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Adoption of ICT by rural entrepreneurs in Mnquma Local Municipality of South Africa in the wake of digital citizenship and e-commerce surge

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Abstract

The significance of Information and Communication Technologies (ICTs) in driving socio-economic development in the rural areas of developing nations is undeniable, particularly in today's increasingly interconnected digital landscape. ICTs enable the effective capture, processing, and dissemination of information across various formats, including text, images, videos, and audio. This capability helps bridge the geographic and informational divides that often limit access to opportunities in these communities. By fostering communication and providing access to essential resources, ICTs enable rural populations to engage more fully with broader economic systems and markets.

Despite these advantages, existing research consistently highlights barriers to ICT adoption and effective use in rural areas. Cultural norms, demographic characteristics, and individual perceptions about technology significantly impede progress. These factors underline the complexity of integrating technology into rural economies and underscore the importance of context-sensitive approaches to adoption. Addressing these barriers is crucial for achieving inclusive socio-economic growth and ensuring these communities are not left behind in the digital age.

This study adopted a purposive sampling method, selecting 85 rural entrepreneurs to assess their ICT adoption and usage patterns, focusing on their perceptions of technology's role in enhancing business capacity. The findings reveal that while ownership of ICT devices is relatively high—smartphones were universally owned, with 31.76% of participants possessing laptops, 17.65% using tablets, and 34.12% owning desktop computers—a significant skills gap persists. Most participants lack foundational digital competencies and knowledge of e-business practices, hindering their ability to maximise the potential of these tools.

To address these challenges, affordable access to ICT infrastructure must be coupled with tailored training programmes to develop digital literacy and e-business skills. Such initiatives, ideally spearheaded by provincial governments or development agencies, should be designed to empower rural entrepreneurs, equipping them with the tools and knowledge needed to capitalise on digital opportunities. These measures can transform rural socio-economic development by fostering sustainable business practices and strengthening local economic resilience.

Keyword: *Entrepreneurs, Developing nations, Digital skills, ICTs uptake and use, Rural communities*

1 Introduction and Study Background

In the contemporary information era, individuals' socio-economic development and well-being increasingly rely on access to information and the effective use of Information and Communication Technologies (ICTs). This dependency is particularly pronounced amidst the digital and e-commerce revolution, which has transformed global economic and social landscapes. The United Nations Sustainable Development Goals (SDGs) encapsulate this principle, underscoring the importance of fostering public access to information and enhancing ICT skills to empower individuals and communities (United Nations, 2015). Many national governments have proactively designed and implemented strategic policies to bridge the digital divide in response to the growing recognition of digital transformation as a cornerstone of socio-economic development. These initiatives focus on expanding access to ICTs while enhancing their populations' digital literacy and technical competencies (UNESCO, 2021; World Bank, 2022). The digital divide, which manifests in disparities in ICT accessibility, affordability, and usage, remains a pressing global challenge, particularly in developing nations where

infrastructural and socio-economic barriers hinder widespread technology adoption (Hilty & Aebischer, 2015; Van Dijk, 2020).

Governments worldwide have recognised that fostering digital inclusivity requires a multifaceted approach, including investments in broadband infrastructure, subsidised access to digital devices, ICT-centred educational reforms, and promoting public-private partnerships to drive innovation (OECD, 2021). For instance, the European Commission's *Digital Compass 2030* initiative aims to ensure that at least 80% of European adults possess basic digital skills by the decade's end (European Commission, 2021). Similarly, the African Union's *Digital Transformation Strategy for Africa (2020–2030)* emphasizes digital infrastructure expansion, ICT education, and entrepreneurship support as key pillars for economic and social progress (African Union, 2020).

Despite these global efforts, challenges persist, particularly in rural and marginalised communities where digital illiteracy, financial constraints, and inadequate ICT infrastructure limit meaningful participation in the digital economy (Robinson et al., 2015; Warschauer, 2018). To address these challenges, researchers advocate for inclusive digital policies that consider socio-economic factors, gender disparities, and localised technology adoption models to ensure that all population segments benefit equitably from ICT advancements (Helsper, 2021). Moreover, with the rapid evolution of artificial intelligence, big data, and automation, governments are recognising the need for adaptive policy frameworks that not only bridge the digital divide but also equip citizens with the necessary competencies to thrive in the future digital workforce (Manyika et al., 2017).

