Digitalization Technology for Sustainable Rural Entrepreneurship and Inequality

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Digitalization Technology for Sustainable Rural Entrepreneurship and Inequality

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Abstract

The digitalization technology transformation of entrepreneurship has positive impacts but also increases inequality and disrupts the sustainable development goals (SDGs). This study aimed to examine the impact of digitalization technology transformation on rural entrepreneurship and explain its mitigation efforts using exploratory sequential mixed methods. The policy acceptance model method was used to reduce uncertainty in analyzing entrepreneurial behavior patterns. Data were collected using questionnaires and semi-structured interviews equipped with ethnographic observations. The results showed that the digitalization technology transformation of rural entrepreneurship supports various new potentials. These include decent work opportunities, family entrepreneurship, and local economic growth. However, the technology increases inequality and the fear of traditional markets that could disrupt achieving other sustainable development goals (SDGs). This inequality and the risk of uncertainty could be mitigated by the social solidarity economic transformation business model based on the potential of local humanist wisdom. Therefore, this study could provide scientific information and implications for social and institutional policies. It could also contribute to the literature on new institutional and social entrepreneurship innovation theories related to the wave of Kontratieff Schumpeter.

Keywords

Digitalization Technology, Rural Entrepreneurship, Sustainability, Inequality

1. Introduction

Rural entrepreneurship's increasingly needed digitalization transformation is a priority scale for regional and global development policies (World Bank, 2022; Rijswijk et al., 2021; Qureshi, 2021). It provides new challenges and opportuni-

ties based on the local wisdom potential of a rural social solidarity economy (SSE) transformation model. Digitalization also increases economic growth and regional development potential (Baranauskas & Raisiene, 2022; Reynolds et al., 2022). However, this topic has only been examined regarding its benefits instead of its negative impacts. Digital technology creates economic value, though the resulting opportunities still need to be identified to create value (Kreuzer et al., 2022; Steininger et al., 2022). Therefore, this study aimed to explore the impact of digitalization technology transformation on rural entrepreneurship in Indonesia.

The digitalization technology transformation of entrepreneurship is the main driving force to achieving sustainable development goals (SDGs). However, it could also increase income inequality and hinder the achievement of SDGs (Qureshi & Woo, 2022; Qureshi, 2021, 2019; ILO, 2021; Hilbert, 2020; Knell, 2021; Ferrari et al., 2022; World Bank, 2022). Most developed economic countries, including the United States, fear the threat of a surge in unemployment and income inequality (Qureshi, 2019; Yusuf, 2021). Inequality has increased significantly in India and China, the two largest developing countries (Qureshi, 2019). Furthermore, digital inequality is exacerbated by high-speed internet that is less accessible to low-income households (Chiou & Tucker, 2020).

The digitalization technology transformation also increases income inequality and hinders inter-generational mobilization and accumulation of human capital among low-income households (World Bank, 2022). It has increased income inequality between companies and workers (Qureshi, 2019). This necessitates examining and explaining the positive and negative impacts of digitalization technology transformation. Today's digital technology s believed to have certain unwanted, invisible, and unknown psychological effects that only become apparent after studies and practice (Rijswijk et al., 2021; Klerkx & Rose, 2020; Pansera et al., 2019; Scholz et al., 2018). Previous literature showed that institutional studies are needed to examine the determinants of the digital transformation of entrepreneurship in driving economic growth (Mgadmi et al., 2021; Gavrila & Ancillo, 2021; Zhang et al., 2022).

The rapid development of sustainable digitalization technology plays a major role in the current industrial revolution (Qin et al., 2022; Li et al., 2022; Baranauskas & Raisiene, 2022). This phenomenon is linked to Schumpeter's innovation theory of the socio-economic evolution of entrepreneurship through technology (Prasetyo et al., 2022; Langroodi, 2021; Hilbert, 2020). Schumpeter's theory defines innovation as combining new knowledge to create new products, markets, organizations, and methods. Moreover, it identifies technological innovation as the main key to the industrial revolution and entrepreneurship (Prasetyo et al., 2021, 2022; Knell, 2021; Hilbert, 2020). As a knowledge-based goods production process, the digital technology transformation of rural entrepreneurship could be considered an innovation. Therefore, Schumpeter's innovation theory is valid and adds to the long wave of exponential progress. This novel study included the dimensions of SSE transformation social innovation as a new concept

to complement Schumpeter's socio-economic innovation theory and its implications.

