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Leveraging Information Technology for Growth in Rural Small and Medium Enterprises

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Abstract:

Small and medium enterprises (SMEs) are widely recognized as key drivers of economic growth and development, particularly in developing regions. Rural SMEs (RuSMEs) in particular, empower local communities by creating jobs and developing skills. However, RuSMEs in South Africa's North-West Province and Zimbabwe's Masvingo Province experience major challenges in implementing information technology (IT) due to infrastructural and financial restraints. This study aims to assess IT adoption among RuSMEs, identifying barriers and proposing strategies for sustainable growth. This study used a Systematic Literature Review (SLR) following PRISMA guidelines, analyzing peer-reviewed research from 2021–2025 on IT adoption and sustainability in rural SMEs. Data were obtained from Scopus, Web of Science, and ScienceDirect, using thematic coding and conceptual frameworks (UTAUT, TOE). The results expose extremely low IT adoption among these two provinces. This study concludes that the low adoption is caused by barriers shared in the provinces: including high costs, limited digital literacy, poor infrastructure, and weak government support. Recommendations include reducing technology costs through subsidies, enhancing rural digital infrastructure, implementing customized ICT training, promoting collaborative networks, and strengthening policy support. Future research should focus on longitudinal studies, comparative regional analyses, and assessing the effectiveness of targeted interventions and digital financial services.

Keywords:

Digital Barriers, IT Adoption, Rural SME Development, Sustainable Development.

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Introduction

There is a general concurrence that small and medium enterprises (SMEs) are the engine of countries' economies in that where SMEs are ineffective, economic levels are deficient and where SMEs thrive, economies flourish (Rahmawati, 2025). Historically, rural SMEs (RuSMEs) have a history that in regions where there are flourishing and socially responsible traders, rural residents also do well economically. The projects of local RuSMEs are given to the locals, thus empowering the locals [such as skilling them and saving them from applicable mischiefs] and giving them earning opportunities. Employment opportunities of RuSMEs are often given to locals, for convenience of the business. These alone, expose that RuSMEs play a central role in nurturing economic development and creating employment opportunities in developing regions. In particular, the rural areas of the North-West Province in South Africa and Masvingo Province in Zimbabwe experience unique challenges and opportunities in utilizing information technology (IT) as a catalyst for business growth. Despite their potential, RuSMEs in these rural areas often encounter barriers such as limited infrastructure, inadequate internet connectivity, financial constraints, and insufficient government support, which deter the effective adoption of IT in their operations. Leveraging IT offers a strategic pathway for enhancing the competitiveness, productivity, and sustainability of RuSMEs (Sandeep et al., 2025). Sarcea et al. (2024) enlighten that the incorporation of IT tools in RuSMEs' operations can improve business processes, customer engagement, and market access. IT support within RuSMEs can support the overall economic resilience of rural communities. However, there are indications that IT adoption levels by SMEs in general, and RuSMEs in particular, is low because of factors such as lack of affordable technology solutions, limited policy interventions targeted at rural enterprises, and low digital literacy. The utilization of IT in RuSMEs by rural business owners entails the use of numerous digital instruments and applications to improve efficiency, market access, and productivity for businesses owned by rural business owners. IT utilization is identified as adopting IT to improve business competitiveness and sustainability, especially in the context of facing increasingly complex market challenges. This study focuses on understanding the IT adoption dynamics among RuSMEs in the North-West Province of South Africa and Masvingo Province of Zimbabwe, targeting to highlight the significant factors influencing technology usage and to propose actionable strategies to support rural RuSMEs in connecting IT for sustainable growth.

Research Objectives

- To assess the current level of IT adoption among RuSMEs in the North-West Province of South Africa and Masvingo Province of Zimbabwe.
- To identify the key factors influencing the adoption and utilization of IT by RuSMEs, including perceived usefulness, financial constraints, infrastructure availability, digital literacy, trust, and government support.

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- To determine the challenges and barriers that RuSMEs experience in integrating IT into their business operations and growth strategies.
- To evaluate the impact of IT adoption on competitiveness, productivity, market access, and financial inclusion of RuSMEs in the selected provinces.
- To explore the role of specific digital tools like e-commerce and fintech in supporting business growth and economic resilience of RuSMEs.

To propose actionable recommendations and strategies for policymakers, stakeholders, and practitioners to enhance IT adoption and leverage technology for sustainable development of RuSMEs in these regions.