Central to this global discourse is the concept of digital citizenship, which Farmer (2011) defines as the capacity of individuals to engage with technology responsibly, critically, productively, and civically. Digital citizenship emphasizes access to ICTs and their ethical and effective utilisation. This focus is particularly pertinent in rural communities in developing countries, where barriers such as cultural practices, inadequate infrastructure, and socio-economic disparities hinder the adoption of ICTs (UNESCO 2021; Okon, 2015; African Union 2020; World Bank 2022). Meijer et al. (2018) also argue that achieving digital citizenship requires addressing systemic inequalities restricting ICT access and usage.

In African rural contexts, the challenges to achieving digital citizenship are manifold. Limited infrastructure, high costs of connectivity, and low levels of digital literacy remain critical barriers

(UNESCO 2021). Cultural practices and socio-economic conditions further exacerbate these issues, creating a digital chasm between rural and urban populations. Addressing these barriers necessitates an in-depth understanding of the unique dynamics of rural communities, including their specific needs and the socio-cultural factors that influence their engagement with technology (Helsper 2021; Meijer et al. 2018; African Union 2020).

Insights from these contexts are crucial for developing targeted strategies to foster ICT adoption and digital literacy in rural areas. Such strategies could include investing in ICT infrastructure, designing culturally sensitive digital literacy programmes, and promoting affordable access to technology. Policymakers and stakeholders should also prioritise empowering rural populations through participatory approaches that integrate their perspectives and address their specific challenges.

Promoting digital citizenship in rural African communities holds the potential to transform these regions by integrating them into the digital economy. This integration can drive socio-economic advancement by creating new opportunities for education, entrepreneurship, and civic engagement, ultimately improving the quality of life and reducing inequalities between rural and urban areas. By bridging the digital divide, governments and development agencies can empower rural populations to harness the transformative potential of ICTs.

2 Description of the Study Problem

The International Telecommunication Union (ITU) report 2022 on global internet usage revealed that more than half of the world's population remains offline, with a significant proportion of this demographic residing in the rural areas of developing nations. This analysis highlighted Africa's ongoing issues with the availability, affordability, uptake, and utilisation of information and communication technologies (ICTs), adding that the continent ranked last on the ICT Development Index (IDI).

In South Africa, the 2020 State of ICT report indicated a growing ICT and internet access penetration within regions previously designated as Black homelands. However, a notable paucity of literature exists concerning the engagement of rural entrepreneurs in these areas with ICT tools and how these technologies can bolster their business activities in today's digital economy (Moyo et al., 2018). Scholars such as Warschauer (2018), Okon (2015), and Van Dijk (2020) emphasise that

the mere existence of ICT infrastructure and internet connectivity does not guarantee developmental progress. Instead, addressing the underlying factors influencing effective technology adoption and usage is essential.

Helsper (2021) argues that the individual characteristics of users, such as socio-economic background, education level, and digital skills, are more critical to the uptake and use of ICTs than the technologies themselves. Furthermore, Venkatesh et al. (2003) identified key determinants of user acceptance of information technology, highlighting two crucial variables: the perceived fit of the technology with user needs and the perceived ease of use. These insights suggest that individual characteristics and perceptions of ICT among rural entrepreneurs can significantly impede their ability to adapt and effectively use these technologies to enhance their business operations (Warschauer 2018; OECD 2021; UNESCO 2021).

Few studies have thoroughly examined the intricate interplay between socio-economic background, educational attainment, and digital competencies in shaping the adoption of ICT by rural SMME entrepreneurs, particularly within the context of Mnquma Local Municipality. This gap in the literature underscores a critical need for an in-depth exploration of how these variables act as both facilitators and impediments to digital adoption, thereby influencing the trajectory of economic development and business sustainability in rural settings. Therefore, this study explores how demographic factors such as education, digital skills, and access to ICT tools, alongside entrepreneurs' perceptions of these technologies, can act as barriers to their adoption and use. The goal is to identify strategies to facilitate effective ICT utilisation among rural entrepreneurs in developing nations, empowering them to capitalise on the opportunities presented by the e-commerce revolution.