Digital technology, platforms, and infrastructure have significantly changed entrepreneurial innovation regarding new job opportunities and inspired various study themes in the future (Nambisan, 2022; Qin et al., 2022). Nambisan et al. (Nambisan et al., 2019; Nambisan, 2022) stated that future study themes must explain their implications. This is because digitalization technology in rural areas could positively impact and control the larger environment. However, it could also disrupt welfare and increase social inequality (Morris et al., 2022; Ferrari et al., 2022). Digitalization technology helps create new job opportunities and supports economic growth (Korchagina et al., 2019; Savira & Fahmi, 2020; Mgadmi et al., 2021; Muafi et al., 2021; Sahut et al., 2021; Kasimov et al., 2021; Abeysinghe & Malik, 2021), but it also creates labor market fears and various inequalities (Qureshi, 2019; Yusuf, 2021; Bourguignon, 2022). Although previous studies showed persistent global digital inequality (Ho & Tseng, 2006), the positive impact could still be maximized to reduce the negative impact (Ferrari et al., 2022). Therefore, studies on reducing the negative impact could provide important information and policy implications for overcoming the rural digital technology gap (Nambisan, 2022; Navarro et al., 2020).

2. Literature Review

Recent literature suggests that the linkage function of digital technology transformation of entrepreneurship has motivated many family companies to innovate through their new business models (Soluk et al., 2021; Soluk & Kammerlander, 2021; King et al., 2022). However, this development has also resulted in multiple digital divides, disparities, disabilities, and inequalities in gender, age, and ethnicity globally and rural-urban regions (Kasimov et al., 2021). The theory of the potential for digitalization technology in rural entrepreneurship has highlighted the changes influencing entrepreneurial behavior. However, the existing theory is considered insufficient (Steininger et al., 2022). According to Steininger et al. (2022), there is no micro-economic data on the impact and policy measures in stimulating the creation and growth of digital entrepreneurship. Therefore, this gap necessitates studies on micro-economic fundamental data described in this paper.

Empirical studies have shown that rural digitalization has shaped various dynamic attitudes, behaviors, and abilities, though the opportunities for using digital technology are unchanged (Dewi et al., 2022). Rural entrepreneurship digitalization could alleviate extreme poverty and food insecurity for most small farmers worldwide (Sathya, 2019; Abeysinghe & Malik, 2021; Soluk et al., 2021; Mushi et al., 2022). Studies have shown that rural digitalization technology could fill the void of new institutional theories and promote entrepreneurship and micro-enterprises in India (Soluk et al., 2021). However, this technology is not sustainable in most developing countries due to inequalities between large and

small farmers (Mushi et al., 2022).

The digital technology of entrepreneurship is an essential element of the transition to a digital economy and a key factor in accelerating regional development (Korchagina et al., 2019). This means the role and function are a conceptualization of digital entrepreneurship and entrepreneurial technology (Giones & Brem, 2017). Giones & Brem (2017) and Nambisan (2017) identified entrepreneurial technology and digitalization, and entrepreneurship digital technology. Entrepreneurial technology is a basic concept well-established in academia (Giones & Brem, 2017). In contrast, entrepreneurial digitalization is the application of digital technology (Giones & Brem, 2017). Regarding Schumpeter's theoretical basis, digital technology in entrepreneurship is a transformation resulting from the socio-economic evolution through entrepreneurial innovation (Prasetyo et al., 2022; Hilbert, 2020). This study interpreted the digitalization of entrepreneurship as a revolution in the digital technology performance for sustainable entrepreneurship. Therefore, increasingly interesting future studies emphasize the importance of digital entrepreneurship (Kollmann et al., 2022).