Literature Review

Success Factors and Challenges of RuSMEs

RuSMEs experience unique challenges in adopting and leveraging IT for business growth due to infrastructural, financial, social, and organizational constraints (Edobor & Sambo-Magaji, 2025). Numerous studies (Gilani et al., 2025; Narwane et al., 2019; Yusof et al., 2025) have explored the factors influencing IT adoption among RuSMEs, with particular attention to contexts where barriers are more pronounced. Some important enhancers of RuSMEs identified are access to finance, broadband adoption, collaboration and partnerships, consumer awareness and local demand, digital infrastructure, infrastructure development, innovation, market access, skills development, support ecosystems, and technology adoption. The barriers and challenges of these businesses were identified as cultural and social barriers, environmental and climate risks, information gaps, limited access to finance, limited human capital, low ICT and digital literacy, market access constraints, poor infrastructure, and weak institutional support, among others. IT adoption by RuSMEs is multilayered, administered by environmental, organizational, and technological factors.

Common Standard Frameworks

Two extensively recognized frameworks that help synthesize these dimensions are the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology-Organization-Environment (TOE) frameworks with proven well-suited for studying technology adoption in RuSMEs across various geographic settings (Shahi & Chaudhary, 2025; Shrestha et al., 2025).

UTAUT: According to Hidayat (2025), the UTAUT framework mixes core determinants of user acceptance, mainly effort expectancy, performance expectancy, social influence, and facilitating conditions. For instance, research in South Africa (Adeel & Irshad, 2025; Kgaabi, 2022) has confirmed that constructs such as performance expectancy (the belief that IT will improve business operations)

and effort expectancy (the perceived ease of using technology) positively impact rural micro-entrepreneurs' intentions to adopt technologies such as mobile applications. Facilitating conditions and behavioural intentions serve as strong determinants of usage behavior among RuSMEs as well.

TOE: Accompanying UTAUT, according to Malik et al. (2021) and Shahadat et al. (2023), the TOE framework situates technology adoption within three contextual dimensions: technological factors (such as compatibility, complexity, and perceived risk), organizational factors (including digital literacy, financial resources, and management support), and environmental factors (like infrastructure availability, government policy, and market competition). Studies that focus on RuSMEs in Malaysia (Alam et al., 2022; Lee, 2023; Ratnasingam et al., 2024; Sauh et al., 2024), which have similar socio-economic settings with some regions of rural South Africa and Zimbabwe, used an integrated framework guided by UTAUT and TOE to identify critical drivers and barriers experienced by RuSMEs in adopting technology. This Malaysian research identified 12 significant factors, the four leading ones being government support, organizational readiness, social influence, and competitive coercion prompting acceptance in these settings.

Customizing the frameworks: The importance of tailoring these frameworks to rural settings is stressed in literature on agricultural and RuSMEs (Korsgaard et al., 2025). These settings are where barriers such as limited policy interventions, insufficient infrastructure, and low digital literacy tellingly constrain IT adoption. Several recent studies in rural agricultural communities (Cahyani et al., 2024; Korsgaard et al., 2025; Nafar et al., 2025) have expanded the UTAUT model to integrate behavioral intentions with actual usage. They emphasize factors like price value and socio-demographic moderators tailored specifically to rural enterprises.

Merging UTAUT and TOE: Integrating UTAUT and TOE frameworks provides an inclusive lens for appraising the way RuSMEs navigate technological innovation adoption (Abulail et al., 2025; Aish & Noor, 2025). This synergy captures individual behavioral intentions and broader organizational and environmental influences. This is important for detecting effective strategies and policy interventions to support RuSME development.

Therefore, the conceptual framework for this study draws from this rich body of literature. It integrates core components grounded in IT adoption research, combining individual (UTAUT) and multi-level contextual factors (TOE) that are mostly relevant for RuSMEs operating in North-West and Masvingo. This tactic aligns with evidence that a multi-dimensional interpretation of technology adoption barriers and enablers is necessary to promote sustainable growth and economic resilience in RuSME ecosystems.

