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Panel Report

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A Global Perspective of Rural Innovation and Entrepreneurship in the Digital Era: A Panel Report

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Abstract:

Rural communities play a significant role in terms of agriculture, climate change, ecological balance, tourism, and indigenous cultures. However, traditionally, rural communities underperform in innovations and entrepreneurship, largely due to the lack of resources, infrastructure and various inhibiting cultural and political factors. With the advent of digital technologies, rural communities have received unique opportunities to engage in innovation and entrepreneurial activities that are affordable, easy-to-use, easy-to-learn, and easy-to-implement – bypassing some of the inherent challenges indigenous to rural areas. Considering the importance of this timely topic, a panel was conducted at the Pacific Asian Conference on Information Systems (PACIS) in Dubai in 2021. The objective of this panel was to initiate a much-needed conversation regarding rural innovation and entrepreneurship in the digital era and motivate academics, particularly information systems researchers, to conduct research to understand the role of digital technology in rural innovation and entrepreneurship. The panel report provides an overarching framework, that is based on socio-materialism, to guide future research in this emerging area of studies.

Keywords: Rural, Innovation, Entrepreneurship, Digital Technology, Global Perspective.

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1 Introduction

The advent of the digital economy has created a discrepancy in terms of economic development between the rural and urban sectors (Singh, 2010). Due to the lack of access to resources, rural areas across the globe experience a brain drain and population loss, introducing several challenges for economic development and impacting the overall economic conditions of rural areas (Liu, 2022). While the term and the context of 'rural' may be perceived differently from continent to continent, rural communities across the globe are commonly burdened with challenges of basic living conditions of sanitation, housing, employment, low level of economic development, and education (Pato & Teixeira, 2016). To aggravate this disparity, the traditional capital investments by governments and the private sector remain highly skewed towards urban areas, leaving rural areas with much less access to resources for innovation and entrepreneurship (Baumgartner et al., 2013). Furthermore, inadequate infrastructure, low literacy, low density populations, and the sheer distance from metropolitan areas (Li et al., 2019; Lokuge, 2021) have created fundamental barriers for rural communities to innovate. However, rural communities play a significant role in areas such as agriculture, climate change, ecological balance, tourism, and indigenous cultures. For example, much of the arable land in the world is geographically classified as rural (Verburg et al., 2010).

The advent of social media, mobile technologies, analytics, cloud computing, and the internet-of-things (also known as SMACIoT) is changing the very nature of the socio-economic landscape and purport to provide unprecedented opportunities, especially for organizations with low access to resources (Nylén & Holmström, 2015; Sedera et al., 2016). These technologies, commonly referred to as digital technologies, are ubiquitous, affordable, easy-to-use, and accessible despite the geographical location (Lokuge et al., 2019). As such, many argue that such value propositions of digital technologies are much more pronounced for the rural communities, and there is emerging evidence that these technologies are enabling entrepreneurship and innovations in rural areas (Gaddefors & Anderson, 2019; Tim et al., 2018). As such, the application of digital technologies is contributing to minimizing the digital divide (Wang et al., 2023). Such evidence does not just pertain to rural areas of developed countries but is common to developing countries too. Especially, following the guidelines of the World Bank country overview, developing countries like India, Kenya, and Romania have demonstrated substantial growth in technologydriven entrepreneurship and innovations (Giri et al., 2023; Ionascu et al., 2023). As such, governments around the world are keen to provide rural communities with access to digital technologies to facilitate new employment opportunities and skill development, social inclusion and democracy, food security through better agricultural practices, sustainability, and overall productivity improvements (Kathuria et al., 2018; Lokuge, 2021; Newbery et al., 2017).

While information systems (IS) researchers have examined the applications of digital technologies in emerging economies (Karanasios & Slavova, 2019), rurality' has been rarely discussed in the IS discipline. In particular Information and Communication Technologies for Development (ICT4D) focuses on the application of ICT for development in low-and-middle-income countries (Chipidza & Leidner, 2019). However, the term rurality has an abundance of contextual complexities. As such, rural innovation and entrepreneurship are likely to follow idiosyncratic processes, form unique patterns, and face distinct challenges from their metropolitan counterparts. As per Pato and Teixeira (2021), the focus on metropolitan and urban areas, and the assumption that entrepreneurship and innovation follow similar patterns in rural areas seem to imply the absence of efficient support mechanisms for rural entrepreneurship and innovation." Further, Pato and Teixeira (2021) argue that the application of general theoretical frameworks cannot be utilized to explain rural innovation and entrepreneurship and, thus, cannot inform policies at the regional or national levels. As per Newbery et al. (2017), examining rural innovation and entrepreneurship will not only add value to academia, but it will add value to the practitioners such as policymakers, rural communities, entrepreneurs, and not-for-profit organizations as well. Investigating such timely and relevant topics will ultimately assist rural communities in alleviating poverty, empowering women, improving economic conditions, and minimizing power disparities. Moreover, a global viewpoint of rural digital innovation and entrepreneurship will provide consensus on shared challenges and encouragement on kindred opportunities.

Considering the aforementioned background, a panel titled "A Global Panel on Rural Innovation and Entrepreneurship in the Digital Era" was formed to explore the global perspective of rural entrepreneurship and innovation in the digital era. The key objectives of the panel were to: (i) provide a global perspective of the rural innovation and entrepreneurship opportunities using digital technologies at individual,

organizational, country, and community-level, (ii) provide further opportunities for IS researchers to consolidate research through theoretical foundations, and (iii) invigorate a conversation on this highly important yet rarely discussed topic and provide future research directions for IS researchers. As such, the panel report is aimed at academics who have a vested interest in understanding the role of digital technology in rural innovation and entrepreneurship.

The panel focused on the overarching question of 'what is the global perspective of rural innovation and entrepreneurship in the digital era?' It allowed the panel to share their specific geographical examples from various parts of the world, where the fundamentals of digital technologies have challenged the traditional equation of innovation. The panel also made observations of such rural innovations and entrepreneurship that successfully applied digital technologies promoting the extension of such applications. This allowed the panel to explore the following research questions for the benefit of future research:

- (i) How do digital technologies provide an edge for rural innovation and entrepreneurship? therein, the panel highlighted the role of digital technologies, as compared to the traditional technologies, in giving rise to rural innovation and entrepreneurship.
- (ii) Whether developing and developed countries have varying objectives/patterns on how digital technologies are employed in rural innovation and entrepreneurship initiatives?
- (iii) What are future research areas in relation to rural innovation and entrepreneurship in the digital era?

This panel report is derived based on a panel discussion conducted in 2021 at the Pacific Asian Conference on Information Systems (PACIS). The panel provided the much-needed ignition for understanding the contemporary landscape and future directions for rural innovation and entrepreneurship in the digital era. In this paper, we provide a summary of the panel discussion and provide a framework that assists IS researchers in continuing future research on this valuable topic. Darshana Sedera (Southern Cross University, Australia) chaired and moderated the panel, while Abhishek Kathuria (Indian School of Business, India), Sachithra Lokuge (University of Southern Queensland, Australia), Robin Stonecash (Southern Cross University, Australia), Suchit Ahuja (Concordia University, Canada), and Daniel Agyapong (University of Cape Coast, Ghana) took part as panelists discussing a global view of rural innovation and entrepreneurship in the digital era.

This paper proceeds as follows, in Section 2, we provide an overview of rural innovation and entrepreneurship and highlight the current understanding of the topic as presented by Darshana Sedera. In Section 3, we highlight what Abhishek Kathuria discussed from an Asian perspective and examples of how technologies have initiated rural innovation and entrepreneurship in the Asian region. Section 4 focuses on the discussion of Robin Stonecash on the Oceania perspective while Section 5 and Section 6 focus on the African (presented by Daniel Agyapong) and the North American perspective (presented by Suchit Ahuja), respectively. Section 7 provides a conversation on the current theoretical understanding of rural innovation and entrepreneurship in the IS discipline presented by Sachithra Lokuge. In Section 8, we collate these discussions and provide a theoretical perspective for future researchers to further study this dormant area of study.

2 An Overview of Rural Innovation and Entrepreneurship in the Digital Era

This section provides an overview of rural innovation and entrepreneurship that Dr. Sedera presented during the panel. He highlighted that for any institute (i.e., organization, country, or continent) innovation and entrepreneurship are considered as the engine that triggers economic development as they provide pathways for obtaining new ideas, techniques, and solutions for common problems (Rousseau et al., 2016). Similarly, for rural and regional areas too, innovation and entrepreneurship provide a pathway to solve existing problems and create new opportunities to enhance the livelihood of rural communities (Chen et al., 2022). With the recent volatility caused by the pandemic and the adverse climate changes, rural communities are facing a myriad of social and economic problems (Mulrooney et al., 2023). As per the United Nations report, currently, the global rural population is approximately 3.4 billion and is expected to increase slightly (United Nations, 2022). Before discussing rural innovation and entrepreneurship, it is important to provide some clarity around the concept of rurality. Rurality is associated with heterogeneous economic structures, low-income earners, socially disadvantaged dwellers, unstable government

institutions, weak and unstable economic institutions, low networking and access to resources, and limited skills and knowledge regarding business and technologies (Beckmann et al., 2021; Ernst, 2002; Mulrooney et al., 2023). As such, rurality is considered a complex, multidimensional concept that requires us to consider geographical, economic, cultural, and social dimensions when studying this phenomenon (Singh & Bhowmick, 2015). As per Nelson et al. (2021) defining and identifying measures of rurality helps policymakers, researchers, and communities understand the different facets and implications of rurality. When considering the existing discourse on rurality, the definition is often determined by the dichotomy of rural and urban (Nelson et al., 2021). Rurality is determined through factors such as population size and density, access to resources, agricultural production and land use, and economic measures (Nelson et al., 2021). However, with the advancements in technology and the increase in urbanization, rurality has seen a new light.

In recent times, with the advent of digital technologies rural and regional institutes have received opportunities similar to all organizations across the globe (Ab Wahid & Aziidah Zulkifli, 2021; Trendov et al., 2019). Digital technologies such as mobile technologies, artificial intelligence, internet-of-things, blockchain, analytics, and social media are revolutionizing the very nature of rural communities (Trendov et al., 2019). The innate characteristics of such technologies such as ease-of-use, cost efficiency, ease-of-acquisition, ease-of-learning, ease-of-implementation, and ease-of-management have increased the adoption of these technologies among rural communities (Cui et al., 2019; Dobson et al., 2013). As a result of such interventions, rural communities have initiated innovation and entrepreneurial activities in rural areas (Lokuge, 2021; Lokuge & Sedera, 2020). Thus, such innovative and entrepreneurial activities have paved the pathway for alleviating poverty, minimizing the digital divide, empowering women in rural areas, and thereby improving the economic conditions of rural communities (Baumgartner et al., 2013; Beckmann et al., 2021).

The study of rural entrepreneurship and innovation is vastly different from that of urban-focused entrepreneurship and innovation (Mulrooney et al., 2023). Prior studies highlight that rurality is challenged by several social, economic, and geographic aspects (Dabson, 2005; Stathopoulou et al., 2004). As per Cloke (2006), rurality goes hand in hand with agricultural activities. Newbery et al. (2017) suggest that the rurality concept should be investigated considering contextual factors such as resourcefulness (capacity) (Roberts et al., 2017), proximity (Liu, 2022), development disparities (Pato & Teixeira, 2021), and inequality (Pato, 2015). Trendov et al. (2019) concur with Newbery et al. (2017) and highlight that rural innovation and entrepreneurship are key catalysts in accelerating economic conditions in rural communities that create new job opportunities and enhance the livelihoods of rural communities. While urban innovation resonates with an abundance of resources, leadership, and expertise (Kohli & Melville, 2019; Lokuge et al., 2019; Scott & Bruce, 1994; Zand, 2011), it is interesting to further study the nuance of rural innovation and entrepreneurship in the digital era.

2.1 Rural Innovation

Innovation is a commonly discussed topic in academia due to its importance and interrelatedness to our day-to-day lives. As per Zaltman et al. (1977), innovation can be defined as an idea, practice, or an artefact perceived to be new by the relevant unit of adoption. Considering this, when rural innovation is defined, scholars follow the same definition but have added the rural context to it. For example, Sonne (2010) defined rural innovation as the creation and implementation of new ideas and/or solutions perceived as new to the rural context. Further, as per (Mahroum et al., 2007, p. 6), rural innovation is defined as "the introduction of something new (a novel change) to economic or social life in rural areas, which adds new economic or social value to rural life." Since the only addition to the conceptualization of rural innovation is the rural context that it formulates, rural innovation can be extended to capture widely classified typologies of innovation such as product and process innovation, technical and administrative innovation, and modular innovation (Damanpour, 1988; Yoo et al., 2010). In addition, considering the temporal nature and the characteristics of innovation, rural innovation can be characterized as incremental, radical, and disruptive (Damanpour, 1991). However, as per Pato (2015), rural innovation has not been studied fully and can be extended to add value for academics and practitioners.