2.1. The study objectives

The specific objectives of the study are to:

1. Establish the participant's demographic background regarding the specific variables (education, e-skills).
2. Determine the participant's perceived usefulness of ICT.
3. Determine how ICT tools are available to support their business activities.
4. Propose strategic measures to improve ICT applications among entrepreneurs.

3 Literature review

The potential digital dividends associated with technological deployment, such as empowering disadvantaged populations and stimulating economic growth in underdeveloped regions, underscore governments' need to invest in technology within marginalised areas (Heeks, 2018; Deichmann, 2019). The digital revolution and the integration of ICTs have fundamentally transformed societies and economies globally (Abdurakhmanova et al., 2021). Businesses are increasingly adopting digital processes, utilising ICT applications to enhance procurement efficiency, optimise production workflows, and better connect with customers and suppliers (Mosteanu et al., 2020; Myovella et al., 2020).

In the modern era of digitalisation, ICT adoption enables SMMEs to streamline operations, reduce transaction costs, expand market reach, and improve efficiency in resource utilisation (Alford & Page, 2015; Wanjohi, 2020). This adoption is particularly crucial for rural enterprises, which often operate in resource-constrained environments with limited access to markets, financial resources, and skilled labour.

ICTs such as mobile phones, the internet, cloud computing, and e-commerce platforms provide rural SMMEs with tools to overcome traditional barriers to growth. For instance, mobile technology has facilitated communication, enabled real-time access to market information, and improved customer relationships (Muthee & Njihia, 2018). Furthermore, e-commerce platforms empower rural enterprises to reach broader customer bases, bypassing geographical limitations and increasing revenue streams (Kabanda & Brown, 2017). By leveraging ICTs, SMMEs in rural areas can also improve supply chain management, inventory control, and financial reporting, critical components of productivity enhancement (Chatterjee & Kar, 2020).

In South Africa, the legacy of the apartheid system, which confined Black populations to rural areas and marginalised them from mainstream economic activities, has resulted in the formation of many SMMEs within historically Black communities (Bvuma & Marnewick, 2020; Mbuyisa, 2017). It was not until the late 1970s and early 1980s that the South African government formally recognised the SMME sector by establishing the Small Business Development Corporation (SBDC) to facilitate opportunities for SMMEs. Despite the government's efforts and various interventions designed to enhance the viability of SMMEs, significant challenges remain that hinder their effective participation in both the South African economy and the broader global market (Bvuma

& Marnewick, 2020; Mbuyisa, 2017; Myeko & Madikane, 2019; Ajibade, 2016).

4 Research Methods

4.1 The underpinning frameworks for the study

The study draws on the frameworks established by Venkatesh et al. (2003) and Van Dijk and Hacker (2003) to explore the interplay between digital opportunities and perceptions of ICTs. Venkatesh et al. (2003) emphasise that users' perceptions significantly influence their willingness to adopt and utilise technology, suggesting that when individuals see technology as beneficial for enhancing their tasks, they are more likely to engage with it. This indicates that perceived usefulness and ease of use are critical factors in technology acceptance.

In contrast, Van Dijk and Hacker (2003) highlight that a lack of digital opportunities is often linked to insufficient access to ICT equipment, as well as psychological barriers such as disinterest, the perceived unattractiveness of new technologies, and a general fear or apprehension towards adopting unfamiliar technological tools. These barriers can significantly hinder the uptake of ICTs, particularly in underrepresented communities where the gap between technology availability and user engagement remains pronounced.

Recent literature reinforces these findings, illustrating that access to technology is about physical availability and social and psychological dimensions that affect how communities perceive and utilize digital tools (Helsper & Reisdorf, 2016; Van Deursen & Helsper, 2015). For instance, Helsper and Reisdorf (2016) argue that digital skills and supportive environments are essential for fostering positive attitudes toward ICTs and enhancing user engagement. Additionally, Van Deursen and Helsper (2015) found that individuals with higher levels of digital skills are more likely to view technology as a valuable resource, leading to greater participation in the digital economy.

The psychological barriers and perceived usefulness identified in Van Dijk's (2003) and Venkatesh et al. (2003) frameworks, particularly regarding the perceived unattractiveness of new technologies, present a significant challenge to technology adoption among rural small, micro, and medium enterprises (SMMEs). These barriers are often rooted in a lack of digital literacy and the perceived irrelevance of technology to improve productivity, as observed in rural business contexts. Such

perceptions hinder the effective integration of ICT tools into business operations, limiting the potential for growth and innovation. To address these challenges, the study included an assessment of participants' educational backgrounds, digital abilities, and access to ICT resources. This approach aimed to provide a comprehensive understanding of how these factors interact to shape the attitudes and behaviours of rural SMMEs toward adopting new technologies.

