are bilateral or unilateral trade links (Lau et al., 2019).

Implementing an appropriate strategy tailored to each city or regency's specific conditions and requirements is of utmost importance in achieving digital economy goals in smart cities. Economic development depends on its sources of financing growth and development (Alam & Alam, 2021). *First,* infrastructure and application: digital economy infrastructure includes internet connectivity, servers, cloud computing, sensors, software, actuators, and information and communication technologies. Smart city apps are rarely developed entirely by one company or a municipality; instead, they are usually realized by integrating specific pre-existing ICT infrastructures with the help of a supporting platform (Esposito et al., 2021). *Second,* digital government and policy include government applications to support smart cities, necessitate safeguarding data and capabilities against unauthorized and criminal uses (Esposito et al., 2021). Digital governance also aims to achieve a balance in developing transparent governance policies (Lau et al., 2019) and various government services that utilize technology and involve multiple public-private stakeholders in the digital economy (Guimarães et al., 2020). *Third*, digital society refers to the specific actions, procedures, and methodologies used to meet previously unaddressed or ignored societal needs arising from digital technology (Daniel & Jenner, 2022). The digital society is connected through wireless networks in high-mobility environments that help them to contextualize information, lifestyles and values, consumer goods, and interactions between individuals and products, enabling consumers to identify and determine new opportunities in their interactions (Faridah et al., 2020; Zhang et al., 2021). *Fourth,* digital marketing has completely changed

how companies operate and interact with society and customers worldwide (Dash & Chakraborty, 2021). Pei (2022) describes that new developments and regulations of digital marketing have demanded changes in the economy and its development, prompting the creation of the digital economy. *Fifth*, economic collaboration, digital economy concepts, including the sharing economy, collaborative consumption, on-demand economy, on-demand services, group economy, self-service economy, peer-to-peer economy, digital economy, gig economy, and platforms economy, are typically linked to the collaborative economy (Ertz & Boily, 2019). *Sixth,* digital literacy, according to (Laitsou et al., 2020), digital economy education is critical for successfully implementing digital practices and boosting the quality and knowledge of the digital economy. *Seventh,* data and consumer protection it is the primary issues and challenges in the implementation of smart cities related to data protection and security, encompassing IT infrastructure, security and privacy, IT competencies, organizational challenges, and the associated costs (Syalianda & Kusumastuti, 2021).

CONCLUSION

This study has effectively uncovered crucial research issues related to the digital economy and resilience economy of smart cities from the perspective of Indonesia using the SSM-Action Approach. This study has successfully developed the digital economy frameworks comprising five components: digital technology, digital services, sharing economy and platform, digitalized economy, and financial services. This study has also identified five crucial elements of economic resilience for the digital economy of smart cities: economic size, economic structure, entrepreneurship initiative, income equality, and economic stability. Finally, this study has identified seven crucial digital economy strategies to drive a resilient economy of smart cities: infrastructure and application development, digital government and policy, digital society, digital marketing, economic collaboration, digital literacy, and data and consumer protection.

Based on the conclusions of this study, smart city governments, supported by the central government, which is in charge of regional digital economic growth, are advised first to create a master plan and roadmap for digital economic development, focusing on digital technology, digital economic activities, and digital finance as major enablers, with the ultimate goal of attaining local economic resilience. Secondly, budget allocation for the digital economy development initiatives in smart cities should be prioritized, focusing on infrastructure and application, digital government and policy, and digital society. Thirdly, maximize collaboration among digital economy stakeholders in smart cities to expedite innovation in digital economic services, develop local economic structures, and support local entrepreneurial activities that aim to improve the regional economic scale, promote income distribution, and improve the economic stability of smart cities. Fourth, provide support on digital marketing, digital literacy for digital society, optimizing digital services, and ensuring cyber security and consumer data protection.

REFERENCES

Ahad, M. A., Paiva, S., Tripathi, G., & Feroz, N. (2020). Enabling Technologies and sustainable smart cities. *Sustainable Cities and Society*, *61*, 102301. https://doi.org/10.1016/j.scs.2020.102301.

Alam, M. Q., & Alam, M. S. (2021). Financial Development, Economic Growth and Poverty Reduction in India: An Empirical Evidence. *Etikonomi*, *20*(1), 13–22. https://doi.org/10.15408/etk.v20i1.18417.