Rural innovation is a multidimensional concept that encapsulates "geographical, economic, cultural, and social circumstance of the rural sector" (Singh & Bhowmick, 2015, p. 808). As such, innovation in the rural context is inherently challenged by several contextual factors. For example, resource availability, knowledge and expertise, financial support, innovation-favoring culture are innately absent in the rural context. Thus, the absence of such innovation catalysts debilitates innovation opportunities. However, in

recent times the advent of digital technologies has provided opportunities for rural communities to innovate. With this surge, we see several success stories of rural innovation stemming around the globe. Agricultural innovation resonates more with academia when focusing on rural innovation (Leeuwis, 2013). Similarly, lifestyle innovations such as tourism innovation are receiving the attention of academics (Brouder, 2012). In addition, rural innovation has expanded its dominance in social innovation context with the advancement of digital technologies. This highlights immense opportunities and pathways for rural communities to solve their common business and social problems (Chen et al., 2022). While we see commonalities between innovation in general and rural innovation, considering the contextual factors of rurality such as population size and density, access to resources, agricultural production, land use, and economic measures the distinctions between the two outweigh the similarities.

2.2 Rural Entrepreneurship

Entrepreneurship stems from exploiting opportunities and acting as economic agents that thrive in financial gains (Nambisan et al., 2019). Such definitions are challenged considering the very nature of rural entrepreneurship. Whether it is in a developing country setting or in a developed country, the notion of rurality has its own unique characteristics. In a rural area, entrepreneurship is inherently challenged due to proximity, inability to access support networks, limited infrastructure, and limited demand from the local market (Dabson, 2005; Fortunato, 2014). However, as per Belloc et al. (2022), the rate of self-employment in rural areas is outgrowing the rate in urban areas. The rural communities have identified the low-cost. high impact opportunities available through rural entrepreneurship endeavors (Fortunato, 2014). Rural entrepreneurship is defined by Korsgaard et al. (2015, p. 6) following Kalantaridis and Bika (2006) as "all forms of entrepreneurship that take place in areas characterized by large open spaces and small population settlements relative to the national context." In such a definition the diversity of rural entrepreneurial activities is not considered, and it fails to capture the social, economic, and cultural disadvantages to the rural community in the entrepreneurial process (Korsgaard et al., 2015). There are several unique challenges faced by rural entrepreneurs as compared to entrepreneurs in urban areas. For example, the remote nature of the rural areas inherently possesses accessibility issues to infrastructure, resource networks, expertise, low population, and possibly limited demand from the local market (Fortunato, 2014). The lack of accessibility to resources includes better education options, as such, rural communities often lack skill levels required for new ventures. In addition, entrepreneurship thrives when there is financial support, investment, and incubators available. However, in most of the rural areas, rurality goes hand in hand with poverty. As such, rural entrepreneurship is inherently challenged and requires further investigation.

Even though entrepreneurship deals with uncertainty, as per Nambisan (2017, p. 1029), "digital technologies have transformed the nature of uncertainty inherent in entrepreneurial processes and outcomes." The innate characteristics of digital technologies are transforming the social, economic, and cultural formula of entrepreneurship in rural areas. Similar to rural innovation, rural entrepreneurship too is distinct from common entrepreneurship. For example, rather than profit-driven philosophy, rural entrepreneurship thrives in enhancing the livelihood of rural communities (i.e., women entrepreneurship) (Pato, 2015), lifestyle (i.e., tourism entrepreneurship) (Dias & Silva, 2021), and social standards (i.e., social entrepreneurship) (Tien et al., 2019). Prior IS studies have focused on entrepreneurship in the contexts of developing countries (Leong, Pan, Zhu, et al., 2016; Leong et al., 2017) but rarely examined how entrepreneurs in rural areas utilize digital technologies in their entrepreneurial endeavors. Therefore, it is important to study rural entrepreneurship in the digital era as it adds value to both academics as well as society.

The sections below highlight examples of rural innovation and entrepreneurship using digital technologies, unique challenges, and opportunities in different contexts (i.e., continents).

3 Asian Perspective

Asia presents numerous challenges and opportunities for rural innovation and entrepreneurship in the digital era. From the technology and manufacturing hubs of China and South Korea to the growing consumer markets of India and Southeast Asia, the opportunities in Asia are diverse and vast. With increasing access to digital technologies and the Internet, consumers in rural areas of the Asian continent now have greater potential to participate in the global economy and improve their standards of living. Digital tools and platforms provide a level playing field for entrepreneurs to innovate, start new businesses, and reach new markets, creating opportunities for growth and development in Asia's rural

areas (Beckmann et al., 2021). While the scale and vastness of the Asian continent, which stretches from the Far East to the Middle East, this section focuses on India as an example relating the opportunities and challenges for rural innovation and entrepreneurship in the digital era. India was selected as the example to represent Asia, to provide a middle ground to the extent of challenges and opportunities in the Asian continent. Dr Kathuria, who has substantial experience in conducting research in Asia, led this discussion.

3.1 Unique Challenges and Opportunities in the Asian Region – The Indian Context

Rural India itself is a massive undertaking, demonstrated by its vastness, productivity, and diversity. With an enormous population of nine hundred million, rural India is a growing and vast segment of the nation. However, despite contributing to about seventy percent of the national workforce, rural India contributes to only forty percent of the national GDP, reflecting its low productivity. Furthermore, rural India is characterized by its rich diversity. The country spans about six hundred sixty-five thousand villages and uses about one hundred twenty-two major languages and sixteen hundred other languages and dialects spoken in this region. Broadly, these issues of vastness, productivity, and diversity abound across not only in rural India, but all over Asia. This poses unique challenges and opportunities for increasing productivity and for achieving sustainability development goals (SDGs).

There are three key challenges facing rural India. First, the dearth of physical, digital, and financial connectivity has made the region disconnected from the semi-urban and urban areas of the nation. This includes a lack of regular and reliable public transportation and digital networks connecting rural areas, as well as the prevalence of un-banked areas where residents do not have access to credit. Second, there is a lack of large-scale skill-development including business, technological, and livelihood skills in rural India. For example, skills pertinent for farmers in rural India would include information on farming techniques, seed variety, or seasonality of different crops. Third, there are a variety of social challenges that are embedded in the local culture that prevent growth in the region. These social challenges are disparities rooted not only in gender, caste, and religion but also include historical poverty and power divisions. Such similar issues and challenges are prevalent, albeit with local differences, across most of South and South-East Asia.

A lack of addressing these challenges results in an ongoing downward propagation of social and financial exclusion of rural areas from urban areas. While technology-driven changes bring benefits to urban areas, rural areas are left behind which further increases the urban-rural divide and exacerbates these circles of exclusion. This leads to mass temporary migration where rural citizens travel to urban areas in search of jobs but return home whenever they are unemployed. For example, there is a large reverse migration during Chinese New Year where workers employed in factories in cities return to their villages during the first wave of COVID-19 in India, migrant workers native to rural India were forced to return to their villages due to the nationwide lockdown. Hence, there is a need to generate sustainable year-long employment opportunities within the context and location of rural communities. This includes leveraging digital innovation and digital technologies to create employment in rural contexts. Doing so implies immense opportunities for entrepreneurs and start-ups to make a meaningful impact. In particular, these entrepreneurs can become profitable while solving challenges by improving the lives, livelihoods, and societal well-being of the denizens of rural India (and Asia), while also reducing social disparities and closing circles of exclusion.

While discussing the potential of minimizing the disparities in urban vs. rural and bridging the digital divide, several examples from rural India that contributed to achieving this can be highlighted. For example, recently, as reported in World Economic Forum, in order to minimize the digital divide and increase the digital literacy of children in rural areas, a project was initiated to teach the daycare workers in rural India to promote the use of smartphones and the internet to pass on this knowledge to young kids (Gupta & Sachdeva, 2023). This application of digital technologies is a great example that contributes to democratizing education and initiating a digital literacy revolution in rural India (Gupta & Sachdeva, 2023). The application of digital technologies has been used to democratize information, educate, increase the reach, and thereby promote digital literacy and minimize the digital divide. Another notable example is the use of social media and mobile technologies for promoting women's empowerment, women's leadership, and women's entrepreneurship in a rural village in Andra Pradesh named Paalaguttapalle. During 2010-2015 Paalaguttapalle village was severely impacted due to droughts. A woman residing in this rural village named Aparna Krishnan formed a small group of women to sew cotton bags and via social media, she promoted these cotton bags. This group of local, rural women sourced orders through WhatsApp and

delivered more than 50,000 cotton bags (Balakrishnan, 2023). Such empowering case studies highlight the positive role of digital technologies in leveraging rural innovation and entrepreneurship in India.



Figure 1. Paalaguttapalle Tote Bags (Source: Paalaguttapalle Facebook)

3.2 Rural Entrepreneurship Opportunities in Rural Asia

While many challenges exist in rural contexts, such challenges give rise to many opportunities for startups to address. These can range from improving connectivity, improving market access, developing, and supplementing skills, and providing access to finance. Other opportunities also abound; however, we focus on these specific exemplars.

There are many opportunities for entrepreneurs to improve connectivity across physical and digital dimensions in rural communities. An example from the rest of Asia is Alodokter, a digital health platform based in Indonesia that provides a range of telemedicine facilities ranging from access to general practitioners and specialists, medicine purchase through e-pharmacy, to providing affordable insurance packages (Harahap et al., 2022). Such an initiative through digital technologies extends the reach and access to such quality services for rural communities. Rather than waiting for expensive infrastructures to be built in rural regions, digital technologies have offered an alternative, convenient pathway to serve rural communities. In India, Swajal is IoT enabled water-tech impact start-up that aims to provide access to clean drinking water in remote villages across the country (Pandey et al., 2023). Such entrepreneurial ventures have successfully leveraged digital innovations to make necessities, such as healthcare and clean water, accessible and affordable to millions of users spread across rural communities in Indonesia, India, and the rest of Asia.



Figure 2. Swajal IoT Based Water Tech Company (Source:)

Another key entrepreneurial opportunity lies in improving access to markets. For instance, Indian start-ups such as AgriBazaar, CroFarm, and Fasal leverage digital technologies to bring farmers closer to wholesale markets or end consumers. This includes providing a range of services such as creating an online marketplace, connecting farmers to businesses, providing information on warehousing, as well as using IoT technologies to gather farm-level data to enable farmers to make data-driven decisions.

Moreover, there is a rise in Farm-to-Table entrepreneurial ventures that connect produce from the farmers directly to end consumers and restaurants. Such democratization of information among rural communities is achieved through digital technologies. Other key venture opportunities lie in bringing handicraft artisans closer to the end customer. For example, Lal10 is an online B2B e-commerce platform that connects India's rural and semi-urban artisans and micro, small, and medium enterprises to international retailers (Darwin et al., 2018). Not only does this empower local artisanal craft but also contributes to increasing India's share in global exports.

There has also been a rise in entrepreneurial ventures that develop and supplement the skills of workers in rural communities. For instance, this includes leveraging a combination of technologies such as IoT, micro-satellites, and artificial intelligence through Software-as-a-Service (SaaS) channel to handhold the complete lifecycle for farm management. Furthermore, there is a rise in start-ups such as Arya Collateral that provide access to micro-loans for farmers (Jammanahalli Mahesh, 2022). Doing so enables farmers to purchase raw materials such as seeds and technologies, making them financially independent.

4 Oceania Perspective

Dr Stonecash led the discussion on rural innovation and entrepreneurship, bringing examples from the Oceanic region. With extensive experience working with agribusinesses in rural Australia, Dr Stonecash highlighted the opportunities that Australian businesses have claimed using digital technologies. At the same time, she demonstrated, despite the perceived richness in resources, Australian rural areas still are challenged with some of the fundamental limitations of rural demographic and geographic limitations.

In Australia alone, it is stated that approximately sixty-seven percent of the value of Australia's exports originates from regional, rural, and remote areas (Rural Health, 2021). Australia has a well-developed and productive agricultural sector. For example, In the year 2021-2022, the gross value of agricultural output Wheat alone was \$13.1 billion, up 33% from 2020-2021 (Australian Bureau of Statistics, 2022). In addition, the agricultural sector is in the top 3 export earners for the country (Reserve Bank of Australia, 2022). The workforce in this region, especially Australia is educated, with 45% having a certificate, diploma, or bachelor's degree or higher education (Australian Bureau of Agriculture, Resources and Economics (ABARES) in 2016-2017 found that 96% of farmers owned and used ICT assets. Out of this, ninety-five percent were connected to the Internet. The biggest users of technology were in the grain sector and in vegetables. They further found that global positioning systems (GPS) are used on grain farms and electronic identification and herd management technologies are used in livestock production (Australian Government, 2022a).

Despite this high level of productivity, there are several challenges in this region for digital technology use and value creation. Australia's land mass is approximately the same as the contiguous United States but with a population of about 1/13th of the United States. The population in Australia is concentrated mostly along the Eastern seaboard, with some population along the western coast. Agricultural production occurs close to the coast but is found more in the inland of the country. This has implications for connectivity and labor, both of which are in short supply. The National Farmers Federation estimates that there was a shortage of 172,000 workers in agriculture and food services in 2022 (National Farmers Federation, 2022). In addition, in 2020, the Australian government acknowledged that there was a significant lack of mobile phone coverage in large parts of the country (Infrastructure Australia, 2022). This lack of connectivity has implications both for agricultural productivity and the health of those living in regions.