Digital technology has spurred empirical progress in entrepreneurial strategy and innovation. It could increase collective economic action and the private worth of better public goods (George et al., 2021; George & Schillebeeckx, 2022). However, studies have shown that the understanding of digital technology should be broadened as socio-economic changes in individuals, organizations, ecosystems, and society. The comprehension should incorporate cross-level analyses, ideas, and concepts from various fields that explicitly recognize the role of digital technology (Nambisan, 2022). Transforming the traditional into a digital economy accelerates local and national economic growth in the European Union and the United States. This economic growth is driven by digital technology from MSMEs and entrepreneurship (Turuk, 2019). Subsequently, new business models in the era of digital transition and intelligent manufacturing should use innovative and creative ideas to maximize management efficiency (Liu et al., 2022).

The digital technology transformation makes business models more efficient, effective, and competitive (Turuk, 2019). This development has provided great opportunities and significant challenges of uncertainty for individuals, organizations, ecosystems, and societies (Nambisan, 2022). As a result of technological innovation, digital technology development has been considered a source of life and a survival mechanism in a sustainable competitive business world (Lokuge, 2021). Furthermore, the economic transformation resulting from digital technology helps accelerate local and national economic growth and is the main driver of MSMEs and entrepreneurship (Turuk, 2019).

Digital technology has changed the uncertainty inherent in the entrepreneurial production process and created many uncertainties and the dealing method (Nambisan, 2017, 2022). The transition process also shows enormous capacity in developing applications and sustainable solutions to overcome poverty and unemployment (Rosário et al., 2022). This technology drives sustainable circular

economic-social transformation and a multidimensional policy perspective to address the current digital inequality (Rosário et al., 2022). However, few studies have explored the negative impact of adopting economic digitalization technology, especially in rural areas. This implies a void in the new institutional theory and sustainable social entrepreneurship in applying digitalization technology in developing countries, such as Indonesia.

Family and community business support factors have helped overcome the vacuum of new institutional and entrepreneurial theories in rural areas in India (Soluk et al., 2021). Social factors and the family environment have also enabled rural entrepreneurs to use digital technology for business development. However, weak planning has hampered the development strategy of SME digitalization in rural areas (Dewi et al., 2022). The potential of technology may remain unrevealed and depends on socio-economic, political, cultural, and digital infrastructure. These conditions influence the performance of specific technologies and the potential interest of rural communities in new technologies (Vanlauwe et al., 2019). It implies that adopting digital technology is relevant for developing countries. However, previous studies found no evidence about the consequences of adopting digital technology (Nambisan, 2017, 2022).

Digital technology is increasingly facilitating new information and communication, allowing the creation of new, better economic networks (Niu, 2022). This convenience is caused by indirect effects or mediating powers, such as sustainable digital social and economic reforms (Niu, 2022). The theory of the information society evolution could become reinforcement in the digital economy and useful as the basis for this study. Consequently, the success of digitalization technology could be explored based on social innovation from the perspective of social network information theory. The theory states that entrepreneurial owners could use social networks to obtain more resources to become efficient, effective, and competitive and increase the digital success of sustainable entrepreneurship (Soltanifar et al., 2021).

Previous studies supporting this theory showed that entrepreneurs could obtain valuable resources through networks (Zhao & Aram, 1995). These networks have a significant positive relationship with business survival and growth (Watson, 2007). A previous study on the network theory used the role of digital technology as a moderator variable. It aimed to ensure that adopting digital technology is essential to success in today's dynamic entrepreneurial business (Ma & Chen, 2020). However, the negative side was not examined, making this study a novelty because new innovative business model concepts in local social entrepreneurship have specifications, uniqueness, rules, weaknesses, and strengths.

In social capital theory, the principal model of "*tuna satak bathi sanak*" is the key to unique and positive entrepreneurial competitiveness in promoting economic growth (Prasetyo et al., 2020). There is a significant positive relationship between social capital, entrepreneurial competitiveness, and economic growth (Prasetyo & Kistanti, 2020; Prasetyo et al., 2020). Schumpeter's economic growth model is shaped by technological innovation and new businesses or entrepre-

neurship. The consistent theory states that the relationship between innovation and technology is incidental (Callegari & Nybakk, 2022). In this case, new technologies and successful entrepreneurial business models replace the old ones. New industries due to digitalization technology also emerge and destroy old industries founded on traditional technologies. This means that an entrepreneur's motivation may not be fully consistent with a capitalist economy. Therefore, the success of digital technology activities requires a quality dimension of trust in social innovators with communities qualitatively different from monetary transactions (Steininger et al., 2022).