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Conceptual Framework

The conceptual framework could integrate the following core components, grounded in relevant IT adoption literature, especially frameworks such as the UTAUT (Unified Theory of Acceptance and Use of Technology) and the TOE (Technology-Organization-Environment) framework) (Indiani et al., 2025), which are well-suited to RuSME contexts. The frame consists of TOE components and details of the UTAUT in bullet points below:

Components (COMPs) of the conceptual framework

COMP1: Technological Factors:

- Perceived usefulness and ease of use of IT tools (performance expectancy, effort expectancy)
- Compatibility of technology with existing business processes and infrastructure
- Complexity and perceived risks of technology adoption

COMP2: Organizational Factors

- Digital literacy and skills of RuSME owners and staff
- Financial capacity and readiness to invest in IT
- Management support and organizational readiness
- Firm size and resource availability

COMP3: Environmental Factors

- Infrastructure availability (internet connectivity, electricity)
- Social influence from community and customers
- Government policies, support programs, and access to funding
- Market pressure and competitive environment

COMP4: Outcomes

- Level of IT adoption and utilization by RuSMEs
- Impact on business competitiveness, productivity, market access, and financial inclusion
- Economic growth and resilience of RuSME communities

Explanations on the components of the conceptual framework

COMP1: Technological factors are the technological attentions influencing a RuSME's decision to adopt and effectively use IT tools (Alabdali et al., 2023). Such factors comprise the perceived usefulness and ease of use of the technology, how the technology fits existing business processes and infrastructure

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for new tools to integrate smoothly without demanding disruptive changes and the intricacy and perceived risks of adoption (Mogaji et al., 2024; Toros et al., 2024), among others.

COMP2: Organizational factors are the capabilities and settings inside RuSMEs that influence their ability to adopt and benefit from technology (Madanchian & Taherdoost, 2025). These include the digital literacy and skills of owners and staff, the financial capacity and readiness to invest in technology, management support and overall organizational readiness, and firm size and resource availability, among others as together, they model how well an organization can plan, execute, and sustain digital transformation initiatives.

COMP3: Environmental factors are the external settings and forces shaping the ability and inspiring RuSMEs to adopt and use technology (Lin, 2025). They are the drivers of IT adoption, and include the disposal of essential infrastructure essential for operating digital tools, and social influence [where encouragement or expectations from the community, customers, or peers] (Ghannam, 2025). Molope et al. (2024) mention policies of government, support programs, and access to funding as essential role players providing regulatory frameworks, training opportunities, financial incentives, and grants to reduce barriers to the use of technology use. Market pressure and the competitive business atmosphere coerce RuSMEs to invent in trying to match the pace of leading competitors.

COMP4: Outcomes refer to the results emerging because of IT adoption by RuSMEs (Johari et al., 2021), such as the level to which RuSMEs adopt and actively incorporate digital tools and technologies in their everyday operations. The outcomes also measure the influence of such adoption on principal business aspects. Apart from individual business gains, these outcomes add to the economic growth and resilience of RuSME communities to endure economic challenges, adapt to fluctuating market conditions, and encourage sustainable local development.

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Conceptual framework diagram