When analyzing the existing reports, it is evident that farmers in Australia face three concerns arising from technology use. First, lack of access to mobile connections – farmers need to rely on mobile phones for connectivity, leading to poor quality connection when coverage is sparse, with frequent dropouts due to blackspots. The second is the inability to determine the appropriateness of a technology – both in general and with respect to their specific situation. Even with a well-educated farm workforce, they struggle to undertake a cost-benefit analysis to see if a particular technology will have a reasonable payback period or be appropriate for them. This is associated with the lack of technological expertise of the farmers in the region. The third and most common concern is the cost of new technologies. For example, tractors for large scale cropping enterprises that use GPS can cost anywhere from \$750,000 - \$1 million. This is a significant investment, and if it turns out not to be effective, this represents a significant loss for the business.



Figure 3. Low Power Wide Area Network (LPWAN) (Source: Connected Farms)

Considering the challenges with accessibility to new technologies, farmers are seeking assistance from private companies to provide connectivity through satellites, such as Low Earth Orbit Satellites (LEOSats), or narrowband connectivity such as low power wide area networks (LPWAN) (Regional Telecommunications Review, 2021). Both solutions allow farmers to utilize IoT applications such as soil probs, water monitoring, and precision agriculture even in more remote locations. The use of these IoT applications allows the farmer to reduce costs and environmental impact. For example, using a series of soil probes allows the farmer to map the field, determine soil needs in terms of water and fertilizer and apply them specifically to the area required, rather than spraying or irrigating an entire field. Using GPS on the tractor also allows farmers to practice controlled traffic farming. This system of farming restricts tractor use to defined traffic lanes or tramlines to minimize disruption of soil structure. Such features improve plant water availability, improve sowing due to better traction on well-defined tramlines, improve the accuracy of application of fertilizer, and reduce driver fatigue. As a result, such technological advancement leads to an overall improvement in farm productivity (Kingwell & Fuchsbichler, 2011).

The next step in minimizing the impact on the soil is the use of autonomous tractors. John Deere, an American corporation that manufactures agricultural machinery released a fully autonomous tractor in 2022 (John Deere, 2024). However, these tractors require connectivity and rely on the solutions discussed above. As well as the benefits of minimum or no-till farming and controlled traffic farming, autonomous tractors may allow farmers to utilize smaller tractors as they can work the tractors for longer, leading to a lowering of capital outlays required. For example, this may also assist with labor shortages as it reduces the need for labor during harvest (Cooper, 2022).

Technology is also being used to improve the sustainability of Australian agriculture. Glasshouses have long been used to control climate when growing seasons do not necessarily match consumer demand. Greenhouses are now being used on a scale to reduce waste, reduce water usage, and guarantee supply for supermarkets. One example is Flavorite in Victoria, Australia. They use greenhouses to produce tomatoes, capsicum, blueberries, cucumbers, and eggplants. Favorite uses of technology to control temperature, water application to individual plants, and to move plants to allow for easier picking of fruit. They claim that only two percent of their produce is wasted and that ninety-five percent of water used is taken up by plants (https://www.flavorite.com.au/sustainability). As a result, they can supply their produce year-round and do so more sustainably.



Figure 4. Favorite Greenhouse (Source: https://www.hortidaily.com/article/9456740/why-australia-s-biggestglasshouse-grower-is-expanding-their-cultivation/)

Rural Australia being a predominantly agricultural region further extends opportunities in agri-Tourism as well. Especially in rural Victoria agri-Tourism is considered as a unique opportunity for entrepreneurs (Agritourism, 2024). Agri-tourism is a type of experiential travel that connects people to different rural agricultural products or produce, delivered on farming land through a direct "on-farm" experience (Agritourism, 2024). Such endeavors open pathways to promote sustainable and inclusive farm solutions, promote agricultural and tourism sectors, promote regional and rural communities, and develop their capacity.

5 African Perspective

Dr Agyapong is a notable researcher from Ghana, who has devoted much of his research career to studying the impact of technology in rural African communities. Dr Agyapong led the discussion of rural Africa and the role of digital technologies in rural Africa facilitating entrepreneurship and innovation. Rural Africa holds a considerable portion of its natural resources. However, most of the inhabitants in rural Africa live in absolute poverty. It is estimated that extreme poverty will still be in double digits in sub-Saharan Africa by 2030. About seventy-nine percent of the poor live in rural areas, especially in rural Africa. Despite its green and serene atmosphere with less pollution, the region continues to house most of the poor global communities. The problem has been exacerbated by the advent of the coronavirus (COVID-19) pandemic. The 2021 Economic Report on Africa estimated that about fifty-five million Africans were pushed into extreme poverty in 2020 due to the effect of COVID-19 (Economic Commission for Africa, 2021).

Despite challenges posed by the COVID-19 pandemic, Africa continues to be a continent of the new millennium with its ever-growing market. With the new existence of the African Continental Free Trade Area (AfCFTA), the continent has one of the largest free trade areas in the world (Maliszewska et al., 2020). An estimate from the Bank shows the AFCFTA is expected to connect 1.3 billion inhabitants from 55 states with a total GDP worth US\$3.4 trillion (The World Bank, 2020). The continent's population was estimated at 1.4 billion (Statistica, 2024). Africa has the youngest population in the world. In the case of Sub-Saharan Africa, about seventy percent of the population is under thirty years. This serves as a huge market for both local and global companies. Due to its great potential, foreign direct investment in Africa was US\$ one billion in 2021 (UNCTAD, 2022). This is an increase of one hundred and thirteen percent

over that of 2020. Despite this massive flow of investment, rural Africa remains poor. The rural areas lack infrastructure, and relevant facilities including roads, health services, financial services, and low-technology architecture. It is estimated that ninety percent of the global poor live in the Sub-Saharan African region (Beegle & Christiaensen, 2019). The low level of technology infrastructure restricts its application for the welfare of the people. Despite this, digital technology has been deployed to resolve rural communities' problems.

First is the use of drones for medical supplies in rural Africa shown in Figure 5. As indicated earlier, the lack of good roads and other logistics challenges make it difficult to transport essential products in rural areas of Africa, especially health supplies. As an intervention, the states of Ghana and Rwanda in 2019 started the distribution of health supplies to rural communities. The centers set up in these two countries supply more than two-thousand five hundred hospitals and other health facilities (Lee, 2020; Nyaaba & Ayamga, 2021).



Figure 5. Drone Delivering Medical Supplies (Source: (Ogundepo, 2023))

Drones are also being used to facilitate mechanical supplies in Uganda, Malawi, the Bennin Democratic Republic of Congo, Senegal, and Madagascar (Adu-Gyamfi et al., 2021; Washington, 2018). Furthermore, drones are being used in rural Africa for agriculture. In the Democratic Republic of Congo, drones are used to improve land tenure in rural areas. Studies such as Ayamga et al. (2021) document the use of drones in precision agriculture in African countries that rely on drones in the continent including Ethiopia, Nigeria, and Ghana.

The second example application of digital technology in rural African regions is digital finance and access to financial services. Digital technologies, including mobile money systems, have helped facilitate payment systems and increase access to financial services and markets in rural Africa. Mobile money technology offers less costly but reliable and instant savings, and the services include credit and sometimes insurance services to rural areas without banking services. The total value of mobile money subscriptions in Africa increased by twenty-three percent (US\$495bn) in 2020 over 2019. West Africa had the highest increase in the value of mobile money transactions with an increase of forty-eight percent during the period followed by North Africa with thirty-seven percent (Andersson-Manjang, 2021). This helped reduce the financial inclusion gap between rural communities on the continent. Digital financial services facilitate online trading and promote fair prices for rural farmers.



Figure 6. Mobile Money Kiosk in Rural Africa (Source: (The Vaulz News, 2025))

Mobile money (momo) is said to reduce financial transactional costs and other risks for rural communities (Batista & Vicente, 2021). Through mobile money, rural communities, including farmers, connect to customers and markets in urban centers. This has helped bridge the gap between access to the markets by farmers and other cottage industries. Using mobile telecommunication, farmers can connect with customers in urban centers which aids in the movement of the farm produce to the customers. Due to the absence of financial institutions in most of these communities, momo wallets serve as a store of value and a medium of exchange for most rural communities. There is increasing receptiveness to technology-led rural innovation in Africa.

Notwithstanding the opportunities and innovative technology solutions provided in rural African space, digitization of rural activities happens against the backdrop of poor internet connectivity and technology infrastructure. Besides, rural Africa has strong cultural and religious practices, that often mitigate technology adoption (Keiyoro et al., 2016; Twati, 2008). Furthermore, there is the problem of digital fluency among many people living in rural Africa which limits their technology adoption. Other issues that impact technology and rural entrepreneurship include physical, digital, financial, partnerships, social connectivity, and connections with institutions and companies in urban areas. There is an absence of the key drivers of innovation including infrastructure and platforms to support innovations. For example, digitized business initiatives are lacking in many rural areas in Africa.

The success of the use of drones in the distribution of medical supplies and mobile money in increasing the financial inclusion of rural communities cannot be overemphasized. However, there is a need for policymakers to be intentional about infrastructural development to promote rural Africa. A public-private partnership investment to improve internet connectivity in rural Africa would help promote more innovations and entrepreneurship in the continent. Furthermore, telecom companies should focus on developing robust rural networks through partnerships and strategic alliances. Another strategy to overcome the connectivity in the rural setting is to increase fiber penetration and foster collaboration with data centers and cloud operators.

Despite these challenges, there are emerging opportunities for the region and the countries in general. The continent's rural area has the highest population and holds the greatest volume of its natural resources. It is home to beautiful landscapes (Zambia, Zimbabwe, Tanzania) forests (Uganda, Ghana), and wildlife (Kenya, Rwanda). These are avenues for eco-tourism. Digital technology provides virtual tourism as an alternative to physical tourism. Besides, most of the natural resources are obtained from rural Africa. These include gold, bauxite, diamond, and other minerals. Yet, there is limited application of digital technology in rural communities to exploit such resources. Many rural communities serve as the food basket for the region, yet due to the absence of digital technology and poor infrastructure, particularly transportation, rural Africa suffers from huge post-harvest losses.

The absence of innovation drivers, including technological infrastructure and platforms to support innovations limits the potential gain from digitization and technological diffusion in rural areas in Africa. Meanwhile, technological advancement promotes financial inclusion and fair prices for farmers in rural Africa. There is a need for technology to promote physical, digital, financial, partnership, and social connections with institutions and companies in the urban and international community. This interaction should, however, be contextualized within the cultural setting of the respective rural community. Furthermore, there should be a deliberate effort by the state, government, and institutions mandated to support and promote rural development and entrepreneurship. There is a need to link enterprise development policy to rural innovations. As part of the practical actions, the role of champions is essential to promote digital technology and rural development in Africa.

6 North American Perspective

Dr Ahuja from Concordia University in Canada led the discussion on how North American rural areas embrace digital technologies for entrepreneurship and innovation, where he specifically highlighted some Canadian examples.

Canada is considered a powerhouse of digital technology-led innovation. Yet, when it comes to the application of digital technology to promote rural innovation, both the USA and Canada seem to struggle to bring mainstream innovations to rural areas. In both the US and Canada, rural economies have been largely excluded from the economic benefits created by the growing digital economy. According to a report by The Center on Rural Innovation (2019), by 2019 ninety-six percent of technology-related jobs created were in metropolitan areas, while only four percent were in rural counties, and twelve-point five percent of the current American workforce lives in rural areas, these rural areas only account for five percent of tech workers. The statistics in Canada are only slightly better and this is because seventy percent of Canada's population lives within 100 miles of the US border and much of the rest of Canada is considered or is close to the classification of "rural." Communities in rural, remote, coastal, and northern regions of Canada contribute to almost thirty percent of GDP and help drive economic growth. Canada has over one million small businesses, and ninety-eight percent of all Canadian businesses have fewer than 100 employees (Coates, 2022). These firms employ about forty-eight percent of Canada's labor force, and a majority are in rural or semi-rural settings (Coates, 2022). With such significant contributions to the economy, there is growing emphasis on research that focuses on unique aspects of rural businesses and their transformation as well as digitalization (Salemink et al., 2017).

The government of Canada classifies communities as: (i) Northern: Yukon, Northwest Territories, and Nunavut, (ii) Rural: a population of fewer than 5,000 people and a population density of fewer than 400 people per square km, and (iii) Remote: a permanent or long-term (5 years or more) settlement with at least 10 dwellings that do not have year-round road access. Canada suffers from a digital divide among its urban and rural populations. The digital divide is a result of underdeveloped infrastructure, financial shortage, paucity of knowledge, human resource limitations, poor geographical and environmental conditions, and cultural factors (Sadreddin et al., 2021).

According to a report on the future of Canada's economy by Coates (2022), "rapid technological change that is transforming the Canadian and global economy and major deficiencies in regional infrastructure and preparedness – represent a fundamental challenge to the economic future of rural Canada." To support innovation in rural Canada, the following are necessary but not sufficient steps: (i) The development of reliable high-speed Internet is fundamental and must be given the same priority formerly assigned to rural electrification; (ii) rural schools must increase their emphasis on technology-based instruction, both conceptual and applied; (iii) rural schools must also invest heavily in digital education, ensuring that world-class instruction is available in historically poorly-served areas; (iv) the Canadian medical system has to place an absolute important role on technological innovation to provide high-quality medical services to rural regions, small towns, and Indigenous communities across Canada.