This study included the SSE transformation as a social innovation to complement the theory of capitalist socio-economic innovation by Schumpeter and Karl Mark. Social innovation could be produced in intra-entrepreneurship because its good concept could be achieved by human effort (Cavallaro, 2020). The theories of the capitalist socio-economic system of Schumpeter and Mark are socially oriented dynamic economic models but are more materialistic than the capitalist economic system. In contrast, the SSE model is more humanist and not merely materialist. The purpose of social innovation in SSE is to rise together to address emerging social needs. It serves as a new solution for mitigating social problems efficiently and effectively and promoting the achievement of the SDGs (Joel & Nel, 2021; Qureshi, 2021).

The digital social innovation (DSI) dimension lacks technological and social innovation (Qureshi, 2021). This suggests that different digital transformation levels could still influence the potential for social innovation. Socially transformative digital initiatives increasingly function as social technologies, supporting disparate knowledge relationships within diverse coalitions of actors (Certomà & Corsini, 2021). This problem could be overcome (Nagy & Somosi, 2022) using the Digital Economy and Society Index (DESI) and the Social Innovation Index (SII). Based on the index value, the economic and social digital transformation significantly and positively impacts social innovation capacity and provides implications and possible policy directions (Nagy & Somosi, 2022).

The policymakers should adapt their interventions institutionally and normatively, accompanied by social innovators (Johannson & Gabrielsson, 2021). Studies show significant policy changes during implementation (Johannson & Gabrielsson, 2021). This is because attitudes toward technological innovation determine organizational innovation, digital entrepreneurship, as well as environmental and social sustainability (Xiao & Su, 2022). However, this study considered Schumpeter's innovation theory a good starting point for analysis consistent with the objectives. In digital and non-digital entrepreneurship, there is a difference between innovative and incremental Schumpeterian (Steininger et al., 2022). According to Schumpeter, entrepreneurs lacking these characteristics are not entrepreneurs but managers that solve well-defined problems through planning (Steininger et al., 2022). Subsequently, this digital technology has disrupted and destroyed the existing market balance (Steininger et al., 2022).

The theoretical basis for Schumpeter's digital economic growth theory is useful in explaining the digitalization technology of sustainable rural entrepreneurship and inequality. Schumpeter's innovative entrepreneurship has changed in digital versus non-digital entrepreneurship. The path to disruption through social innovation may have also changed, though the fundamental characteristics and motivations remain the same (Steininger et al., 2022). Social innovation is a key element of social entrepreneurship used to solve public problems because they cannot be solved by institutional performance (Prasetyo et al., 2022; Joel & Nel, 2021; Qureshi, 2021). Therefore, it is interesting to examine the Neo-Schumpeter view of the optimistic bias regarding the relationship between technology, economy, and society. The focus is also on the technology's ability to ensure strong economic growth and social well-being (Weiss et al., 2021; Callegari & Nybakk, 2022). These strengths of Schumpeter's entrepreneurship contribute to changing the post-crisis environment. They could support or weaken the public's reaction to the crisis and define the path of institutionalization in defining a new normal (Callegari & Nybakk, 2022).

3. Metodology

Traditional assessment models of environmental sustainability are mostly affected by uncertainty (Cavallaro, 2020). For this reason, a case study was designed with exploratory sequential mixed methods. The method focused on directing the objectives in exploring and identifying the dual impact of digitalization technology on sustainable rural entrepreneurship and inequality. The aim was to find answers on how to reduce the negative impacts caused. Moreover, this mixed method was used to perform authenticity of context, measurement or control, and generalization through two stages. The first stage used the exploratory design method to examine the qualitative data. The second stage employed an explanatory design to describe quantitative information.

The experimental theory policy acceptance model (PAM) method was used to measure and analyze the behavioral change and awareness of entrepreneurial business actors and related policy institutions. This method reduced the risk of uncertainty in interpreting patterns of behavior that are invisible and cannot be generalized and standardized. In the initial stage, this study explored the key variables of the digitalization technology transformation in rural entrepreneurship (Creswell & Creswell, 2018). The sequential approach began with a qualitative phase by exploring entrepreneurial business behavior regarding digitalization technology in rural areas. This exploratory sequential mixed methods design integrates and synergizes data sources to explore the main problem and digital technology absorption in dynamic and complex rural areas (Creswell & Creswell, 2018; Poth & Munce, 2020; Munce et al., 2021; Dawadi et al., 2021).