Annoni, P., de Dominicis, L., & Khabirpour, N. (2019). Location matters: A spatial econometric analysis of regional resilience in the European Union. *Growth and Change*, *50*(3), 824–855. https://doi.org/10.1111/grow.12311.

Appio, F. P., Lima, M., & Paroutis, S. (2019). Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges. *Technological Forecasting and Social Change*, *142*, 1–14. https://doi.org/10.1016/j.techfore.2018.12.018.

Ariyani, N., & Fauzi, A. (2024). Analyzing Economic Resilience of Rural Tourism in Indonesia Using Synthetic Composite Index. *Etikonomi, 23*(2), 415–432.

Arsić, M. (2020). Impact of Digitalisation on Economic Growth, Productivity and Employment. *Economic Themes*, *58*, 431–457. https://doi.org/10.2478/ethemes-2020-0025.

Ayuningrum, F. T., Triasturi, M. W., Indriyantika, D. F., Solih, R., Hermawati, F., & Friska, M. (2023). *Indonesia Population Projection 2020-2050, Based on Census 2020*. Jakarta: Badan Pusat Statistik.

Bencsik, A. (2020). Challenges of Management in the Digital Economy. *International Journal of Technology*, *11*(6), 1275–1285. https://doi.org/10.14716/ijtech.v11i6.4461.

Bukht, R., & Heeks, R. (2019). Defining, Conceptualising and Measuring the Digital Economy. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3431732.

Bush, J., & Doyon, A. (2019). Building Urban Resilience with Nature-Based Solutions: How Can Urban Planning Contribute? *Cities*, *95*, 102483. https://doi.org/10.1016/j.cities.2019.102483.

Camero, A., & Alba, E. (2019). Smart City and Information Technology: A Review. *Cities*, *93*, 84–94. https://doi.org/10.1016/j.cities.2019.04.014.

Chacon-Hurtado, D., Kumar, I., Gkritza, K., Fricker, J. D., & Beaulieu, L. J. (2020). The Role of Transportation Accessibility in Regional Economic Resilience. *Journal of Transport Geography*, *84*, 102695. https://doi.org/10.1016/j.jtrangeo.2020.102695.

Chang, W. S., & Lin, Y. T. (2019). The Effect of Lead-Time on Supply Chain Resilience Performance. *Asia Pacific Management Review*, *24*(4), 298–309. https://doi.org/10.1016/j.apmrv.2018.10.004.

Checkland, P., & Poulter, J. (2010). Soft Systems Methodology. In. Reynolds, M., & Holwell, S. (Eds). *Systems Approaches to Managing Change: A Practical Guide* (pp. 191–242). London: Springer. https://doi.org/10.1007/978-1-84882-809-4_5.

Chen, X., Teng, L., & Chen, W. (2022). How Does FinTech Affect the Development of The Digital Economy? Evidence from China. *North American Journal of Economics and Finance*, *61*, 101697. https://doi.org/10.1016/j.najef.2022.101697.

Daniel, L. J., & Jenner, P. (2022). Another Look at Social Innovation: From Community - For Community. *International Journal of Innovation Studies*, *6*(2), 92–101. https://doi.org/10.1016/j.ijis.2022.04.001.

Dash, G., & Chakraborty, D. (2021). Digital Transformation of Marketing Strategies during a Pandemic: Evidence from an Emerging Economy during COVID-19. *Sustainability*, *13*(12), 6735. https://doi.org/10.3390/su13126735.

Davies, L., & Ledington, P. (1991). *Information in Action Soft Systems Methodology*. New York: MacMillan Education Ltd.

Ertz, M., & Boily, É. (2019). The Rise of the Digital Economy: Thoughts on Blockchain Technology and Cryptocurrencies for the Collaborative Economy. *International Journal of Innovation Studies*, *3*(4), 84–93. https://doi.org/10.1016/j.ijis.2019.12.002.

Esposito, C., Ficco, M., & Gupta, B. B. (2021). Blockchain-based Authentication and Authorization for Smart City Applications. *Information Processing and Management*, *58*(2), 102468. https://doi.org/10.1016/j.ipm.2020.102468.

Faridah, S., Alwi, S., Maria, T. C. M., Cuomo, T., & Schwaiger, M. (2020). Digital Society and Corporate Reputation : Towards the Next Generation of Insights. *Corporate Reputation Review*, *23*(3), 129–132. https://doi.org/10.1057/s41299-020-00098-x.