To address the various issues of digitalization in rural communities, the Government of Canada established Regional Development Clusters to better contextualize the problems and solutions. The regional clusters program aims to create, grow, and nurture inclusive regional ecosystems that support business needs throughout the innovation continuum, and foster an entrepreneurial environment conducive to innovation, growth, and competitiveness. Once the regional clusters were established, the government also allowed partnerships with venture capital institutions as well as private investors that could help revitalize rural innovation and entrepreneurship. With these partnerships, the government targeted the following: (i) Innovation: to provide up to \$1.7 billion over 13 years in new support for high-speed connectivity in rural and remote communities, including the Universal Broadband Fund, which will support fiber optics and other technologies, including securing cutting-edge Low Earth Orbit (LEO) satellite capacity to connect Canada's hardest-to-reach communities. (ii) Public-Private-Partnerships: providing funding and tailored support in communities across Canada to help create the right environment

to start and grow businesses and create strong and dynamic local economies. Establishing the Community Futures Program (CFP), which funds local community development offices, and the Strategic Partnerships Initiative that helps communities adapt to take advantage of emerging digital and physical business opportunities.



Figure 7. Low Earth Orbit (LEO) Satellite (Source: (Pugliese, 2018))

In this report, we zoom into taking a closer look at one community futures development corporation (CFDC) and how it changed the entrepreneurial and rural innovation environment of a rural community in southern Ontario. Community Futures Ontario supports sixty CFDCs in rural and remote communities across the province, in the delivery of the Community Futures Program. We focus on the CFDC in Ontario whose mandate was to provide financing up to \$250,000 for new or existing businesses in the region with the following goals: provide initial financing to start a new business, to purchase or renovate a building, leasehold improvements, equipment purchases or upgrades, inventory, working capital, etc. It partnered with a local entrepreneur who had relocated to the region after retiring from Silicon Valley on a successful exit upon initial public offering. He was interested in investing his wealth in the region. He bought a former resort and marina and renovated it into office suites. It served as an incubator for 10 entrepreneurs with 37 employees. The incubator provided startup capital to technology entrepreneurs.

One of the firms within the incubator is GoVideo. GoVideo creates rich media content that is integrated into its customers' marketing campaigns, communication strategies, websites, and social media campaigns. GoVideo operates two businesses. One is the production of digital videos for promotional purposes and the other is the production of video content for online walk-through video tours of both public and private spaces such as museums, grocery stores, real estate, etc. GoVideo caters mainly to small and medium-sized enterprises (SME). It has established its market in smaller towns and rural areas that are often overlooked by larger video production firms in metropolitan cities. The founder speaks about the importance of the government's investments in broadband infrastructure and his firm's investments in technology tools and equipment.

"We could not do this cutting-edge work without technology, and it has to be fast as far as our Internet connection is concerned...which is difficult to get in rural areas...so we are thankful to have broadband Internet and the folks at the incubator. For our own infrastructure, we have been able to not sink a lot of cash into it. We have about \$20K in camera equipment and it does the job...I am talking gyros stabilizers or high-definition cameras and high frame rate high-definition cameras at an effective cost."

To service clients in rural areas, GoVideo must operate within certain constraints concerning human resources, expertise, and business skills. It also acknowledges the role of the ecosystem; in fact, they depend on it for the supply of skilled human resources (lansiti & Levien, 2004). Such an ecosystem generally consists of partnering educational institutes, the regional economic development office, community support, other firms in the region, etc. Firms operating in resource-constrained settings face difficulties obtaining capital during their initial stages of growth, they also face additional challenges with sustaining their revenue cycles. As a result, these firms are constrained when growing the business. Some are even seasonal businesses that depend on other SMEs during a particular tourist or visitor season and are thus constrained in their options for investments and expenditures.

GoVideo focused on building partnerships within the community and leveraged the infrastructure and services provided by the incubator. It then pivoted its business model to develop affordable business,

in marketing and videography.

technology, and human resource capabilities. For example, GoVideo partnered with a local college to hire students as interns for its video development services. GoVideo also focused on its internal capabilities and operations to streamline them to be able to function within the challenges of its market and environmental conditions, where customers valued lower-cost services and greater return-on-investment

The CEO of GoVideo identifies certain constraints that he faces in terms of the current capabilities in his firm and then goes on to mention some other digital capabilities he would ideally invest in. He also emphasizes that current technology is a constraint and not an enabler due to the low maturity level of the platforms/devices they are dependent upon. He warns about jumping to new technology solutions without assessing thier impact:

"I would say that generally technology is way behind where we want to be. It is always frustrating to want to do something, but the technology limitations are restricting us from doing it. For instance, just a simple thing like an iPhone, getting interactive video on an iPhone is pretty much impossible. And then there are other technology things like Google Places or Google Street View. So, a lot of people have asked the question well you are competing against Google because they are doing their street view inside stores. But it is not a real product. You cannot actually call up Google and say I want my store featured in street view...The technology that we are looking to invest in would be an "App" that we could easily plug into existing tourism maps to host the interactive video tours. That is where I see big potential. And we have a proposal from a company that can write that module. And we can easily work with an existing App firm to integrate that in. So, let us say, a tourism App for a certain region is developed; we can then add interactive tours for attractions in that region into the App as an add-on."

GoVideo is interested in developing the capability to enable its products and services on mobile platforms. However, here the CEO discussed that there are several strategic challenges to developing such a capability. The primary concern is developing stable videos for multiple mobile platforms and ensuring that the underlying technological components are compatible. More specifically, the technology standards supported by different mobile platforms are incompatible with each other, and how this could add to the firm's production costs. This is a major concern that has not allowed them to push towards growth on the mobile platform. However, the firm recognizes that such a capability would help it strategically differentiates its products and services from those of its competitors. GoVideo's CEO acknowledges that his strategic decisions have worked well and that he may continue to follow the low-cost model. Furthermore, using the right equipment and flexible systems helps streamline operations and improve efficiency. He also recognizes employee retention and well-being as important performance indicators. To gather some longitudinal perspective and to confirm that small firms in the Canadian market can survive while operating in rural environments.

In summary, Canada has taken some strides in addressing rural innovation using digital technologies by setting up an ecosystem and investing in the grassroots of rural communities. It has set up institutions that are dedicated to bridging the digital divide between urban and rural communities. Canada has invested in digital infrastructure and connectivity, funding businesses in need, partnerships with private venture capital, and development of human resources in rural and remote areas. This has helped tremendously in addressing some of the challenges that rural communities encounter. However, a substantial portion of Canada is known as the remote North. These are relatively inaccessible and inhospitable terrains where First Nations and indigenous populations reside. Therefore, stronger measures such as low-orbit satellites for internet connectivity and much more focused and trust-based partnerships will be required to promote entrepreneurship and innovation in these rural areas. Thankfully, with firms such as GoVideo, there are successful templates that exist for Canada to copy in these regions with further nuances.

7 Current Theoretical Understanding of Rural Entrepreneurship and Innovation in IS

Dr Lokuge related the examples illustrated by the panelists with the existing IS literature on rural innovation and entrepreneurship to offer; (i) an overarching view of the topic coverage, (ii) to provide examples of potential theoretical foundations that have been employed in the past studies, and (iii) to identify the relative importance of this topic in the IS journals.

When conducting the literature review the following steps were taken to ensure validity of the data. To get an understanding of the current state of rural innovation and entrepreneurship research in the IS discipline, a systematic literature review was conducted following the guidelines of Levy and Ellis (2006). The review of literature on rural innovation and entrepreneurship included studies published in the Senior Scholars' list of premier journals. Herein, we acknowledge the wealth of studies that are published in other IS journals, which have made substantial knowledge contributions. The objective of selecting the senior scholars' list is not an attempt to be inclusive, but rather an attempt to merely demonstrate adequate examples of past studies. This list of premier IS journals included MIS Quarterly (MISQ), Information Systems Research (ISR), Journal of Management Information Systems (JMIS), Journal of the Association for Information Systems (JAIS), Journal of Information Technology (JIT), Information Systems Journal (ISJ), Journal of Strategic Information Systems (JSIS), European Journal of Information Systems (EJIS), Decision Support System (DSS), Information and Management (I&M), and Information and Organization (I&O). Originally papers published from 2013-2021 were considered for the data sample. However, this analysis is extended to include studies from 2022-2024 as well. Keywords used for the search string were "rural innovation" OR "rural entrepreneur*" OR "rural*." The search results included more than 400 journal articles. Each article was reviewed and excluded if the topic was unrelated to the research objective, or if the paper did not fit with the panel topic. For the analysis, forty-seven (47) journal papers were considered. Essays, special issues, and research opinion papers were excluded from the analysis. Each paper was read entirely and identified the theories used in these papers. It was evident that rural entrepreneurship and innovation have been largely understudied in the IS discipline. With the advent of digital technologies, there are plenty of opportunities provided through these technologies for rural communities. As such, IS scholars have great opportunities to explore and contribute to this area of study. Table 1 below provides papers found through the analysis from 2013 – 2024.

Journal	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	Total
MISQ	0	0	1	0	1	1	0	0	4	2*	0	1	10
ISR	1	1	0	0	0	0	0	0	1	0	0	1	4
JMIS	0	0	0	0	0	0	0	0	0	0	0	0	0
JAIS	0	1	0	1	1	1	1	1	0	0	1	0	7
JIT	0	0	1	1	0	0	0	0	0	0	0	2	4
ISJ	3	0	0	1	1	2	1	0	0	1	0	0	9
JSIS	1	1	0	0	0	1	0	1	0	1	0	0	5
EJIS	0	1	2	0	0	0	0	0	0	0	0	0	3
DSS	0	0	0	0	0	1	0	0	0	0	0	1	2
I&M	0	0	0	0	0	0	0	0	0	0	0	0	0
1&O	0	0	1	0	0	0	2	0	0	0	0	0	3
Total	5	4	5	3	3	6	4	2	5	4	1	5	47
*Note: Paper investigates innovation/entrepreneurship													

Table 1.	Number	of Papers	that In	vestigates	the	Concept	'rural'

As per Table 1 above it is evident that there has only been a limited number of studies interested in studying the concept of rural. Among them, only a limited number of papers investigated rural entrepreneurship and innovation. Most of the papers focused on rural networking, healthcare, development, and empowerment related topics. When considering the research context and data sourcing country, it was clear that the majority of the papers sourced data from India, followed by China. In addition

to these two countries, papers sourced data from countries such as South Africa, Australia, Malawi, Pakistan, Cambodia, Kenya, Ghana, and the United States. Overall, it is evident that innovation and entrepreneurship in the rural context have been rarely studied and there are immense opportunities for IS researchers in this area.

While the sole objective of this literature review was to get an idea about the extent to which the rurality concept has been investigated in the IS discipline, we also analyzed the theories that have been used in these studies. The analysis highlighted that the most commonly applied theories in studying the rurality concept were the technology affordance perspective (Gibson, 1986; Majchrzak & Markus, 2012), activity theory (Leont'ev, 1978), resource orchestration perspective (Sirmon et al., 2011), contagion theory (Venkatesh et al., 2020), ecology theory (Nardi & O'Day, 1999), social network theory (Scott, 2000), process virtualization theory (Overby, 2008), social identity theory (Tajfel, 1981), social markedness theory (Brekhus, 1998), theory of market separations (Bartels, 1968), postcolonial theory (Adam & Myers, 2003), service-dominant logic (Lusch & Nambisan, 2014), theory of practice (Bourdieu, 2020), path constitution theory (Singh et al., 2015), technology acceptance model (Davis et al., 1989), effectuation theory (Sarasvathy, 2001), and frame theory (Cornelissen & Werner, 2014). In particular, the technology affordance perspective was used to understand the emerging role of technology (i.e., social media) in rural settings (Tim et al., 2018), the introduction of telemedicine camps for underprivileged individuals (Li et al., 2020), and also how technologies and self-organized study circles promote economic growth in rural Kenya (Hatakka et al., 2020). On a similar note, activity theory is applied in studies to understand how poverty alleviation in a rural setting is achieved through the development of a local ecommerce ecosystem (Li et al., 2019) and how ICT led to a process of hybridization of information practices among rural farmers in Ghana (Slavova & Karanasios, 2018). Resource orchestration as per Sirmon et al. (2011) leads to capability development. As such, resource orchestration has been used to explain how new capabilities such as ecommerce development in rural settings are initiated (Cui et al., 2019; Cui et al., 2017). Contagion theory has been applied in rural contexts to understand how ICT development influences local behaviors (Chen et al., 2024; Venkatesh et al., 2020). Ecology theory posits that "technology merges organizations, governments, and institutes into an ecosystem to drive transformation. As such, this theory has been used in a rural context to explore the implications of rural e-governance (Shou et al., 2024). Venkatesh and Sykes (2013) applied social network theory to explore technology use and the outcomes of the digital divide in rural India. Process virtualization theory was used to understand the factors that affect the telehealth process virtualization in rural settings (Ayabakan et al., 2024). Pethig and Kroenung (2019) apply social identity theory and social markedness theory to explore technology perceptions of digitally disadvantaged individuals. Sandeep and Ravishankar (2015) applied the effectuation theory to explore social entrepreneurship in India. Postcolonial power parity theory applied by Chipidza and Leidner (2019) explored power asymmetries in rural context. Considering the novelty and explorative nature of the topic, most papers found on innovation and entrepreneurship in the rural context are essays or idea pieces. It was highlighted that a limited number of empirical works have been completed in the rural innovation and entrepreneurship context.