Primary data were collected using questionnaires, semi-structured interviews, and ethnographic observations of rural entrepreneurs. The semi-structured tech-

nique followed (Bell et al., 2019). In line with the exploratory design, purposive and snowball sampling were used to analyze the primary quantitative data further. However, the variable of digitalization technology transformation on entrepreneurship could not be used in the next qualitative analysis stage. This necessitated the use of the exploratory design method in the second stage. The data in the first stage were analyzed, and the information was used in this manuscript and served as the basis for building the next quantitative stage. Quantitative data were collected using a simple random sampling technique for homogeneous respondents. However, the processing was still in the experimental model stage and could be used scientifically. These weaknesses were overcome using a systematic literature study approach to strengthen the analysis and increase the data validity and reliability (Weiss et al., 2020; Negri et al., 2021).

Figure 1 describes the general framework for this research. Before the urgency of negative impact mitigation research can be answered, the main research questions in this research are; what is the context of using digitalization technology for entrepreneurship in rural areas? This semi-structured interview and ethnographic research technique is intended to identify and study behavioral patterns of entrepreneurial socio-cultural realities and their interactions in related sample areas in the context of virtual utilization of entrepreneurial digitalization technology in rural areas. The source of reliability and validity of this research technique is based on the results of testing the instrument from the contents of the questionnaire that has been conducted on several respondents before this research was conducted. The results of the trial of the instrument have been declared valid and reliable and suitable to be used for representative and relevant primary data collection. This research method has limitations as a case study, so scientifically it is not possible to generalize all existing problems. However, what is interesting from this research is the uniqueness of the behavior patterns of people's real life in responding to technological advances, which basically is difficult to generalize.

Digitalization technology is an opportunity to enable an environmentally sustainable future in rural areas. Therefore, this study aimed to answer the problems where the operational definition of exploring new business model variables in this sustainable social entrepreneurship system followed (Davies & Chambers, 2018; Spieth et al., 2019; Gregori & Holzmann, 2021). The qualitative design was recommended to obtain a refined theoretical framework in the study of institutional logic (Reay & Jones, 2016; Shim et al., 2021). Furthermore, this exploratory

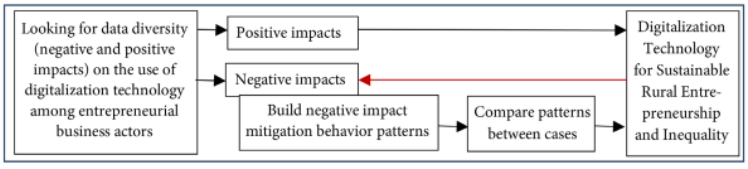

Figure 1. The process of digitalization technology circular economy research framework.

method followed a systematic approach that allows participation in the theoretical framework (Corley, 2015; Weiss et al., 2020; Shim et al., 2021). The next stage was to adopt a more responsible innovation approach because the baseline analysis requires a better understanding and anticipation of unknown impacts (Shim et al., 2021). The basic stages of this study framework help explain the problematization of digital transformation smoothly and better. They have been illustrated in various studies on the social theory of entrepreneurship and new institutional economics. A positive and negative impact identification approach was used further to support this understanding (Rijswijk et al., 2021). The data source on economic inequality and global policy institutions supported by the SDGs referred to (ElMassah & Mohieldin, 2020; Inna & Elena, 2021; Gupta & Rhyner, 2022). Therefore, this study method is expected to bridge the gap further and reduce uncertainty (Bathelt & Li, 2020).

4. Results and Discussion

Advances in digital technology have helped develop the economy of the sample rural communities. The digital technology transformation has entered the rural areas and has changed the pattern of economic behavior. Consumption, production, and sustainable business systems have transitioned from traditional to digital technology and the economy. In contrast, digital technology's unbalanced and less humane development has created greater inequality. Digital technology in rural development may have reduced inequality between rural and urban areas. However, this study did not focus on distinguishing the inequality between rural and urban areas.