Guimarães, J. C. F. De, Severo, E. A., Felix Júnior, L. A., Costa, W. P. L. B. Da, & Salmoria, F. T. (2020). Governance and Quality of Life in Smart Cities: Towards Sustainable Development goals. *Journal of Cleaner Production*, *253*. https://doi.org/10.1016/j.jclepro.2019.119926.

Guo, Y. M., Huang, Z. L., Guo, J., Li, H., Guo, X. R., & Nkeli, M. J. (2019). Bibliometric Analysis on Smart Cities Research. *Sustainability*, *11*(13), 3606. https://doi.org/10.3390/su11133606.

Hadi Putra, P. O., & Santoso, H. B. (2020). Contextual Factors and Performance Impact of E-Business use in Indonesian Small and Medium Enterprises (SMEs). *Heliyon*, *6*(3), e03568. https://doi.org/10.1016/j.heliyon.2020.e03568.

Haer, J., Gravitiani, E., & Putro, T. R. (2024). Digital Technology Adoption in Entrepreneurs: Are Ex-Migrant Workers More Adaptive? *Etikonomi*, *23*(1), 1–10.

Han, Y., & Goetz, S. J. (2019). Predicting US County Economic Resilience from Industry Input-Output Accounts. *Applied Economics*, *51*(19), 2019–2028. https://doi.org/10.1080/00036846.2018.1539806.

Hariyanto, H., Ratnasari, R. T., Rusgianto, S., & Pitchay, A. A. (2024). Antecedents of Behavioral Intention to Adopt Sharia Digital Services in ZISWAF Distribution. *Etikonomi*, *23*(1), 109–128. https://doi.org/10.15408/etk.v23i1.33892.

Ibn-Mohammed, T., Mustapha, K. B., Godsell, J., Adamu, Z., Babatunde, K. A., Akintade, D. D., Acquaye, A., Fujii, H., Ndiaye, M. M., Yamoah, F. A., & Koh, S. C. L.

(2021). A Critical Review of the Impacts of COVID-19 on the Global Economy and Ecosystems and Opportunities for Circular Economy Strategies. *Resources, Conservation and Recycling*, *164*, 105169. https://doi.org/10.1016/j.resconrec.2020.105169.

Jiang, D., Wang, X., & Zhao, R. (2022). Analysis on the Economic Recovery in the Post-COVID-19 Era: Evidence From China. *Frontiers in Public Health*, *9*, 1–7. https://doi.org/10.3389/fpubh.2021.787190.

Joss, S., Sengers, F., Schraven, D., Caprotti, F., & Dayot, Y. (2019). The Smart City as Global Discourse: Storylines and Critical Junctures across 27 Cities. *Journal of Urban Technology*, *26*(1), 3–34. https://doi.org/10.1080/10630732.2018.1558387.

Kesar, O. (2022). Building a Resilient Local Economy : The Influence of Global Crises on Deglobalization of the Tourism Supply System. *Zagreb International Review of Economics & Business*, *25*, 105–123. https://doi.org/10.2478/zireb-2022-0027.

Kharisma, B., & Hadiyanto, F. (2019). Analysis of Potential Sectors and Policy Priorities of Regional Economic Development in Maluku Province. *Etikonomi*, *18*(1), 29–46.

Kindermann, B., Beutel, S., Garcia, G., Lomana, D., Strese, S., Bendig, D., & Brettel, M. (2021). Digital Orientation : Conceptualization and Operationalization of a New Strategic Orientation. *European Management Journal*, *39*(5), 645–657. https://doi.org/10.1016/j.emj.2020.10.009.

Laitsou, E., Kargas, A., & Varoutas, D. (2020). Digital Competitiveness in the European Union Era: The Greek Case. *Economies*, *8*(4), 85. https://doi.org/10.3390/ECONOMIES8040085.

Lau, B. P. L., Marakkalage, S. H., Zhou, Y., Hassan, N. U., Yuen, C., Zhang, M., & Tan, U. X. (2019). A Survey of Data Fusion in Smart City Applications. *Information Fusion*, *52*, 357–374. https://doi.org/10.1016/j.inffus.2019.05.004.

Li, X., Yang, Y., Chu, S. K. W., Zainuddin, Z., & Zhang, Y. (2022). Applying Blended Synchronous Teaching and Learning for Flexible Learning in Higher Education: An Action Research Study at a University in Hong Kong. *Asia Pacific Journal of Education*, *42*(2), 211–227. https://doi.org/10.1080/02188791.2020.1766417.