Further, most of the papers on rurality have investigated organizational level phenomena rather than individual level phenomena. The study areas related to the rural context were confined to topics such as ICT4D, healthcare technology adoption, telemedicine, rural-urban inequality considering the technology adoption, banking and mobile app adoption, and education. Only a limited number of papers focused on topics such as women's entrepreneurship in rural areas and digital empowerment. Considering the inherent challenges present in the rural context and the opportunities presented to these communities via digital technologies, there are many opportunities veiled in this area for IS researchers.

While there have been many studies focusing on the impact of digital technologies in the contemporary era for innovation and entrepreneurship, when the 'rurality' context is applied, the common theories and frameworks that IS researchers use will require reconsideration. Whether it is organizational context or individual context, there are economic, geographical, and social aspects that vary from an urban setting. Further, the demographics of rural vs. urban is another important factor that impacts the findings of rural innovation and entrepreneurship research. In addition, innate characteristics of rurality such as the dominance of agricultural opportunities (Liu et al., 2022), poor socio-economic conditions, distance to markets, aging population, limited infrastructure, limited access to public services, and government support are creating a new ecosystem that is different to an urban innovation ecosystem (Leong, Pan, Newell, et al., 2016). Such concepts have been rarely discussed and IS researchers can contribute to this novel area.

7.1 Role of Research

As the body of research on rural innovation and entrepreneurship in the digital era continues to grow, there is a need to ensure that such research also bridges the urban-rural divide. It is pertinent for scholars to be tolerant and aware of the multiplicities and differences spread across rural communities. Research from Western, educated, industrialized, rich, and democratic (WEIRD) contexts does not necessarily generalize to the rest of the world (Henrich et al., 2010). Instead, examining research phenomena on rural entrepreneurship anew in growing, rural, eastern, aspirational, transitional (GREAT) contexts (Karhade & Kathuria, 2020) is necessary. For example, in WEIRD contexts rural innovation and entrepreneurship is generally about agricultural innovation as most of their agricultural lands are based in rural areas. However, with the availability of broadband infrastructure and digital technologies in WEIRD contexts, there is a huge growth in non-agricultural innovation as well. For example, in Pikeville, a small town in Kentucky, United States of America, a company called Bit Source, developed a software development company that offers services such as database solutions and mobile app development, healthcare products, and web solutions. Such initiatives provide solutions that cater to local needs and promote digital enablement (The Center on Rural Innovation, 2021). In addition, in GREAT contexts, the lack of access to resources, the differences in education, and cultural differences require options for the supply of these fundamental resources. As such, in GREAT contexts, rural innovation and entrepreneurship examples resonate with social innovation. For example, accessibility to clean drinking water and drone ambulances are some of these examples (Subhan et al., 2019). Such decolonization of research is essential as WEIRD research cannot be simply imposed onto GREAT domains (Karhade & Dong, 2021). Researchers need to challenge existing power structures and knowledge creation systems by identifying reasons why non-native constructs do not work in GREAT contexts. By asking great questions, scholars can and should reinvent the wheel to yield great answers.

To do so, researchers should seek to apply theories and methods from other fields and areas. For instance, by investigating the international business literature, one can conceptualize what resources and capabilities are organization-specific, what can move across rural-urban boundaries, and what are location-bound (Khuntia et al., 2021; Khuntia et al., 2019). Investigation into such contextual factors will add value to both academia and practitioners. Doing so can shine a light on the resources and capabilities that can be leveraged within the rural context to create a competitive advantage. Furthermore, it is necessary to develop a deep understanding of rural contexts and acknowledge the multiple overlapping relationships that may exist and need to be untangled in these contexts (Zavala, 2013). Hence, scholars must design diverse ground-up studies that use qualitative, ethnographic, or data-first inductive-abductive methodologies (Chilisa, 2019; Kathuria et al., 2020). Moreover, approaches such as natural experiments and randomized controlled trials, which are used extensively in developmental economics, can be applied to infer causal relationships. While the application of critical theory is on the rise for rurality studies (Bailey et al., 2018), this is also very limited.

8 Conclusion

This section below is a summary based on the discussion that occurred during the question-and-answer session of the panel. The discussion below highlights the role of digital technologies in rural innovation and entrepreneurship and provides answers to the three research questions discussed in the introduction section.

8.1 RQ1 - The Role of Digital Technology in Rural Innovation and Entrepreneurship

The summary of the discussion of the panel session highlighted an understanding of several important aspects that are important for rural innovation and entrepreneurship research. They are: (i) Capabilities of digital technology, (ii) Opportunities for rural communities to utilize digital technologies, and (iii) Barriers to implementing digital technologies. The findings of the examples above resonate with the notion of technology affordances as the user may perceive technology as an enabler or a constraint (Majchrzak & Markus, 2012). As per Costall (1995), the affordance of a certain object depends on the material interaction between technology affordances (particularly focusing on urban users). While there have been many studies on technology affordances (particularly focusing on urban users), there are innate differences between the rural user and the influence of the environment (rural community/area) they are situated in. As per Pols (2012) affordances are perceptual and experiential and as a result can be learned

through trial and error and through knowledge of others. To derive the role of digital technology in rural innovation and entrepreneurship, Table 2 below summarizes some of the technology affordances viewpoints for rural innovation and entrepreneurship. This approach provided a theoretical lens to the cases discussed and the insights gained out of the panel discussion.

Technology Affordances to Rural Communities	Explanation				
Access to information and information democratization	Digital technologies provide access to a wealth of information market trends, and consumer demands, enabling rural entrepreneurs to make informed decisions and tailor their products and services accordingly. As witnessed in African, Canadian, Indian, and Australian contexts digital technologies provide the necessar access to information for launching their innovation initiatives.				
Operate in E-Commerce and online sales platforms	Rural businesses can leverage e-commerce platforms to reach a global customer base, reducing the limitations of geographic location and expanding their market reach. As witnessed especially in the Canadian and Indian contexts, digital technology provides a platform for the communities to reach a global market to sell their products and services.				
Greater mobile connectivity	With the proliferation of mobile devices, rural entrepreneurs can engage with customers, manage operations, and access information even in areas with limited traditional infrastructure. As witnessed especially in the African context, the access to mobile money provides pathways for rural communities to initiate reliable businesses.				
Reducing infrastructure barriers	Digital technologies can help overcome physical infrastructure challenges by allowing businesses to operate in an online environment, reducing the need for extensive brick-and-mortar facilities. As witnessed in Africa, North America, and India the basic resource requirements were provided (i.e., water, internet, finance services) via digital technology.				
Allowing remote work	Digital technologies enable rural entrepreneurs to tap into remote work and freelancing opportunities, allowing them to collaborate with professionals from around the world and provide services to global clients. As witnessed in rural Canada, GoVideo disrupted the location barriers and opened rural communities to work remotely with a global customer base. Similarly, in North America, several examples highlighted the ability to work remotely in rural areas.				
Augmented organizational learning	Digital platforms offer opportunities for rural residents to access online courses, acquire new skills, and stay updated on industry trends, fostering entrepreneurship and innovation. As witnessed in Australia, through connectivity rural communities were able to innovate (i.e., agri-tourism opportunities). Further, in India, digital literacy projects were a great example of this as well.				
Access to financial services	Digital banking and fintech solutions can improve access to financial services, making it easier for rural entrepreneurs to manage transactions, payments, and loans. As witnessed in Africa, having momo (mobile financial services) provides them with a platform to conduct businesses securely.				

Table 2. Conceiving	the Role of	Technology in	Rural Innovation
		reconnology in	iturar innovation

Enabling new opportunities and minimizing barriers	Through digital technologies it was evident that the rural communities were creating new opportunities as well as minimizing the traditional barriers they had. For example, the advancement of new digital agriculture technologies (AgTech) has enhanced crop yields, enabled managing resources efficiently, and provided efficient ways of monitoring livestock health. Thereby improving agricultural practices in rural areas. Such examples were witnessed in rural Australia.
Acting as an intermediary (access to wider networks) and network-informed associating	Digital platforms facilitate networking, allowing rural entrepreneurs to connect with mentors, peers, and potential partners across different regions. As witnessed in all our geographical areas, digital technology acts as an intermediary, creating bridges to connect diverse communities.
Emergent organizing	Strategic collaboration is facilitated through digital technologies as evident in the Paalaguttapalle tote bags example, and digital literacy projects in India. Digital technology allowed the assembly of like- minded communities to crowdsource for expertise as well as empower women.

As per our panel discussion, it was evident that digital technology plays an enabling role that minimizes the inherent resource barriers prevalent in rural areas. Technology provides a rich array of affordances that assist rural communities in promoting rural innovation and entrepreneurship initiatives. By leveraging technology affordances, rural entrepreneurs can not only overcome geographical constraints but also contribute to local economic development, job creation, and community empowerment. However, it is important to address challenges like digital literacy, internet access, and relevant training to ensure that rural communities can fully harness the potential of digital technologies for innovation and entrepreneurship initiatives.

8.2 RQ2 – Differences in Rural Innovation and Entrepreneurship Between Developing and Developed Nations

The panel highlighted that, while the broad notions of the innovation lifecycle can remain the same for rural areas, human-technology interaction unfolds differently in *developing* and *developed countries* context (Avgerou et al., 2016). Inherently, developing and developed countries vary in considering factors such as access to finance, resource limitations, and social factors. However, in the rural context, whether it is a developing nation or a developed nation, they have a common set of demons that impact innovation and entrepreneurship potential. For example, access to resources, lack of connectivity, lack of expertise, lack of population, and scarcity of knowledge are common challenges faced by rural communities despite the context of developed and developing countries. However, considering the examples provided, it is evident that the concept of rurality has an abundance of contextual complexities. This gives rise to idiosyncratic rural innovation and entrepreneurship in various developing and developed contexts. For example, the objectives and processes followed in rural innovation and entrepreneurship form unique patterns and distinct challenges.

As per Chinowsky et al. (2011) and Porter et al. (2002) three main economic development phases can be identified based on the Gross Domestic Profit per capita of a country. They are factor-driven, efficiency-driven, and innovation-driven economic developments. Factor-driven economies compete based on factor endowment (i.e., resources, labor requirements). Most of the developing countries fall into this category. Considering the resource deficiencies, the developing nations follow a more factor-driven economic approach. Efficiency and innovation driven economic phases coincide with developed economies that focus on increasing efficiency, product quality, and innovation (Porter et al., 2002).

An Asian perspective, our examples characterized the factor-driven economic phase. For example, the objective of innovation and entrepreneurship endeavors was focused more on the social aspect. Especially in the African and Indian continents, the focus was more on obtaining the basic facilities such as the internet, water, health, and financial services. The innovations that occurred in these regions can be considered social innovations that focused on women's empowerment, and accessibility to health, and

financial services. In all these instances, the impact of innovation and entrepreneurship projects was more concentrated on social benefits rather than economic benefits.

In developing contexts, for example, Oceania and North American perspectives, the projects focused more on enhancing efficiencies and innovation. This corresponds with the characteristics of efficiency and innovation-driven economic phases. In such cases, the focus was on economic benefits rather than social benefits. However, even for rural communities of the developed nations, there are initial challenges they commonly face such as establishing themselves within the region and earning social capital. One of the best strategies used in this case by developed nations is liaising with incubators within the region and leveraging their network as well as business, technology, and social capabilities. The establishment of such incubators is a major difference between developing and developed rural contexts. However, in recent times, especially in India we see partnerships with the established universities and rural communities to develop incubators promoting rural innovation and entrepreneurship.

Another widespread problem faced by all rural communities but prevalent in developing nations is the affordability and accessibility of the business models. Digital technologies such as social media, mobile computing, analytics, cloud computing, 3D printing, platforms, AI, blockchain, and the Internet-of-Things can assist with the development of cutting-edge capabilities at relatively affordable costs. To overcome constraints such as skilled human resources, rural communities can partner with educational institutions within the ecosystem and provide local employment opportunities. It would be prudent not to engage in hyper-scaled growth but to find more sustainable, social, and environmental impact-based metrics and goals.