The role of digital technology in rural economic development is creating new business opportunities and reducing unemployment and poverty. However, it has not reduced inequality, increasing the economic gap. Reducing unemployment, poverty, and income inequality are closely related to long-term quality economic development. According to economist Dudley Seers (1969), development occurs when a country does not experience poverty, inequality, and unemployment. Development cannot be declared successful when one or all three of these conditions worsen, even when per capita income increases. This implies that the digital technology transformation in rural areas creates economic inequality. Therefore, development is not successful and could threaten the achievement of the SDGs. Development transcends economic growth, as seen in Dudley Seers' emphasis on the need for socio-economic development as a central issue in development theory (Naylin, 2020).

There are indications that digital technology development does not respect human rights in the rural environment. The development focuses on sustainable economic inclusion by exploiting material wealth with its monetary dimension. The sustainable production results hardly consider aspects of social inclusion and are less humane, exacerbating the decline in the rural social capital environment. It means that the role of digital technology in rural areas is not the vi-

sion and mission of Indonesia's development. The existing digital transformation has not built the entire social community environment and the Indonesian people as a whole. Moreover, the development concept supports the expectations of economists Dudley Seers (1969) and Edgar Owens (1987). According to Edgar Owens (1987), the most important thing in human development not the development of things. Then, development is indicated by human development and not the development of something. This opinion is more consistent with Indonesia's development mission aimed at the people. Therefore, when development disrespect human rights and is less humanistic, success is declared a failure. This means that the development of sustainable rural digital technology remains questionable. It requires the capacity and quality of the relevant institutions to initiate mitigation and policies equitably.

From the history of economic thought, the paradigm could be stated as the twin issue of digital technology and inequality proposed by Freeman and Perez. They stated that inequality is the main social tension in every long wave and increases in the initial, installation, or discomfort phase. It declines this phase when production capital asserts control over financial capital during implementation. Stagnation is considered a turning point that occurs when there is speculation (Knell, 2021). The results are closely related to the policy strategy during the administrations of President SBY and President Jokowi with their triple and four-track strategy (Prasetyo & Kistanti, 2020; Prasetyo et al., 2021). The Indonesian government has realized that economic development reduces unemployment, poverty, and inequality in rural areas. However, the high figures mean the government must accelerate development in rural areas of Indonesia with Village-Owned Enterprises (BUMDes) programs. It should also develop internet network infrastructure, facilities, and software throughout the region and empower the community. However, the transformation requires active participation by all relevant parties as institutional actors by empowering, enabling, and protecting. The program's failure indicates weaknesses in the informal and formal implications and vacancies of the new institutional theory.

The government and the community have tried to reduce the negative impacts by adding internet network infrastructure to the village. However, this effort is unsuccessful because including a 5G network system increases inequality. The results showed a humanist social solidarity economic system (SSE) model that could reduce the impact of this inequality. The SSE system model is a relationship of social capital cohesion of a pluralistic society, implying symbiotic mutualism to achieve mutual prosperity. Additionally, it is a social innovation model useful in mitigating the negative impacts of rural digitalization technology. One form of the SSE system model is the principle of "*tuna satak bathi sanak*" (Prasetyo et al., 2020).

Promoting more humane digital and social technology innovations requires new business models for SSE transformation, such as social and green entrepreneurship, green technology or human capital, green economy, and the principle

of "tuna satak bathi sanak" (Prasetyo et al., 2022, 2020; Prasetyo & Kistanti, 2020; Esteves et al., 2021; Makarovič, 2022; Pangarso et al., 2022).

In this case, developing sustainable rural digital technology requires dynamic new business transformations that mitigate social problems better. These transformations should also promote a more effective and efficient human-economic, cultural, and ecological work ethic system. Although the revolution in developing digital technology in rural areas is unavoidable, its negative impact should be reduced. One of the new institutional systems that could reduce these negative impacts is the SSE business model based on the potential of local community wisdom.

The SSE business model creates the value of new technological innovations in supporting sustainable rural development. The long-term implementation could boost the achievement of the SDGs targets by creating viable and humane new business opportunities to reduce poverty, unemployment, and inequality. Furthermore, the SSE model is expected to complement the standard capitalist socio-economic system model from Schumpeter, Karl Mark, and Max Weber. This result supports previous studies, which found that the experience and success of local capacity in SSE transformation could strengthen the implementation of SDGs goals (Esteves et al., 2021). According to Esteves et al. (2021), SSE is an approach to producing and consuming goods, services, and knowledge to address contemporary economic, social, and environmental crises more effectively.