Studies have revealed that educational achievement has a significant impact on digital competency and willingness to embrace technological change. Entrepreneurs with higher levels of education are more likely to perceive ICTs as valuable tools for enhancing productivity and competitiveness (Muthee & Njihia, 2018; Kabanda & Brown, 2017).

Similarly, the level of digital literacy among rural SMME operators significantly affects their ability to navigate and utilise technological tools effectively. For instance, research by Njoku et al. (2021) highlights that limited digital skills constrain the adoption of ICT and exacerbate perceptions of its complexity and irrelevance. This aligns with Van Dijk's assertion that digital skills are a prerequisite for overcoming psychological barriers to technology adoption.

Thus, this study aims to provide a nuanced understanding of how perceptions and access to ICTs influence the digital opportunities available to users, particularly in rural and underprivileged communities. By addressing both the psychological and structural barriers to technology adoption, policymakers can better design interventions that promote digital inclusion and empower individuals to harness the full potential of ICTs.

4.2 The Study Data Collection Approach

Since there is no existing database on the study area of rural SMME entrepreneurs, the researchers employed a purposive sampling technique to survey within the designated study area, utilising a self-administered questionnaire as the primary data collection tool. This approach was selected to ensure that participants were specifically drawn from small, micro, and medium enterprises (SMMEs) operating in rural environments, thereby aligning with the study's objectives of gathering insights from individuals whose business activities are directly relevant to the research (Creswell & Creswell, 2018). The focus was on SMMEs characterised by a workforce ranging from one to fifteen employees

under the National Small Business Amendment Act 29 of 2004, which defines these categories (NSBAA, 2004).
The researchers' proactive outreach efforts to encourage participation resulted in 85 respondents ultimately consenting to participate and completing the questionnaire.

Recent literature emphasises the importance of purposive sampling in exploratory research, particularly in contexts where specific characteristics are necessary to address the research questions effectively (Creswell & Creswell 2022). By focusing on participants with pertinent experience and operational insights, the researchers aimed to enhance the validity and relevance of their findings, contributing valuable perspectives on the integration of ICTs within rural SMMEs.

In the current research, a combination of open-ended and closed-ended questions was employed as part of the data collection strategy to ensure comprehensive validation of findings. This methodological approach was designed to capture both qualitative and quantitative dimensions of the research problem, thereby enhancing the depth and breadth of the study. Closed-ended questions provided structured responses, enabling the collection of standardized data that could be easily quantified and statistically analysed. This facilitated the identification of patterns, trends, and correlations within the dataset, ensuring the reliability of the findings (Creswell & Creswell, 2018).

On the other hand, open-ended questions allowed participants to express their views, experiences, and insights in their own words, providing rich, detailed qualitative data. This approach was particularly valuable for uncovering nuanced perspectives that might not emerge through structured questioning alone. By capturing the complexity and diversity of participants' responses, using open-ended questions contributed to a more holistic understanding of the phenomena under investigation.

5. The Study's Empirical Findings, Presentation, and Discussion

A substantial body of scholarly research has underscored the pivotal role of Information and Communication Technologies (ICTs) in strengthening the operational capacities, competitiveness, and overall sustainability of Small, Micro, and Medium Enterprises (SMMEs) in diverse economic landscapes. ICT adoption has been widely recognised as a catalyst for business growth, efficiency enhancement, and market expansion, particularly in developing economies where digital

transformation remains a critical driver of economic resilience (Afolayan et al., 2020; Chimucheka & Mandipaka, 2015).

Empirical studies have demonstrated that ICT tools—ranging from cloud computing and enterprise resource planning systems to digital marketing, e-commerce platforms, and mobile applications—enable SMMEs to streamline operations, improve decision-making through data analytics, and enhance customer engagement (Müller et al., 2018; Niebel, 2018). Furthermore, access to digital financial services, such as mobile banking and fintech solutions, has empowered small businesses to overcome capital constraints and expand their reach in previously inaccessible markets (Bongomin et al., 2020).