8.3 RQ3 - Guiding Future Research Through the Lens of Socio-Materialism

The panel highlighted contextual diversities, even within the context of rural areas, providing examples from all around the world. While there are differences in the global rural examples and the type/configuration of technological innovations, at a philosophical level, the 'context' of rural (as explained in research question 2) and 'the role of digital technology' (as explained in research question 1) provide the foundational elements to develop a strategy for future research. The examples discussed by the panelists also demonstrated that, once digital innovations are introduced to the rural communities, the communities continue to interact with the technology, refining and reconfiguring, while simultaneously changing their social structures as well. For example, when analytics-based digital innovations are introduced to farming communities in Australia, both the social values and the digital innovation change over time. Therein, over time, farmers develop a sense of trust towards the recommendations elicited through the analytics systems. Similarly, farmers learn to gradually delegate their tacit knowledge-centric, gut feelings, and the associated individualistic and cultural values to the analytics system. Moreover, the premise of 'context' extends to the geography of rural areas as well. Either marked by distance or infrastructure limitations, rural areas have their own unique conditions based on geography. This interplay between the 'context' and the 'technology' is nuanced, continuous, and continues to configure and reconfigure both the technology and the context.

Herein, we propose socio-materialism as a methodological framework. Socio-materialism (Leonardi, 2017; Orlikowski, 2007; Scott & Orlikowski, 2014). The socio-materiality methodological framework is apt as a framework for future research on rural technological innovations, as it recognizes the dynamic interaction between the 'social' – as the embedded symbols, meanings, desires, fears, and cultural discourses, and the 'materials' – in this case, the role and the structures provided by the technology innovation (Fenwick et al., 2015). Orlikowski (2007, p. 1435) highlights the interaction of social and material, arguing that IS studies have "overlooked the ways in which organizing is bound up with the material forms and consideration through which humans act and interact." Attesting to the true dynamic nature of socio-materiality, Orlikowski (2007) also states that the socio-material perspective is not fixated on inherent or the initial meanings of social and material, but rather an evolutionary, inseparable parts of the reality that are fused in practice.

It must be clarified that, while socio-materialism itself is considered as a theory, future research could focus on a particular aspect of social and material, or interactions. For example, Fenwick et al. (2015) list four theories that employ the paradigm of socio-materiality: actor-network theory (Callon, 1999), cultural-historical activity theory (Vygotsky, 1978), complexity theory (Waldrop, 1993), and spatial theory (Enelow & Hinich, 1984). Others have employed the configuration theory (Vorhies & Morgan, 2003) and ambidexterity theory (O'Reilly III & Tushman, 2013). The listing of the theoretical foundations here should not be misconstrued as prescriptive – rather aimed at demonstrating the nuanced approaches that future

research could consider in this emerging topic. The expositions of these theories should be considered for future research of rural digital innovation and entrepreneurship with a deep and genuine concern regarding the technologies, their technological assemblies, and configurations, in light of the rural context. In fact, socio-materialism allows (and encourages) the researchers to recognize symbolism, symbolic interactionism (Orlikowski, 2007), and cultural geography (Whatmore, 2006) that separates rural from urban.

Another perspective for future research can focus on the geographical or physical entity of rural geography. Therein, spatiality theories of socio-materialism can provide philosophical guidelines. Fenwick has proposed deep insights as to how spatiality can be manifested in socio-materialism (Fenwick, 2010, 2014; Fenwick et al., 2015). Therein, it is argued that 'space' should not be considered a mere object of study, but rather as an opportunity to engage in its theoretical possibilities (Fenwick et al., 2015). As such, future research could observe how rural spaces enable, encourage, or inhibit certain practices related to innovation and entrepreneurship. For example, in the context of African rural financial enhancements through mobile money kiosks, the spatial theory allows researchers to focus on how the African rural context provides the space for financial enhancement, provides encouragements, or prohibitions against the intentions of the providers, makes exclusions, or facilitate new innovations and entrepreneurship opportunities (Fenwick, 2010; Fenwick et al., 2015).

Socio-materialism allows future researchers to explore the 'aesthetics' of the rural geographical or cultural uniqueness as well. Especially in relation to aesthetics, Soares and Bispo (2017), argue that aesthetics can illuminate insights of the contextual daily routines, that are often overlooked in behavioral research. Future researchers can also employ the perspectives of aesthetics to inform the sensory knowledge that may be hard to verbalize. Especially in rural traditions and cultures, future researchers could explore the biases pertaining to the contexts, communication patterns, and sharing knowledge that is tacit – hence difficult to articulate.

Future researchers could focus on how modern technologies provide an effect of a 'borrowed size' to rural areas. Such research will essentially delineate the overemphasis of past research on the 'lack of resources' in rural areas. The existing theoretical foundations, such as the resource-based view (Barney, 1991), on resource constraints provide only a simplistic view of the rural context and are incongruent with the nature of modern technologies. Most technology-led innovations exemplified herein are based on affordable, easy-to-access subscription platforms (Lokuge et al., 2025; Nambisan, 2013), as such negating the need for a heavy emphasis on resources.

Furthermore, future research can focus on how entrepreneurs and innovators of 'non-rural' origins translate their work into the rural context (or vice versa from rural based, moving to a metropolitan setting). From one perspective, future research could observe how the original innovations are translated into a new setting through the configuration of technologies. Therein, theories like the configuration theory (Vorhies & Morgan, 2003), ambidexterity (O'Reilly III & Tushman, 2013), or the contingent theory (Brush & Artz, 1999) can be useful. We note that only a handful of studies also have observed the processes associated with copying a 'Western' developed technology-led innovation to another part of the world (Flath et al., 2017; Lokuge et al., 2018).

8.3.1 Framework for Future Studies

This panel was conducted with the salient objective of developing a diverse, yet philosophical discourse on one of the emerging topics in the world – rural innovation and entrepreneurship in the digital era. By considering the era of digital transformation, the panel acknowledged and promoted the important role that modern digital technologies play in enhancing innovation and entrepreneurship in rural areas. The examples that the panelists shared highlighted, viewed through the socio-materialism lens, proved to be useful in that it recognized the importance of unique symbols, meanings, desires, cultural discourse, aesthetics, and the distinctive geographies associated with rural areas. It alluded to the complexities and sensitivities of the *rural context* and highlighted the *role that digital technologies can play* in fostering innovation and entrepreneurship.

To the extent that future research considers these nuances in the (i) phenomenon under investigation, (ii) inter-related, in-depth complexities, and (iii) the patterns of innovation and entrepreneurship will increase our understanding of this topic. As such, the panelists provide the following framework to guide future research using socio-materialism as an overarching theoretical scaffold. As depicted in Figure 8, we recommend that future researchers immerse deeply and acknowledge the contextuality of rural

environments. Therein, the researchers will narrow the scope of the observations, selecting and isolating observable variables of his/her choice. Next, the socio-materialism framing allows the researcher to engage in deep conversation. Therein, adapting Tietjen et al. (2023) we present three framing choices to the researcher, discouraging the researcher from engaging in all three of them at once. As Tietjen et al. (2023, p.17) highlight, the three theoretical framing choices should only "serve as a starting point for investigations of emergent activity within future learning spaces from a socio-material perspective."

The first socio-material framing option encourages researchers to investigate how history, culture, and community come together to impact rural innovations and entrepreneurial practices. Such research, which would be conducted at the macro-level, could benefit from employing theoretical foundations like the Actor-Network Theory (Callon, 1999). Here, the researchers recognize rural phenomena as a macro level phenomenon and pay attention to its heterogeneous assemblages of both human and non-human elements and how these assemblages are initiated, persist, mutate, or decline as they interact with other entities.



Figure 8. A Framework to Guide Future Research

The second analytical framing option through the material-embodiment perspective allows future researchers to examine how material affordances of digital technologies' imprint on the social embodiments of rurality. Scholars could employ the affordance theory (Gibson, 1986), together with theories of embodied learning (Streeck et al., 2011). We also note that some scholars (e.g., Moss, 2001; Tan et al., 2020) have employed the sensemaking perspective to understand how people make meanings from technologies considering the environmental, social, and cultural artefacts.

The third analytical framing option examines how rural entrepreneurship and innovation occur through the lens of the physical clues of rurality, with its interactions with the affordances of technologies, over a period. Herein, we propose that future studies on rural innovation or rural entrepreneurship using digital technologies investigate the ideation, incubation, and maturity over a period, through a longitudinal study.

Finally, future studies can observe the translation of rural innovations and entrepreneurship, with a view to observing patterns of innovation and entrepreneurship. Therein, we hypothesize that the patterns of (i) new to the world, (ii) translations from urban to rural, and (iii) translations from rural to urban would bear distinct characteristics that would be of interest to both researchers and practice.

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References

- Ab Wahid, R., & Aziidah Zulkifli, N. (2021). Factors affecting the adoption of digital transformation among SME's in Malaysia. *Journal of Information Technology Management, 13*(3), 126-140.
- Adam, M. S., & Myers, M. D. (2003). Have you got anything to declare? In Organizational information systems in the context of globalization (pp. 101-115). Springer.
- Adu-Gyamfi, S., Gyasi, R. M., & Darkwa, B. D. (2021). Historicizing medical drones in Africa: A focus on Ghana. *History of Science and Technology, 11*(1), 103-125.
- Agritourism. (2024). Agritourism 2030. Australian Regional Tourism Ltd. https://regionaltourism.com.au/projects/agritourism/
- Andersson-Manjang, S. K. (2021). The Mobile Money Prevalence Index (MMPI): A country-level indicator for assessing the adoption, activity, and accessibility of mobile money. https://ssrn.com/abstract=3935919
- Australian Bureau of Statistics. (2022). Value of agricultural commodities produced, Australia. https://www.abs.gov.au/statistics/industry/agriculture/value-agricultural-commodities-producedaustralia/2021-22#key-statistics
- Australian Government. (2022a). Information and communication technology use in Australian agriculture. https://www.agriculture.gov.au/abares/research-topics/productivity/productivity-publications/ict-usesummary#key--findings
- Australian Government. (2022b). Snapshot of Australia's agricultural workforce. Department of Agriculture, Fisheries, and Forestry. https://www.agriculture.gov.au/abares/products/insights/snapshot-of-australias-agricultural-workforce
- Avgerou, C., Hayes, N., & La Rovere, R. L. (2016). Growth in ICT uptake in developing countries: New users, new uses, new challenges. *Journal of Information Technology*, *31*(4), 329-333.
- Ayabakan, S., Bardhan, I. R., & Zheng, Z. (2024). Impact of telehealth and process virtualization on healthcare utilization. *Information Systems Research, 35*(1), 45-65.
- Ayamga, M., Tekinerdogan, B., & Kassahun, A. (2021). Exploring the challenges posed by regulations for the use of drones in agriculture in the African context. *Land*, *10*(2), 164.
- Bailey, D. E., Diniz, E. H., Nardi, B. A., Leonardi, P. M., & Sholler, D. (2018). A critical approach to human helping in information systems: Heteromation in the Brazilian correspondent banking system. *Information and Organization, 28*(3), 111-128.
- Balakrishnan, R. (2023). *How technology is empowering women in rural India*. Her Story. https://yourstory.com/herstory/2023/03/technology-empowering-women-rural-india-facebookwhatsapp
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99-120.
- Bartels, R. (1968). The general theory of marketing. *Journal of Marketing*, 32(1), 29-33.
- Batista, C., & Vicente, P. C. (2021). *Is mobile money changing rural Africa?: Evidence from a field experiment.* IZA Institute of Labor Economics. https://docs.iza.org/dp16101.pdf
- Baumgartner, D., Schulz, T., & Seidl, I. (2013). Quantifying entrepreneurship and its impact on local economic performance: A spatial assessment in rural Switzerland. *Entrepreneurship & Regional Development*, 25(3-4), 222-250.
- Beckmann, M., Garkisch, M., & Zeyen, A. (2021). Together we are strong? A systematic literature review on how SMEs use relation-based collaboration to operate in rural areas. *Journal of Small Business* & *Entrepreneurship*, 1-37.
- Beegle, K., & Christiaensen, L. (2019). *Accelerating poverty reduction in Africa.* World Bank Group. https://openknowledge.worldbank.org/entities/publication/f437cb8e-d90e-55e0-9759-f17cf4d61b1a