There is a need to apply the principles of the local wisdom's potential in the SSE model. This is because developing the digital economy through the increased use of platforms based on financial inclusion alone as a new business model for providing goods and services is less humane and creates social disruption and inequality. This dimension is also growing dynamically and is increasingly complex, challenging the quality and capability of public policy institutions for national and global development. The development of new 5G networks is making the convergence of information technology and could run faster than the capabilities of public institutions. Therefore, a new 5G network widens the inequality in rural areas when not followed by the awareness and capacity of human capital.

This necessitates regulation, policy implications, and the integration and collaboration of all related elements. There is also a need for wider investment in related digital technology infrastructure. Another essential requirement is the quality and capacity of a new and more focused institutional structure that works hard and smart in rural areas. This result supports previous studies that promoting a sustainable entrepreneurial business needs integration and collaboration of various related elements and higher quality institutional structure and performance to strengthen the new entrepreneurship model (Rosário et al., 2022; Prasetyo et al., 2021, 2022; Prasetyo & Dzaki, 2020; Negri et al., 2021). However, the existing institutional structure prefers the old unsustainable business and system rather than using newer technologies. This requires digital entrepreneurs to start their informal institutional changes (Rosário et al., 2022). Therefore,

good policy implications and a firm framework are needed to integrate the important functions of digital technology most relevant to the circular economy strategy (Liu et al., 2022).

The framework is needed in a circular economy because it promotes the achievement of the SDGs as follows;

1) Digital transformation provides quality digitalization connectivity to entrepreneurial household business actors in rural areas in production, consumption, market, and product growth systems.

2) Impact on total entrepreneurial productivity. Regulation, infrastructure investment, institutional quality, and capacity increase positive externalities and humane income growth of rural communities.

3) Impact on developments in new business sectors related to local wisdom and cultural principles, increasing the community productivity.

Digital technology in rural areas is not realized, especially in increasing the total capacity of high business productivity. In the early stages, the technology has caused inconvenience and increased inequality between individuals and rural family business groups. Although its existence could provide decent job opportunities and support regional economic growth, it has not reduced income inequality. Therefore, digitalization technology only increases pseudo-rural economic growth but cannot reduce unemployment, poverty, and inequality. The result reinforces previous studies that regional economic growth rates depend on inequality and are negatively related to inequality in neighboring regions (Panzera & Postiglione, 2022). This is consistent with the optimistic bias statement about the role of digitalization technology in rural areas on welfare (Callegari & Nybakk, 2022). Therefore, the phenomenon of optimistic bias is closely related to the twin issue paradigm of multiple digital inequalities (Kasimov et al., 2021).

The increasingly interesting optimistic bias occurs when digital technology creates new job opportunities. Initially, digital technology quickly leads to creative destruction in rural areas, and the resulting new unemployment exceeds the job opportunities created. Unemployment occurs when development is always faster than human resource capacity. This occurs due to the accumulated impact of digital technology disruption because the community's capacity is late in utilizing the new technology. Therefore, Schumpeter's theory of human capital capacity development is still valid (Prasetyo, 2020; Prasetyo & Kistanti, 2020). This gap is increasingly clear when the existing institutional performance capacity cannot quickly adapt to the digital technology development revolution. In line with this, some institutional actors may be reluctant to change (Rosário et al., 2022; Prasetyo et al., 2022; Prasetyo & Dzaki, 2020) because the existing institutions feel comfortable.

This study also identified several determinants that increase inequality, including the ability to absorb digital technology, digital platforms, and the digital infrastructure. Though with an insignificant positive impact, the government has made efforts to develop internet network infrastructure and software and empower digital literacy communities during the COVID-19 pandemic. According

to a previous study, the modern understanding of digital inequality is not much related to internet access infrastructure. It is more related to the technology absorption capacity of human resources as users apply digital technology to improve their lives (Inna & Elena, 2021). As users, people become the main driving transformation agents when they have the technology absorption power to act (Govindharaj, 2021; Prasetyo, 2020).