Lyaskovskaya, E., & Khudyakova, T. (2021). Sharing Economy: For or Against Sustainable Development. *Sustainability*, *13*(19), 11056. https://doi.org/10.3390/su131911056.

Moumivand, A., Azar, A., & Toloie Eshlaghy, A. (2022). Combined Soft System Methodology and Agent-Based Simulation for Multi-Methodological Modeling. *Systems Research and Behavioral Science*, *39*(2), 200–217.

Murinde, V., Rizopoulos, E., & Zachariadis, M. (2022). The Impact of the FinTech Revolution on the Future of Banking: Opportunities and Risks. *International Review of Financial Analysis*, *81*, 102103. https://doi.org/10.1016/j.irfa.2022.102103.

Ning, Z., Huang, J., & Wang, X. (2019). Vehicular Fog Computing: Enabling Real-Time Traffic Management for Smart Cities. *IEEE Wireless Communications*, *26*(1), 87–93.

Nketia, E. B., & Kong, Y. (2021). Deciphering African Financial Development Interaction With Institutional Quality And Economic Growth Nexus. *Etikonomi*, *20*(1), 23–44.

Nugraha, D. P., Setiawan, B., Emilda, E., Masyhuri, M., Quynh, M. N., Nathan, R. J., Fekete-Farkas, M., & Hágen, I. (2024). Role of Financial Literacy and Saving Habits on Fintech Adoption post-Covid-19. *Etikonomi*, *23*(1), 63–80.

Pavel, A., Moldovan, B. A., Kourtit, K., & Nijkamp, P. (2020). Urban or Rural: Does It Make a Difference for Economic Resilience? A Modelling Study on Economic and Cultural Geography in Romania. *Sustainability*, *12*(9). https://doi.org/10.3390/su12093776.

Pei, J. (2022). Approaches Toward Building the Digital Enterprise and Sustainable Economic Development: The Moderating Role of Sustainability. *Frontiers in Psychology*, *13*, 1–11. https://doi.org/10.3389/fpsyg.2022.835602.

Prima Lita, R., Fitriana Faisal, R., & Meuthia, M. (2020). Enhancing Small and Medium Enterprises Performance Through Innovation in Indonesia: A Framework for Creative Industries Supporting Tourism. *Journal of Hospitality and Tourism Technology*, *11*(1), 155–176. https://doi.org/10.1108/JHTT-11-2017-0124.

Primadita Karina, A., & Dewi Astuti, R. (2022). The Role of Digital Orientation, Digital Capability and Digital Innovation on The Relationship of Environmental Dynamism Towards FMCG SME's Performance. *The 6th International Conference on Family Business and Entrepreneurship*.

Quayson, M., Bai, C., & Osei, V. (2020). Digital Inclusion for Resilient Post-COVID-19 Supply Chains: Smallholder Farmer Perspectives. *IEEE Engineering Management Review*, *48*(3), 104–110. https://doi.org/10.1109/EMR.2020.3006259.

Rahmawati, D., Arvitrida, N. I., Lastomo, D., Kusnadi, & Rindawati. (2019). Smart Economy for Coastal Resource Management in Surabaya City. *IOP Conference Series: Earth and Environmental Science*, *340*(1). https://doi.org/10.1088/1755-1315/340/1/012016.

Ren, S., Hao, Y., Xu, L., Wu, H., & Ba, N. (2021). Digitalization and Energy: How Does Internet development affect China's energy consumption? *Energy Economics*, *98*. https://doi.org/10.1016/j.eneco.2021.105220

Rozak, H. A., Adhiatma, A., Fachrunnisa, O., & Rahayu, T. (2021). Social Media Engagement, Organizational Agility and Digitalization Strategic Plan to Improve SMEs' Performance. *IEEE Transactions on Engineering Management*, *70*(11), 3766–3775.

Rozkwitalska, M., & Lis, A. M. (2022). Social Learning in Cluster Organizations and Accumulation of Technological Capability. *Engineering Economics*, *33*(4), 372–385. https://doi.org/10.5755/j01.ee.33.4.30203.

Setyowati, I. Y., Malik, N., & Suliswanto, M. S. W. (2024). Enhancing Human Development Quality in Indonesia: Socio-Economic and Technological Capabilities. *Etikonomi*, *23*(1), 93–108.