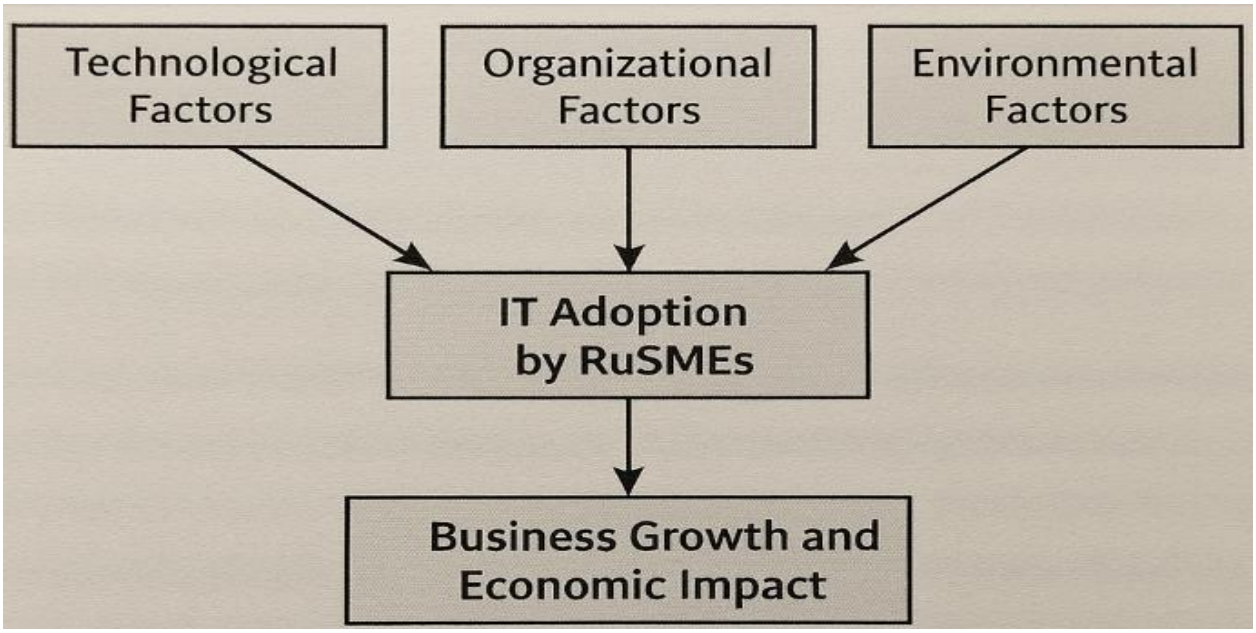

Figure 1: Conceptual framework diagram

The arrows specify the effect on IT adoption. The factors [Technological, Organizational, and Environmental] jointly determine the degree and effectiveness of IT adoption in RuSMEs (Fanelli, 2021), which in turn leads to improved business outcomes and contributes to rural economic development. This framework aligns with existing theoretical models proven in RuSME research such as those proposed for Malaysian RuSMEs (Abdul Rashid et al., 2024; Yaacob & Radzi, 2022) and customizes them for the rural areas of South Africa and Zimbabwe. It stresses the essence of multi-dimensional factors to interpret the way RuSMEs adopt IT and the way this adoption influences their growth and sustainability.

Methods and Data

Previous studies, such as Jongwe et al. (2024) and Molope et al. (2024), and others after 2020, that were focusing on issues of this study, and peer-reviewed, are used. According to Kessi et al. (2025), a robust literature review methodology appropriate for a journal manuscript on IT adoption and technology-driven sustainable development in RuSMEs should analytically synthesize current peer-reviewed research. This study reviewed works published from 2021 onward. Schwaeke et al. (2025) inform that most current high-impact studies follow a Systematic Literature Review (SLR) methodology, adhering to frameworks such as PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) to ensure transparency, replicability, and rigor. The SLR approach starts with the definition of inclusion

and exclusion criteria (de Azevêdo Santos & Cándido, 2025). In this paper we specifically focused on peer-reviewed articles published between 2021 and 2025. These sources examined technology adoption, digital transformation, and sustainability in SMEs, with a preference for studies addressing rural or developing region contexts. Wide-ranging searches were conducted across prominent databases: Scopus, Web of Science, and ScienceDirect. The keywords used included "SMEs," "technology adoption," "ICT," "sustainability," and regional identifiers. Main themes and findings were extracted, coded, and analyzed for patterns, with cross-validation where possible. The analysis employed conceptual frameworks (UTAUT and TOE) to frame enablers and barriers of adoption. The analysis further incorporated thematic analysis to identify emergent trends, drivers, and gaps (Faiz et al., 2024). These included themes on the essential role of digital culture, infrastructure, managerial support, financial constraints, organizational competencies, and the value of sustainability integration. The quality and relevance of the included studies were assessed. The implications were drawn for researchers, practitioners, and policymakers, situating findings within broader sustainable development goals (Mohd Zain et al., 2025). This rigorous, transparent SLR methodology generated a holistic understanding of the multi-level factors influencing IT adoption and technology-driven sustainability among RuSMEs. It provided a validated foundation for future theory development and policy engagement (Yuwono et al., 2024).

Results

The results (RES1, RES2, . . ., RES6) presented in the forthcoming tables are the themes that emerged from the study objectives. The next result was based on the first objective: to assess the current level of IT adoption among RuSMEs in the North-West Province of South Africa and Masvingo Province of Zimbabwe.