- Belloc, I., Molina, J. A., & Velilla, J. (2022). Living in rural areas and self-employment. In *I. I. o. L. Economics* (Ed.), *Discussion paper series*. Germany.
- Bourdieu, P. (2020). Outline of a theory of practice. In *The new social theory reader* (pp. 80-86). Routledge.
- Brekhus, W. (1998). A sociology of the unmarked: Redirecting our focus. *Sociological Theory, 16*(1), 34-51.
- Brouder, P. (2012). Creative outposts: Tourism's place in rural innovation. *Tourism Planning & Development*, 9(4), 383-396.
- Brush, T. H., & Artz, K. W. (1999). Toward a contingent resource-based theory: The impact of information asymmetry on the value of capabilities in veterinary medicine. *Strategic Management Journal*, 20(3), 223-250.
- Callon, M. (1999). Actor-network theory—The market test. The Sociological Review, 47(1_suppl), 181-195.
- Chen, H.-C., Knierim, A., & Bock, B. B. (2022). The emergence of social innovation in rural revitalisation practices: A comparative case study from Taiwan. *Journal of Rural Studies, 90*, 134-146.
- Chen, X., Cheng, X., Zhang, T., & Guo, H. (2024). How do information and communication technology platforms shape rural e-governance: The case of Zhao-lou Village on the WeCounty platform. *Information Systems Journal*, *35*(2), 545-576.
- Chilisa, B. (2019). Indigenous research methodologies. Sage.
- Chinowsky, P., Hayles, C., Schweikert, A., Strzepek, N., Strzepek, K., & Schlosser, C. A. (2011). Climate change: Comparative impact on developing and developed countries. *The Engineering Project Organization Journal*, *1*(1), 67-80.
- Chipidza, W., & Leidner, D. (2019). A review of the ICT-enabled development literature: Towards a power parity theory of ICT4D. *The Journal of Strategic Information Systems*, *28*(2), 145-174.
- Cloke, P. (2006). Conceptualizing rurality. In P. Cloke (Ed.), Handbook of rural studies (Vol. 18). Sage.
- Coates, K. (2022). Innovation in rural Canada: Overcoming the digital divide. https://thefutureeconomy.ca/op-eds/innovation-rural-canada-overcoming-digital-divide/
- Cooper, L. (2022). Driverless tractor set for commercial production at John Deere. ABC News. https://www.abc.net.au/news/rural/2022-01-10/driverless-tractor-john-deere/100744258
- Cornelissen, J. P., & Werner, M. D. (2014). Putting framing in perspective: A review of framing and frame analysis across the management and organizational literature. *Academy of Management Annals*, 8(1), 181-235.
- Costall, A. (1995). Socializing affordances. Theory & Psychology, 5(4), 467-481.
- Cui, M., Pan, S. L., & Cui, L. (2019). Developing community capability for e-commerce development in rural China: A resource orchestration perspective. *Information Systems Journal, 29*(4), 953-988.
- Cui, M., Pan, S. L., Newell, S., & Cui, L. (2017). Strategy, resource orchestration and e-commerce enabled social innovation in rural China. *The Journal of Strategic Information Systems*, *26*(1), 3-21.
- Dabson, B. (2005). *Entrepreneurship as a real community and economic development strategy*. Rural Policy Research Institute, University of Iowa College of Public Health.
- Damanpour, F. (1988). Innovation type, radicalness and the adoption process. *Communication Research*, *15*(5), 545-567.
- Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. Academy of Management Journal, 34(3), 555-590.
- Darwin, S. N., Chesbrough, H., & Rotter, K. B. (2018). Prototyping a scalable smart village (B). In *The Berkeley-Haas case series*. University of California.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, *35*, 982-1003.

- Dias, Á., & Silva, G. M. (2021). Lifestyle entrepreneurship and innovation in rural areas: The case of tourism entrepreneurs. *Journal of Small Business Strategy*, *31*(4), 40-49.
- Dobson, P., Jackson, P., & Gengatharen, D. (2013). Explaining broadband adoption in rural Australia: Modes of reflexivity and the morphogenetic approach. *MIS Quarterly*, *37*(3), 965-991.

Economic Commission for Africa. (2021). Economic report on Africa 2021. https://www.uneca.org/era2021

Enelow, J. M., & Hinich, M. J. (1984). The spatial theory of voting: An introduction. CUP Archive.

- Ernst, D. (2002). Global production networks and the changing geography of innovation systems: Implications for developing countries. *Economics of Innovation and New Technology*, *11*(6), 497-523.
- Fenwick, T. (2010). Re-thinking the "thing": Sociomaterial approaches to understanding and researching learning in work. *Journal of Workplace Learning*, 22(1/2), 104-116.
- Fenwick, T. (2014). Sociomateriality in medical practice and learning: Attuning to what matters. *Medical Education, 48*(1), 44-52.
- Fenwick, T., Edwards, R., & Sawchuk, P. (2015). *Emerging approaches to educational research: Tracing the socio-material*. Routledge.
- Flath, C. M., Friesike, S., Wirth, M., & Thiesse, F. (2017). Copy, transform, combine: Exploring the remix as a form of innovation. *Journal of Information Technology*, *3*2(4), 306-325.
- Fortunato, M. W.-P. (2014). Supporting rural entrepreneurship: A review of conceptual developments from research to practice. *Community Development*, *45*(4), 387-408.
- Gaddefors, J., & Anderson, A. R. (2019). Romancing the rural: Reconceptualizing rural entrepreneurship as engagement with context(s). *The International Journal of Entrepreneurship and Innovation*, *20*(3), 159-169.
- Gibson, J. J. (1986). The ecological approach to visual perception. Lawrence Erlbaum Associates.
- Giri, A. K., Mohapatra, G., & Debata, B. (2023). Technological development, financial development, and economic growth in India: Is there a non-linear and asymmetric relationship? *Journal of Economic and Administrative Sciences*, *39*(1), 117-133.
- Gupta, A., & Sachdeva, S. (2023). Using smartphones to boost digital literacy among India's rural communities. World Economic Forum. https://www.weforum.org/stories/2023/12/how-smartphones-can-boost-digital-literacy-among-indias-rural-communities/
- Harahap, R. M., Kusumahadi, K., & Nurhazizah, E. (2022). Analysing service quality of mobile health platforms using text analytics: A case study of Halodoc and Alodokter. *Asian Journal of Research in Business and Management, 4*(1), 168-182.
- Hatakka, M., Thapa, D., & Sæbø, Ø. (2020). Understanding the role of ICT and study circles in enabling economic opportunities: Lessons learned from an educational project in Kenya. *Information Systems Journal, 30*(4), 664-698.
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, 33(2-3), 61-83.
- Iansiti, M., & Levien, R. (2004). Keystones and dominators: Framing operating and technology strategy in a business ecosystem. *Harvard Business School, Boston, 3*, 1-82.
- Infrastructure Australia. (2022). *Mobile telecommunications coverage in regional and remote areas.* https://www.infrastructureaustralia.gov.au/map/mobile-telecommunications-coverage-regional-and-remote-areas
- Ionașcu, A. E., Gheorghiu, G., Spătariu, E. C., Munteanu, I., Grigorescu, A., & Dănilă, A. (2023). Unraveling digital transformation in banking: Evidence from Romania. *Systems*, *11*(11), 534.
- Jammanahalli Mahesh, S. (2022). *Agritech innovations in India*. Massachusetts Institute of Technology. https://www.researchgate.net/publication/365895472_Agritech_Innovations_in_India
- John Deere. (2024). The Next Giant Leap in Ag Technology. Deere & Company. https://www.deere.com.au/en/autonomous/

- Kalantaridis, C., & Bika, Z. (2006). Local embeddedness and rural entrepreneurship: case-study evidence from Cumbria, England. *Environment and Planning A*, *38*(8), 1561-1579.
- Karanasios, S., & Slavova, M. (2019). How do development actors do "ICT for development"? A strategy-as-practice perspective on emerging practices in Ghanaian agriculture. *Information Systems Journal, 29*(4), 888-913.
- Karhade, P., & Dong, J. Q. (2021). Innovation outcomes of digitally enabled collaborative problemistic search capability. *MIS quarterly*, *45*(2), 693-718.
- Karhade, P., & Kathuria, A. (2020). Missing impact of ratings on platform participation in India: a call for research in GREAT domains. *Communications of the Association for Information Systems*, *47*(1), 19.
- Kathuria, A., Karhade, P. P., & Konsynski, B. R. (2020). In the realm of hungry ghosts: multi-level theory for supplier participation on digital platforms. *Journal of management information systems*, *37*(2), 396-430.
- Kathuria, R., Kathuria, N. N., & Kathuria, A. (2018). Mutually supportive or trade-offs: An analysis of competitive priorities in the emerging economy of India. *The Journal of High Technology Management Research*, *29*(2), 227-236.
- Keiyoro, P. N., Muya, B. I., Gakuo, C. M., & Mugo, K. (2016). Impact of Sociocultural factors on adoption of modern technologies in beekeeping projects among women groups in Kajiado County-Kenya. *International Journal for Innovation Education and Research*, 4(4), 55-64.
- Khuntia, J., Kathuria, A., Andrade-Rojas, M. G., Saldanha, T., & Celly, N. (2021). How foreign and domestic firms differ in leveraging IT-enabled supply chain information integration in BOP markets: The role of supplier and client business collaboration. *Journal of the Association for Information Systems*, *22*(3), 6.
- Khuntia, J., Kathuria, A., Saldanha, T. J., & Konsynski, B. R. (2019). Benefits of IT-enabled flexibilities for foreign versus local firms in emerging economies. *Journal of management information systems*, *36*(3), 855-892.
- Kingwell, R., & Fuchsbichler, A. (2011). The whole-farm benefits of controlled traffic farming: An Australian appraisal. *Agricultural Systems*, *104*(7), 513-521.
- Kohli, R., & Melville, N. P. (2019). Digital innovation: A review and synthesis. *Information Systems Journal*, 29(1), 200-223.
- Korsgaard, S., Müller, S., & Tanvig, H. W. (2015). Rural entrepreneurship or entrepreneurship in the rural—Between place and space. *International Journal of Entrepreneurial Behavior & Research*, 21(1), 5-26.
- Lee, H. S. (2020). Africa's Drone Medical Delivery Service Saves Lives in Lockdown. https://knowledge.insead.edu/operations/africas-drone-medical-delivery-service-saves-liveslockdown
- Leeuwis, C. (2013). Communication for rural innovation: Rethinking agricultural extension. Blackwell Publishing Company.
- Leonardi, P. M. (2017). Materiality as an organizing process: Toward a process metaphysics for material artifacts. In *The Sage handbook of process organization studies* (pp. 529-543).
- Leong, C., Pan, S., Newell, S., & Cui, L. (2016). The emergence of self-organizing e-commerce ecosystems in remote villages of China: A tale of digital empowerment for rural development. *MIS Quarterly, 40*(2), 475-484.
- Leong, C., Pan, S., Zhu, K., & Cui, L. (2016). Digitally enabled grassroots entrepreneurship for rural development. *Pacific Asia Conference on Information Systems*, Chiyai, Taiwan.
- Leong, C., Tan, B., Xiao, X., Tan, F., & Sun, Y. (2017). Nurturing a FinTech ecosystem: The case of a youth microloan startup in China. *International Journal of Information Management, 37*(2), 92-97.

Leont'ev, A. N. (1978). Activity, consciousness, and personality. Prentice-Hall.

Levy, Y., & Ellis, T. J. (2006). A systems approach to conduct an effective literature review in support of information systems research. *Informing Science Journal, 9*, 181-212.

- Li, L., Du, K., Zhang, W., & Mao, J. Y. (2019). Poverty alleviation through government-led e-commerce development in rural China: An activity theory perspective. *Information Systems Journal, 29*(4), 914-952.
- Li, X., Rai, A., & Krishnan, G. (2020). Designing cost-effective telemedicine camps for underprivileged individuals in less developed countries: A decomposed affordance-effectivity framework. *Journal of* the Association for Information Systems, 21(5), 3.
- Liu, L., Cavaye, J., & Ariyawardana, A. (2022). Supply chain responsibility in agriculture and its integration with rural community development: A review of issues and perspectives. *Journal of Rural Studies*, 93, 134-143.
- Liu, S. (2022). The urban–rural divide: The effects of the small business innovation research program in small and nonmetro counties. *Economic Development Quarterly, 36*(3), 208-227.
- Lokuge, S. (2021). Theoretical opportunities for rural innovation and entrepreneurship research. In S. Lokuge & D. Sedera (Eds.), *Rural entrepreneurship and innovation in the digital era* (pp. 270-287). IGI Global.
- Lokuge, S., & Sedera, D. (2020). Rural entrepreneurship and innovation in the digital era. IGI Global.
- Lokuge, S., Sedera, D., & Nanayakkara, S. (2018). Innovate or copy: A qualitative document analysis to entrepreneurship in developing countries. *European Conference on Information Systems*, Portsmouth, United Kingdom.
- Lokuge, S., Sedera, D., Grover, V., & Sarker, S. (2025). Orchestrating digital technologies with incumbent enterprise systems for attaining innovation. *Information & Management, 62*(1), 104066.
- Lokuge, S., Sedera, D., Grover, V., & Xu, D. (2019). Organizational readiness for digital innovation: Development and empirical calibration of a construct. *Information & Management, 56*(3), 445-461.
- Lusch, R. F., & Nambisan, S. (2014). Service innovation: A Service-Dominant (SD) logic perspective. *MIS Quarterly*, *39*(1), 155-175.
- Mahroum, S., Atterton, J., Ward, N., Williams, A. M., Naylor, R., Hindle, R., & Rowe, F. (2007). Rural innovation. *National Endowment for Science, Technology and the Arts (NESTA)*, London, Issue.
- Majchrzak, A., & Markus, M. L. (2012). *Technology affordances and constraints in management information systems* (MIS). Sage Publications.
- Maliszewska, M., van der Mensbrugghe, D., Pereira, M. F. S., Osorio Rodarte, I., & Ruta, M. (2020). African Continental Free Trade Area: Economic and distributional effects. *GTAP Annual Conference on Global Economic Analysis*.
- Moss, M. (2001). Sensemaking, complexity and organizational knowledge. *Knowledge and Process Management, 8*(4), 217-232.
- Mulrooney, T., Liang, C.-L., Kurkalova, L. A., McGinn, C., & Okoli, C. (2023). Quantitatively defining and mapping rural: A case study of North Carolina. *Journal of Rural Studies, 97*, 47-56.
- Nambisan, S. (2013). Information technology and product/service innovation: A brief assessment and some suggestions for future research. *Journal of the Association for Information Systems, 14*(4), 215-226.
- Nambisan, S. (2017). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory and Practice, 41*(6), 1029-1055.
- Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy, 48*(8), 1-9.
- Nardi, B. A., & O'Day, V. (1999). Information ecologies: Using technology with heart. MIT Press.
- National Farmers Federation. (2022). Unprecedented labour crisis across Australia's food supply chain. https://nff.org.au/media-release/unprecedented-labour-crisis-across-australias-food-supply-chain/
- Nelson, K. S., Nguyen, T. D., Brownstein, N. A., Garcia, D., Walker, H. C., Watson, J. T., & Xin, A. (2021). Definitions, measures, and uses of rurality: A systematic review of the empirical and quantitative literature. *Journal of Rural Studies*, 82, 351-365.