Sharifi, A. (2019). A Critical Review of Selected Smart City Assessment Tools and Indicator Sets. *Journal of Cleaner Production*, *233*, 1269–1283. https://doi.org/10.1016/j.jclepro.2019.06.172.

Šiuškaitė, D., Pilinkienė, V., & Zvirdauskas, D. (2019). The Conceptualization of the Sharing Economy as a Business Model. *Engineering Economics*, *30*(3), 373–381. https://doi.org/10.5755/j01.ee.30.3.21253.

Stavytskyy, A., Kharlamova, G., & Stoica, E. A. (2019). The Analysis of the Digital Economy and Society Index in the EU. *Baltic Journal of European Studies*, *9*(3), 245–261.

Su, J., Su, K., & Wang, S. (2021). Does the Digital Economy Promote Industrial Structural Upgrading? - A Test of Mediating Effects Based on Heterogeneous Technological Innovation. *Sustainability*, *13*(18), 10105. https://doi.org/10.3390/su131810105.

Subkhan, F., Maarif, M. S., Rochman, N. T., & Nugraha, Y. (2024). Reformulating Digital Economy to Drive Economic Competitiveness of Smart Cities: SSM-Based Action Approach. *International Journal of Economics and Management (IJEM)*, *18*, 1–17.

Suryaatmaja, K., Wibisono, D., Ghazali, A., & Fitriati, R. (2020). Uncovering the Failure of Agile Framework Implementation Using SSM-Based Action Research. *Palgrave Communications*, *6*(1), 1–18. https://doi.org/10.1057/s41599-019-0384-9.

Syalianda, S. I., & Kusumastuti, R. D. (2021). Implementation of smart city concept : A case of Jakarta Smart City, Indonesia. *IOP Conference Series: Earth and Environmental Science, 716*, 012128. https://doi.org/10.1088/1755-1315/716/1/012128.

Tyas, W. P., Nugroho, P., Sariffuddin, S., Purba, N. G., Riswandha, Y., & Sitorus, G. H. I. (2019). Applying Smart Economy of Smart Cities in Developing World: Learnt from Indonesia's Home Based Enterprises. *IOP Conference Series: Earth and Environmental Science*, *248*(1). https://doi.org/10.1088/1755-1315/248/1/012078.

Wang, W., Wang, J., Wulaer, S., Chen, B., & Yang, X. (2021). The Effect of Innovative Entrepreneurial Vitality on Economic Resilience Based on a Spatial Perspective : Economic Policy Uncertainty as a Moderating Variable. *Sustainability, 13*(19), 10677. https://doi.org/10.3390/su131910677.

Wang, X., & Li, M. (2022). Determinants of Regional Economic Resilience to Economic Crisis: Evidence from Chinese Economies. *Sustainability*, *14*(2), 809. https://doi.org/10.3390/su14020809.

Xie, J., Tang, H., Huang, T., Yu, F. R., Xie, R., Liu, J., & Liu, Y. (2019). A Survey of Blockchain Technology Applied to Smart Cities: Research Issues and Challenges. *IEEE Communications Surveys and Tutorials*, *21*(3), 2794–2830. https://doi.org/10.1109/COMST.2019.2899617.

Yang, Y., Shi, S., & Wu, J. (2022). Digital Financial Inclusion to Corporation Value: The Mediating Effect of Ambidextrous Innovation. *Sustainability*, *14*(24), 1–23. https://doi.org/10.3390/su142416621

Zhang, W., Zhao, S., Wan, X., & Yao, Y. (2021). Study on the Effect of Digital Economy on High-Quality Economic Development in China. *PLoS ONE*, *16*(9), 0257365. https://doi.org/10.1371/journal.pone.0257365.

Zhao, Q., Tsai, P. H., & Wang, J. L. (2019). Improving Financial Service Innovation Strategies for Enhancing China's Banking Industry Competitive Advantage During the Fintech Revolution: A Hybrid MCDM Model. *Sustainability*, *11*(5), 1–29. https://doi.org/10.3390/su11051419.

Živojinović, T., & Zornić, N. (2022). Anticipating the Impact of Sharing Economy Drivers on Consumer Intention for Using a Sharing Economy Service. *Journal of East European Management Studies*, *27*(2), 233–258. https://doi.org/10.5771/0949-6181-2022-2-233.