RES1: Level of IT Adoption Among RuSMEs

ICT adoption status	North-West	Masvingo
ICT adoption level	About 0.8% of North-West RuSMEs have adopted ICT (Aruleba & Jere, 2022)	IT adoption among RuSMEs is very low (Jongwe et al., 2025)
Barriers of IT adoption	Weighty barriers blocking IT adoption: limited digital infrastructure, high costs, lack of digital skills, limited management support for investing in technology (Lolebo & Tshidzumba, 2024)	Weighty barriers block IT adoption: high costs, limited awareness, and infrastructural challenges (unreliable electricity supply and poor internet) (Sithole et al., 2021).
Basic Digital Technology Adoption	Where adoption occurs, it is basic [mobile phones and low-cost internet	Basic technologies [mobile phones, social media to communicate & for basic business]. Less adoption of

	options] rather than more advanced digital solutions (Martino, 2023).	advanced tools (Jongwe et al., 2025).
Weak Government Digital Investment	Ineffective governments support (Botha, 2024)	Scarce governmental support, weak policy implementation & inadequate investment in digital infrastructure (Guma, 2024).

Table 1: Level of IT adoption

The table shows that rural SMEs North-West and Masvingo provinces adopted IT extremely lowly, with only about 0.8% of North-West RuSMEs adopted ICT (Aruleba & Jere, 2022). There are substantial barriers in both provinces: high costs, lack of digital skills, limited digital infrastructure, insufficient management support hinder IT uptake, poor internet connectivity, and unreliable electricity. Where there is IT adoption, it is limited to basic technologies: mobile phones and social media rather than advanced digital tools. This situation is worsened by ineffective government support, implement policy weakly, and inadequate investment in required digital infrastructure.

The second objective was to identify the key factors influencing the adoption and utilization of IT by RuSMEs, including perceived usefulness, financial constraints, infrastructure availability, digital literacy, trust, and government support. The RES2 below reflect the findings made on this objective.

RES2: Key factors influencing the adoption and utilization of IT by RuSMEs

Factor	North-West	Masvingo
Perceived usefulness	ICT can enhance competitiveness and business processes, informal economy SMEs face barriers to fully appreciate digital technologies' benefits (Ebrahim & Van den Berg, 2024)	ICT adoption can boost innovation and competitive advantage; limited knowledge and ICT application hinder realization of these benefits (Jongwe et al., 2025)
Financial constraints	Financial confines and budgetary constraints inhibit RuSMEs (Martino, 2023)	Lack of finances, high interest rates, no government subsidies, collapsed bank loan facilities (Guma, 2024)
Infrastructure availability	Inadequate infrastructure, inconsistent electricity, poor network coverage (Achieng & Malatji, 2022)	Poor infrastructure, unreliable electricity, limited Internet connectivity (Jongwe et al., 2025)
Digital literacy	Limited digital literacy, no know-how in using IT (Martino, 2022)	RuSMEs run by ICT nonreaders (Sithole et al., 2021).
Trust	Not openly highlighted in the sources reviewed	Not openly highlighted in the sources reviewed
Government support	RuSMEs experience challenges related to policy implementation and support mechanisms (Ebrahim & Van den Berg, 2024)	Insufficient and ineffective support; poor policy design, no subsidies, inadequate ICT execution (Guma, 2024)

Table 2: Key factors

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Observing from the table, the two provinces' key factors affecting IT adoption by RuSMEs include recognising ICT's potential to enhance competitiveness and innovation. Many RuSMEs lack the knowledge or ability to fully realize these benefits. Financial limits such as inadequate funds, high interest rates, and absence of government subsidies or low-interest loans restrict technology adoption. Both provinces suffer from inadequate infrastructure: unreliable electricity, poor internet connectivity, compounded by low digital literacy among RuSME operators. Trust was not appearing as a major factor, but weak government support, ineffective policies, and poor implementation deter IT adoption and use by RuSMEs in these regions.

The third objective: To examine the challenges and barriers that RuSMEs experience in integrating IT into their business operations and growth strategies, is addressed in the next theme.