- Newbery, R., Siwale, J., & Henley, A. (2017). Editorial: Rural entrepreneurship theory in the developing and developed world. *International Journal of Entrepreneurship and Innovation, 18*(1), 3-4.
- Nyaaba, A. A., & Ayamga, M. (2021). Intricacies of medical drones in healthcare delivery: Implications for Africa. *Technology in Society, 66*, 101624.
- Nylén, D., & Holmström, J. (2015). Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation. *Business Horizons, 58*(1), 57-67.
- Ogundepo, J. (2023). Drones as life-changing tool in medical delivery. Punch. https://punchng.com/drones-as-life-changing-tool-in-medical-delivery/
- O'Reilly III, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. Academy of Management Perspectives, 27(4), 324-338.
- Orlikowski, W. J. (2007). Sociomaterial practices: Exploring technology at work. Organization Studies, 28(9), 1435-1448.
- Overby, E. (2008). Process virtualization theory and the impact of information technology. Organization Science, 19(2), 277-291.
- Pandey, P., Gupta, A. P., Dutta, J., & Thakur, T. K. (2023). Role of artificial intelligence in water conservation with special reference to India. In *Emerging technologies for water supply, conservation and management* (pp. 65-81). Springer.
- Pato, L. (2015). Rural entrepreneurship and innovation: Some successful women's initiatives. 55th Congress of the European Regional Science Association, Lisbon, Portugal.
- Pato, L., & Teixeira, A. A. (2016). Twenty years of rural entrepreneurship: A bibliometric survey. Sociologia Ruralis, 56(1), 3-28.
- Pato, L., & Teixeira, A. A. C. (2021). Do technological factors impact differently on rural and urban new venture performance?: Empirical evidence from the Portuguese case. In S. Lokuge & D. Sedera (Eds.), *Rural entrepreneurship and innovation in the digital era* (pp. 1-19). IGI Global.
- Pethig, F., & Kroenung, J. (2019). Specialized information systems for the digitally disadvantaged. *Journal* of the Association for Information Systems, 20(10), 1412-1446.
- PFAN. (2025). Swajal Water. https://pfan.net/projects_and_stories/swajal-water/
- Pols, A. J. (2012). Characterising affordances: The descriptions-of-affordances-model. *Design Studies*, 33(2), 113-125.
- Porter, M., Sachs, J., & McArthur, J. (2002). *Executive summary: Competitiveness and stages of economic development (The Global Competitiveness Report)*. https://www.earth.columbia.edu/sitefiles/file/Sachs%20Writing/2002/WorldEconomicForum_2001-2002_GlobalCompetitivenessReport2001-2002_ExecutiveSummary.pdf
- Pugliese, D. (2018). Canada budgets a boost for LEO broadband constellations. Space News. https://spacenews.com/canada-budgets-a-boost-for-leo-broadband-constellations/
- Regional Telecommunications Review. (2021). Regional telecommunications review 2021. https://www.infrastructure.gov.au/sites/default/files/documents/regional-telecommunications-review-2021-issues-paper.pdf
- Reserve Bank of Australia. (2022). *Trends in Australia's balance of payments*. https://www.rba.gov.au/education/resources/explainers/trends-in-australias-balance-ofpayments.html
- Roberts, E., Anderson, B. A., Skerratt, S., & Farrington, J. (2017). A review of the rural-digital policy agenda from a community resilience perspective. *Journal of Rural Studies, 54*, 372-385.
- Rousseau, M. B., Mathias, B. D., Madden, L. T., & Crook, T. R. (2016). Innovation, firm performance, and appropriation: A meta-analysis. *International Journal of Innovation Management, 20*(03), 1650033.
- Rural Health. (2021). Rural health in Australia snapshot 2021. https://www.ruralhealth.org.au/rural-healthaustralia-snapshot

- Sadreddin, A., Ahuja, S., & Dang, T. L. P. (2021). Digital technologies in low-resource communities: An exploratory study. *International Conference on Information Systems TREOs*, Austin, USA. https://aisel.aisnet.org/treos_icis2021/17
- Salemink, K., Strijker, D., & Bosworth, G. (2017). Rural development in the digital age: A systematic literature review on unequal ICT availability, adoption, and use in rural areas. *Journal of Rural Studies*, 54, 360-371.
- Sandeep, M., & Ravishankar, M. (2015). Social innovations in outsourcing: An empirical investigation of impact sourcing companies in India. *The Journal of Strategic Information Systems*, 24(4), 270-288.
- Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, *26*(2), 243–263.
- Scott, J. (2000). Social network analysis: A handbook. Sage Publications.
- Scott, S. G., & Bruce, R. A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, *37*(3), 580-607.
- Scott, S. V., & Orlikowski, W. J. (2014). Entanglements in practice. *MIS Quarterly, 38*(3), 873-894.
- Sedera, D., Lokuge, S., Grover, V., Sarker, S., & Sarker, S. (2016). Innovating with enterprise systems and digital platforms: A contingent resource-based theory view. *Information & Management, 53*(3), 366–379.
- Shou, M., Jia, F., Yu, J., & Wu, Y. (2024). Challenges in developing information and communication technology (ICT) use for rural e-governance: An ecology perspective. *Information Systems Journal*, 35(1), 247-278.
- Singh, R., Mathiassen, L., & Mishra, A. (2015). Organizational path constitution in technological innovation: Evidence from rural telehealth. *MIS Quarterly, 39*(3), 643-665.
- Singh, S. (2010). Digital divide in India: Measurement, determinants, and policy for addressing the challenges in bridging the digital divide. *International Journal of Innovation in the Digital Economy* (*IJIDE*), 1(2), 1-24.
- Singh, S., & Bhowmick, B. (2015). An exploratory study for conceptualization of rural innovation in the Indian context. *Procedia-Social and Behavioral Sciences*, 207, 807-815.
- Sirmon, D. G., Hitt, M. A., Ireland, R. D., & Gilbert, B. A. (2011). Resource orchestration to create competitive advantage breadth, depth, and life cycle effects. *Journal of Management, 37*(5), 1390-1412.
- Slavova, M., & Karanasios, S. (2018). When institutional logics meet information and communication technologies: Examining hybrid information practices in Ghana's agriculture. *Journal of the Association for Information Systems, 19*(9), 775-812.
- Soares, L. C., & Bispo, M. d. S. (2017). Learning to cook in light of social practices and organizational aesthetics. *Brazilian Business Review, 14*, 247-271.
- Sonne, L. (2010). *Pro-poor, entrepreneur-based innovation and its role in rural development*. UNU-MERIT, Maastricht Economic and Social Research and Training Centre on Innovation and Technology. https://cris.maastrichtuniversity.nl/ws/portalfiles/portal/704719/guid-af485c7f-3f69-4bd4-9289-a03af9301068-ASSET1.0.pdf
- Stathopoulou, S., Psaltopoulos, D., & Skuras, D. (2004). Rural entrepreneurship in Europe: A research framework and agenda. *International Journal of Entrepreneurial Behavior & Research, 10*(6), 404-425.
- Statistica. (2024). Demographics of Africa statistics & facts. Statistica. https://www.statista.com/topics/7928/demographics-of-africa/
- Streeck, J., Goodwin, C., & LeBaron, C. D. (2011). *Embodied interaction: Language and body in the material world*. Cambridge University Press.
- Subhan, I., Ghazi, S. S., & Nabi, S. (2019). Use of drones (unmanned aerial vehicles) for supporting emergency medical services in India. *Apollo Medicine*, *16*(1), 61-65.

- Tajfel, H. (1981). Human groups and social categories: Studies in social psychology. Cambridge University Press.
- Tan, B., Pan, S. L., Chen, W., & Huang, L. (2020). Organizational sensemaking in ERP implementation: The influence of sensemaking structure. *MIS Quarterly, 44*(4), 1773-1809.
- The Center on Rural Innovation. (2019). Rural America's tech employment landscape: How to increase tech talent and tech employment. https://ruralinnovation.us/resources/reports/report-rural-americas-tech-employment-landscape/
- The Center on Rural Innovation. (2021). *Five startups that show rural innovation is way more than AG tech.* https://ruralinnovation.us/blog/five-startups-that-show-rural-innovation-is-way-more-than-agtech/
- The Vaulz News. (2025). *E-levy Collapsed 17,000 MoMo Businesses- MoMo Agents Association*. The Vaulz News. https://thevaultznews.com/business/vaultz-business/e-levy-collapsed-17000-momo-businesses-momo-agents-association/
- The World Bank. (2020). *The African Continental Free Trade Area*. The World Bank IBRD IDA. https://www.worldbank.org/en/topic/trade/publication/the-african-continental-free-tradearea#:~:text=The%20African%20Continental%20Free%20Trade%20Area%20(AfCFTA)%20agree ment%20will%20create,valued%20at%20US%243.4%20trillion.
- Tien, N. H., Anh, D. B. H., Ngoc, N. M., & Do Thi, Y. N. (2019). Sustainable social entrepreneurship in Vietnam. *International Journal of Entrepreneurship*, 23(3), 1-12.
- Tietjen, P., Ozkan Bekiroglu, S., Choi, K., Rook, M. M., & McDonald, S. P. (2023). Three sociomaterial framings for analysing emergent activity in future learning spaces. *Pedagogy, Culture & Society, 31*(1), 17-36.
- Tim, Y., Pan, S. L., Bahri, S., & Fauzi, A. (2018). Digitally enabled affordances for community-driven environmental movement in rural Malaysia. *Information Systems Journal, 28*(1), 48-75.
- Trendov, M., Varas, S., & Zeng, M. (2019). Digital technologies in agriculture and rural areas: Status report. *Digital Technologies in Agriculture and Rural Areas: Status Report.*
- Twati, J. M. (2008). The influence of societal culture on the adoption of information systems: The case of Libya. *Communications of the IIMA, 8*(1), 1.
- UNCTAD. (2022). World Investment Report 2022: International tax reforms and sustainable investment. https://unctad.org/webflyer/world-investment-report-2022
- United Nations. (2022). 68% of the world population projected to live in urban areas by 2050, says UN. UNU-MERIT Working Papers No. 037. https://www.un.org/en/desa/68-world-population-projected-live-urban-areas-2050-says-un
- Venkatesh, V., & Sykes, T. A. (2013). Digital divide initiative success in developing countries: A longitudinal field study in a village in India. *Information Systems Research*, 24(2), 239-260.
- Venkatesh, V., Sykes, T., & Zhang, X. (2020). ICT for development in rural India: A longitudinal study of women's health outcomes. *MIS Quarterly, 44*(2), 605-629.
- Verburg, P. H., van Berkel, D. B., van Doorn, A. M., van Eupen, M., & van den Heiligenberg, H. A. (2010). Trajectories of land use change in Europe: A model-based exploration of rural futures. *Landscape Ecology*, 25(2), 217-232.
- Vorhies, D. W., & Morgan, N. A. (2003). A configuration theory assessment of marketing organization fit with business strategy and its relationship with marketing performance. *Journal of Marketing*, 67(1), 100–115.
- Vygotsky, L. S. (1978). *Mind in society*. Harvard University Press.
- Waldrop, M. M. (1993). Complexity: The emerging science at the edge of order and chaos. Simon and Schuster.
- Wang, Y., Peng, Q., Jin, C., Ren, J., Fu, Y., & Yue, X. (2023). Whether the digital economy will successfully encourage the integration of urban and rural development: A case study in China. *Chinese Journal of Population, Resources and Environment, 21*(1), 13-25.

- Washington, A. N. (2018). A survey of drone use for socially relevant problems: Lessons from Africa. *African Journal Of Computing & ICT, 11*(3), 1-11.
- Whatmore, S. (2006). Materialist returns: Practising cultural geography in and for a more-than-human world. *Cultural Geographies*, *13*(4), 600-609.
- Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). Research commentary: The new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research, 21*(4), 724-735.
- Zaltman, G., Duncan, R., & Holbek, J. (1977). Innovations and organizations. John Wiley & Sons.
- Zand, F. (2011). Information technology and firm performance: The role of innovation. TU Delft, Delft University of Technology.
- Zavala, M. (2013). What do we mean by decolonizing research strategies? Lessons from decolonizing, Indigenous research projects in New Zealand and Latin America. *Decolonization: Indigeneity, Education & Society, 2*(1), 55-71.

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