Fosu (2018) further emphasised the necessity for education and training in ICT applications among SMME entrepreneurs in Buffalo City Metro, suggesting that a lack of digital literacy could impede their ability to fully engage with the opportunities presented by the global digital economy. This highlights a crucial need for targeted capacity-building initiatives that equip entrepreneurs with the skills to leverage ICTs effectively.

Recent literature supports that enhanced digital literacy and targeted training programs can foster greater ICT adoption among SMMEs, improving business outcomes and competitiveness in an increasingly digital marketplace (Bwalya & Zulu, 2019; Afolayan et al., 2020). By addressing the barriers to ICT adoption and enhancing the skills of entrepreneurs, developing nations can better position their SMMEs to capitalise on the benefits of the digital economy.

The findings of the current study are presented according to the study objectives below:

5.1 Educational background and e-skills of the study respondents

According to Myeko and Madikane (2019), the decision power of operational running of SMMEs ultimately rests on the SMMEs owner, although a manager may be employed. The work of Chiliya and Roberts-Lomberts (2012) has revealed a direct impact of the level of education and skills of SMME owners on the financial performance of their businesses. The current study respondent's educational background and e-skills are presented in Tables 1 and 2 below:

Table 1: Educational backgrounds

Educational level	Frequency	Percentage
No formal education	38	44.71
Primary educational level	21	24.71
Secondary educational level	13	15.29
College level	5	5.88
University level	8	9.41

The findings in Table 1 indicated 44.71% of no formal education, 24.71% of primary education level, 15.29% of the secondary, and an accumulated percentage of 15.29% for college and university levels. The low educational levels among the study respondents have the potential not only to hinder the financial performance of their business, as demonstrated by Chiliya and Roberts-Lomberts (2012), but also the uptake and use of new ICTs. Literature is evidence of studies that show how a low educational level affects an individual's uptake and use of new technologies (Okon, 2015; Meijer et al., 2018, Musa et al., 2014; Helsper, 2021).

For an entrepreneur to participate in the contemporary era of e-commerce requires ICT infrastructure coupled with some basic e-skills, such as making and uploading videos, pictures, etc., on various digital platforms to profile and advertise their business and products to potential online customers. The study assesses some basic e-skills deemed necessary for individuals to participate in e-commerce. Respondents were allowed to choose as many as applicable to them.

Table 2: e-skills and e-business knowledge

Basic e-skills	Frequency	Percentage
Able to write and send messages via emails and social media	47	55.29
Able to attach documents to emails and social media messages	32	37.65
Able to write a personal letter, a brief description of an event, or a report using the Microsoft Word package	25	29.41
Fill out online forms	25	29.41
Able to take pictures, make videos, and send or upload them to a digital platform	28	32.94
e-business skills		
Have a website for my business	6	7.05
Have business account pages on various social media platforms for my business	12	14.12

The data presented in Table 2 reveal that 55.29% of respondents possess the skills necessary to write and send messages via email and social media platforms. However, a significantly lower percentage—only 29.41%—reported being proficient in utilising Microsoft Word to compose letters, create brief event descriptions, write reports, and fill out online forms. This disparity is noteworthy, as it may severely limit the respondents' ability to participate effectively in e-commerce activities.

E-commerce inherently relies on digital communication, where transactions are facilitated online and necessitate sharing essential information, including detailed descriptions of products and services, written explanations, and contractual agreements (Kshetri, 2018). Consequently, a lack of proficiency in these fundamental skills can act as a barrier to entry for smallholder entrepreneurs aiming to engage in e-commerce, thereby restricting their market opportunities.

Moreover, social media platforms offer substantial potential for market entry, enabling small-scale entrepreneurs to advertise their products and establish a presence in the global marketplace. Despite this potential, only 14.12% of respondents indicated they had created business pages on various social media platforms. This limited engagement highlights a critical gap in leveraging digital tools for business development. The ability to effectively utilise social media for marketing is essential in today's digital economy, where online visibility can significantly enhance customer reach and engagement (Mochalova & Hadrava, 2020).

Therefore, enhancing digital literacy and training on essential software and online platforms is imperative. Such initiatives would empower entrepreneurs to fully capitalise on the opportunities presented by the digital landscape and engage more effectively in e-commerce (Fosu, 2018; Molla & World Bank, 2021).