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RES3: Challenges and barriers of RuSMEs

Challenge / barrier	North-West	Masvingo
Financial Constraints	Excessively high costs, limited access to financing, and credit (Ebrahim & Van den Berg, 2024)	Lack of finance, high interest, no collateral, no subsidies or affordable loans (Sithole et al., 2021)
Infrastructure Limitations	Poor/inconsistent electricity, limited broadband and internet access in rural areas (Martino, 2023)	Inadequate electricity access, poor internet connectivity, inexistent broadband (Achieng & Malatji, 2022)
Digital Literacy / Skills	Limited digital skills, lack of know-how in using IT systems (Martino, 2022)	Limited ICT knowledge and skills among RuSME operators limit IT utilization (Guma, 2024)
Government Support	RuSMEs complain of weak support, poor policy enactment, no enabling location (Martino, 2023)	Policies poorly formulated or executed; no clear support structures, subsidies, and coordination impedes adoption (Sithole et al., 2021)
Awareness & Perceived Usefulness	Some RuSMEs fail to perceive the full benefits of IT adoption, leading to resistance (Lolebo & Tshidzumba, 2024)	Low awareness of ICT, lack of information, poor adoption (Jongwe et al., 2025)
High Costs of Maintenance/ Upgrades	Costs related to upgrading systems, IT maintenance are unaffordable and limit continuous IT use (Botha, 2024)	Maintaining and upgrading IT infrastructure: running generators, creates barriers (Sithole et al., 2021)
Bureaucracy and Policy Environment	Not highlighted as a major issue in available South African sources (Mapiye et al., 2025)	Burdensome bureaucracy, unclear regulations, no coordination between government agencies discourage RuSMEs and create operational difficulties (Guma, 2024)
Trust and Security Concerns	Less emphasized or not highlighted in the South African rural SME context (Ebrahim & Van den Berg, 2024)	Generally, not emphasized as a major barrier in the literature for Masvingo, Zimbabwe (Sithole et at., 2021)

Table 3: Challenges and barriers

The table shows RuSMEs in both provinces experiencing major challenges in including IT into their operations and growth strategies. Financial restraints (high costs, limited access to affordable financing, and credit barriers) are common in both regions. Limitation of infrastructure (unreliable electricity and poor internet connectivity mostly) interrupt IT usage. Low digital literacy and limited ICT skills delay technology adoption. Government support is weak in both areas, with North-Western RuSMEs claiming poor policy application and Masvingo RuSMEs experiencing poorly articulated policies, no subsidies, and coordination issues. In addition, many RuSMEs are unaware of IT's full benefits, resisting, while high maintenance and upgrade costs further limit sustained use. Bureaucracy and regulatory difficulties

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are problematic in Masvingo but less so in North-West. Trust and security concerns are not major barriers in either context.

The fourth objective was to evaluate the impact of IT adoption on competitiveness, productivity, market access, and financial inclusion of RuSMEs in the selected provinces. The next phrase addresses it.

RES4: IT impact on competitiveness, productivity, market access, and financial inclusion

Dimension	North-West	Masvingo
Competitiveness	RuSMEs show moderate to advanced ICT adoption, increasing competitiveness Via efficiency, innovation, and broader service offerings (Ebrahim & Van den Berg, 2024)	RuSMEs tend to adopt ICT at a threshold or low level due to finance and infrastructure constraints, limiting competitiveness gains (Lu et al., 2022).
Productivity	IT adoption improves efficiency, reduces costs, streamlines production and management processes in South African rural SMEs (Martino, 2023)	Lower ICT uptake, infrastructure is poor, and limited digital skills (Guma, 2024)
Market access	Digital platforms and e-commerce increasingly used (Martino, 2023)	RuSMEs face countless challenges with market access obscure (Jongwe et al., 2025)
Financial inclusion	Literacy gaps among most of RuSME practitioners has some effect to digital banking (Lolebo & Tshidzumba, 2024)	Barriers: poor government support, policy gaps, and infrastructure faults, but cellphone banking has helped RuSMEs financially on small scale (Sithole et al., 2021)

Table 4: IT impact

The table shows that RuSMEs of North-West prove moderate to advanced levels of IT adoption. This enhances their competitiveness through improved efficiency, innovation, and expanded service offerings. This adoption results in increased productivity by streamlining operations and reducing costs. Moreover, digital platforms and e-commerce empower these RuSMEs to widen their market access, while fintech services and digital banking improve financial inclusion despite some digital literacy challenges. Conversely, RuSMEs in Masvingo experience low or threshold levels of IT adoption due to financial and infrastructure restraints. This limits gains in competitiveness and productivity. Poor connectivity and limited use of online sales channels restrict market access, and major barriers (inadequate government support, policy gaps, and infrastructural deficiencies impede their adoption of fintech solutions, thereby limiting financial inclusion).

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The fifth objective: To explore the role of specific digital tools like e-commerce and fintech in supporting business growth and economic resilience of RuSMEs, is addressed next.