The internet infrastructure and software are unchanged, but with no guarantee that they would run effectively and efficiently according to plan. This is due to slow awareness and empowerment of digital literacy communities. The weaknesses enlarge the gap in the absorption capacity of digital technology in rural areas. Although digital literacy may increase, the new business model with SSE transformation may not run smoothly. Understanding and applying SSE's new business model requires collaboration and integration of extra awareness, as well as a long process and time. In most cases, the increase in literacy and the use of digital technology is seen in playing games and on social media. Very few rural communities quickly and consciously utilize this technology for their new business needs. Furthermore, most utilization is as a means of online shopping to fulfill consumer needs and not for production facilities. This implies no significant positive impact on the increase in total productivity. In contrast, a few rural people that have mastered the absorption of digital technology grow rapidly, leaving many others behind and enlarging the existing inequality. In the current digitalization era, family businesses cannot compete with those able to adopt the new system.

The human and institutional resource capacity should be increased through digitalization-based social entrepreneurship education and training integrated with digital literacy awareness. In this case, a digital-based education and training model is useful as a future business model (Fodranová & Antalová, 2021; Hansen, 2022). When the workforce's education and skills do not match the basic digital requirements, it increases the economic model with high unemployment (Fodranová & Antalová, 2021). This implies that digital-based social entrepreneurship education and training are important to increase total effectiveness and productivity and reduce unemployment (Padilla-Vento, 2021). Therefore, rural economic fundamentals (FE) could help develop more efficient regions (Reynolds et al., 2022). This model could be operationalized as an ethnography-based institutional policy with socio-economic outcomes for underdeveloped areas (Reynolds et al., 2022).

When this digitalization technology only increases pseudo-rural economic growth without reducing inequality, poverty, and unemployment in rural areas, it supports the optimistic bias statement (Callegari & Nybakk, 2022). Therefore, there is a need for a new entrepreneurial economic approach with the SSE model of social innovation transformation system based on the potential of local community wisdom. The new model could be applied in conjunction with digital technology in sustainable villages to mitigate poverty, unemployment, and inequality and increase productivity. The SSE model of social innovation could fill

the void of social entrepreneurship theory because it is humanist and different from the established materialistic capitalist socio-economic model. Then, social innovation in rural areas is not about changing a regime. Conversely, it is about how different social innovations could develop together in pluralism that benefits the community (Slee & Polman, 2021).

5. Conclusion

The digital technology transformation has increasingly dynamic and complex positive and negative impacts. Evaluating its success in sustainable development is insufficient and requires further investigation globally. Digitalization technology in rural areas creates business and decent work opportunities and supports economic growth. However, it has disrupted well-being by increasing income inequality between families and individuals. In the initial phase, technology increases unemployment faster than creating new job opportunities.

The increasing inequality of digitalization in rural areas is consistent with the sustainability of its positive impacts. However, this inequality could be slightly reduced by the new SSE transformation system model based on the potential of local wisdom of the local humanist community. This is because the models' traditional transformation function is a strategy to increase decent work opportunities and mitigate inequality. The SSE transformation system model slightly differs from the socio-economic concept of the Schumpeter and Karl-Mark models. A family social entrepreneur's motivation and basic personal attitude in the SEE model may not fully support the established capitalist socio-economic system. Besides the positive and negative impacts, digitalization technology towards a digital economy should continue running to reduce the negative impacts.

The capitalist socio-economic theory with monetary dimensions, such as the corporate social responsibility model, cannot reduce inequality in a humanistic and fair manner. Integrating digitalization technology into SEE transformation based on local wisdom and social entrepreneurship potential could mitigate inequality. However, the SSE concept is difficult to generalize because it is measured differently by communities. This measurement depends on the termination of the potential of the local wisdom and the diversity of its socio-cultural system. Furthermore, the relationship between innovation and cultural diversity of productive entrepreneurship and institutional strengthening in family businesses is becoming increasingly interesting to continue to study. This necessitates prioritizing the need for public digital security policies to manage and mitigate the main risks of digital entrepreneurship. Therefore, this study is expected to fill the void in the new institutional theory and socio-cultural entrepreneurship literature.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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