5.2 ICT devices available to respondents

The study was assessed in a guided closed-ended questionnaire to establish ICT devices available to participants, with the option of choosing as many as applicable. To either become a digital citizen or participate in e-commerce demands, if not ownership, access to some ICT devices. The study findings of ICT devices available to participants are presented in Table 3 below:

Table 3: ICT devices available to respondents

ICT device type	Frequency	Percentage
Smartphone	85	100
Computers	29	34.12
Laptop	27	31.76
Tablet	15	17.65
Telephone	10	11.76
CCTV cameras	25	29.41
Photocopier machine (with fax & emailing application)	19	22.35
Digital scanning devices	12	14.12

The findings of this study corroborate the South African State of ICT Report (2022), which indicates a remarkably high prevalence of mobile phone ownership among rural communities in South Africa. The study reveals that 100% of respondents own a mobile phone, suggesting they possess the necessary tools to participate in e-commerce activities effectively.

Access to smartphones equips respondents with the ability to establish and manage various social media accounts, which can serve as platforms for business promotion and customer engagement. This capability is critical, as social media has become essential for small enterprises to reach broader markets and enhance visibility (Kaplan & Haenlein, 2010). Moreover, smartphones facilitate mobile banking transactions, allowing entrepreneurs to conduct financial operations conveniently and securely. This is crucial in the context of limited access to traditional banking services in rural areas (Nicolas & Hu, 2021).

Additionally, smartphones empower users to create multimedia content, such as videos and photographs, which can be utilised for marketing purposes. This ability to showcase products visually is increasingly important in capturing the attention of potential customers in a competitive online marketplace (Huang & Benyoucef, 2017). Consequently, the complete ownership of smartphones among the respondents indicates a significant opportunity for these rural entrepreneurs to harness digital technologies for business growth and development.

In summary, the widespread ownership of mobile phones, particularly smartphones, positions respondents favourably for engaging in e-commerce, facilitating communication and transaction capabilities, and enhancing their marketing strategies through digital content creation.

5.3 Respondents' perceptions of ICTs and their usefulness

Literature shows how individuals' perception of technology influences their uptake and use (Venkatesh et al., 2003; Van Dijk and Hacker, 2003).

The study findings on respondents' perception of ICTs and their usefulness are presented in Table 3 below:

Table 3: perceptions of ICTs

Statements	Strongly agree (%)	Agree (%)	Not sure (%)	Strongly disagree (%)	Disagree (%)
ICTs are valuable in enhancing business operations	14.12	28.24	41.18	9.41	7.08
ICTs help in increasing business market access	11.10	25.40	40.63	8.47	14.40
ICTs are valuable in enhancing business productivity	10.59	25.32	42.25	7.98	13.86
ICTs assist in reducing business operational cost	17.15	46.74	26.11	4.64	5.36
ICTs assist in enhancing effectiveness and efficiency	16.99	27.58	43.01	6.23	6.19

A notable pattern of uncertainty emerged among respondents, with an average of 38.64% expressing ambivalence regarding guided statements about the potential benefits businesses can derive from applying ICTs (see Table 3). This finding underscores the need to address respondents' perceptions concerning the advantages of ICT utilisation, as such perceptions could hinder their willingness to adopt and effectively employ these technologies to enhance their business operations. According to Van Dijk and Hacker (2003), such a lack of clarity regarding the benefits of digital tools can lead to diminished opportunities for entrepreneurs, particularly within the context of the current e-commerce revolution.

The hesitancy demonstrated by the respondents reflects a broader trend observed in various studies, which suggests that a lack of awareness and understanding of the advantages of ICTs can significantly impede their adoption in developing regions (Gomez et al., 2016; Jansen et al., 2019). Furthermore, this uncertainty can perpetuate the digital divide, exacerbating existing inequalities and limiting rural entrepreneurs' capacity to leverage the digital economy's full potential.

To foster a more robust uptake of ICTs among rural entrepreneurs, it is imperative to develop targeted educational initiatives that inform them about the specific benefits of these technologies and provide practical demonstrations of how ICTs can enhance their business activities. Entrepreneurs may be more likely to accept digital tools if they have a better knowledge of their potential influence on productivity and market access.

5.4 How respondents applied ICTs to support their business activities

The respondent's application of available ICT devices to support their business activities was assessed in an open-ended questionnaire. The responses are presented in common themes with corresponding percentages.

Table 4: Respondent's application of the available ICT tools

Common themes	Frequency	Percentage
Facilitate communication between myself, my customers, and suppliers.	85	100
It assists me with banking (mobile banking), receiving customer payments, and paying my suppliers through cash-sent applications.	76	89.41
It assists in tracking the company vehicle movement, staff reporting, and closing time.	37	43.53
It assists in providing security to my store, factory, and building where my business operates.	38	44.71

The data presented in Table 4 indicates that respondents utilise the available ICT tools to enhance their business activities at operational levels. This aligns with the assertion made by Salehan and Negahban (2013), who highlighted that the technological revolution, driven by integrating ICT devices into business practices, has led to an increased adoption and utilisation of these technologies within operational frameworks. However, this initial adoption must be maintained and strategically guided to maximize the potential benefits of the e-commerce revolution in the modern economic landscape.

To effectively capitalise on these opportunities, it is essential to implement structured training and support systems that encourage entrepreneurs to deepen their engagement with ICT tools. Recent literature emphasises that fostering digital literacy among small and micro enterprises (SMMEs) is vital for enhancing their competitiveness and enabling them to navigate the complexities of the digital economy (UNCTAD, 2021; OECD, 2020). Furthermore, as businesses transition into more digitally orientated models, the capacity to leverage ICT tools for activities such as marketing, customer engagement, and operational efficiency becomes increasingly important (Zhao et al., 2022).

Thus, while respondents' current use of ICTs reflects a positive step towards embracing digital tools, concerted efforts are required to cultivate their skills and understanding of these technologies. This

nurturing process can empower rural entrepreneurs to adopt ICTs and innovate and optimise their business practices in alignment with the dynamic demands of the e-commerce sector.

6. The Study Conclusion and Proposed Strategies

Revolutions invariably bring about specific transformations and requirements that redefine operational paradigms. The current digital revolution has catalysed the emergence of e-commerce, compelling businesses to adapt their trading operations to enhance effectiveness, efficiency, sustainability, and productivity. This paradigm shift does not exempt enterprises in rural areas of developing nations from its impact.

The present study explores how demographic factors and perceptions among rural entrepreneurs can act as barriers to the adoption and utilisation of ICTs in enhancing their business operations within the context of the e-commerce revolution. Moreover, it proposes strategies to promote effective ICT usage among rural entrepreneurs in developing nations. While the findings of this study may not be broadly generalisable to all isolated rural entrepreneurs across developing countries, previous research by Meijer et al. (2015) indicates that similar developmental challenges are prevalent in these contexts. Therefore, it is reasonable to suggest that the insights derived from this study could resonate with the experiences of rural entrepreneurs in other developing nations.

The study's results reveal that, despite the low levels of e-skills and education among respondents, these entrepreneurs have significant potential to engage in e-commerce, particularly with appropriate interventions. To this end, several strategies are proposed to facilitate the digital capacity development of these entrepreneurs:

1. ***Leveraging Mobile Phone Ownership***: Given the high rate of smartphone ownership among participants, it is crucial to focus on utilising mobile phones as tools for digital capacity development. This technology can be a gateway for entrepreneurs to access essential resources and training.
2. ***User-Friendly Applications in Local Languages***: To support digital capacity building, it is recommended that user-friendly mobile applications be developed, incorporating local languages. Such applications can provide guidance and training tailored to the unique needs of rural entrepreneurs, facilitating their understanding and use of ICTs.

3. ***Promoting Access to Modern ICT Infrastructure***: As global economies increasingly rely on advanced ICT applications, it is essential for governmental agencies responsible for promoting small, micro, and medium enterprises (SMMEs) to ensure continuous access to modern ICT infrastructure at affordable prices. This includes fostering skill development in e-business knowledge and enhancing digital literacy among rural entrepreneurs.

Finally, future research should focus on conducting comprehensive behavioural studies to identify and quantify the factors that drive rural entrepreneurs' intentions to utilise mobile phones for capacity development. This understanding will be instrumental in designing targeted interventions that address these entrepreneurs' barriers in the digital landscape.

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