RES 5: Role of digital tools in supporting RuSME growth and resilience

Aspect	North-West	Masvingo
e-Commerce Adoption	Limited adoption: expand client base and increase sales (Botha, 2024)	Limited uptake: poor infrastructure, no digital literacy, unaffordability (Jongwe et al., 2025)
Fintech Usage	Increased fintech use, mobile banking, digital payments (Lolebo & Tshidzumba, 2024)	Relies on mobile money (e-money), infrastructure deters fintech adoption (Sithole et al., 2021)
Business Growth Impact	Digital tools for sales, operational efficiency; market access contributes to growth and resilience (Botha, 2024)	e-Commerce and fintech contributions are limited by economic challenges and digital divides (Guma, 2024)
Economic Resilience	IT adoption, diversify income sources & reduce dependency on local markets (Lolebo & Tshidzumba, 2024)	Economic resilience: due to weak digital infrastructure and unreliable power supply (Sithole et al., 2021)

Table 5: Role of digital tools

The sixth (and last) objective was to propose actionable recommendations and strategies for policymakers, stakeholders, and practitioners to enhance IT adoption and leverage technology for sustainable development of RuSMEs in these regions. It is addressed next.

RES 6: Actionable proposals to enhance technology adoption by RuSMEs

Focus area	North-West	Masvingo
Technology Adoption Barriers	Reduce, address, or remove high costs; low digital literacy; limited tech awareness (Mapiye et al., 2025)	Similar cost and awareness challenges, no infrastructure (Sithole et al., 2021) must be addressed
Digital literacy and training	Need for focused ICT literacy programs for RuSMEs (Botha, 2024)	Require more outreach by telcoms and training providers (Guma, 2024)
Infrastructure Development	Government intervention with local parteners required to address poor connectivity; no internet-enabled tools (Lolebo & Tshidzumba, 2024)	Partnership between government and private sector required to tackle existing poorer infrastructure and connectivity than North-West (Jongwe et al., 2025)
Financial Support	RuSMEs limited by financing for tech acquisition (Mapiye et al., 2025). Hence, financiers must be	Likely similar financial constraints, but existing financing schemes must provide small scale loans to RuSMEs

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	encouraged to provide affordable loans with government as guarantor.	
Awareness and Information Dissemination	Low awareness of advanced tech beyond e-commerce (Botha, 2024). Hence, department responsible for SMEs through non-governmental organisations should play pivotal role of information dissemination.	Limited knowledge of benefits of AI, IoT, big data (Sithole et al., 2021), therefore, information must be made readily available by relevant government department(s).
Collaborative Platforms & Networking	Limited collaboration and access to networks (Mapiye et al., 2025). Setting up of forums of RuSMEs as a form of information sharing and networking.	Similar isolation affecting market access (Guma, 2024). Therefore, the establishment of RuSME forums to network and discuss different IT opportunities must be put in place through relevant government department(s)
Sustainability Integration	Awareness needed to link tech to sustainable development (Botha, 2024) through participation by telcoms companies as a social responsibility.	Strong need for integrating sustainability practices through tech (Sithole et al., 2021). Here telcom companies as well as relevant government department(s) must provide leadership in this regard.

Table 6: Proposals to enhance technology adoption

The table endorses actionable strategies for policymakers, stakeholders, and practitioners to improve IT adoption and harness technology for the sustainable development of RuSMEs in the two regions. These two areas experience significant barriers (high costs of internet and ICT equipment, low digital literacy, and limited awareness of advanced technologies), with Masvingo experiencing poorer infrastructure access. There is a need for targeted ICT literacy and training programs, with North-West requiring focused RuSME programs and Masvingo needing greater outreach by telecom companies and training providers. Infrastructure development is fundamental because basic internet connectivity and internet-enabled devices are inadequate in both Masvingo and North-West. Financial limits also restrict RuSMEs' ability to acquire essential technology in both regions. Awareness about advanced technologies beyond basic e-commerce is low, particularly regarding AI, IoT, and big data. Collaboration prospects are limited. They restrict market access due to isolation in both regions. Lastly, integrating sustainability into RuSME development through technology is indispensable. North-West needs increased awareness on linking technology use to sustainability. Masvingo, on the other hand, requires strong integration of sustainable practices via technology.

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Discussion

The study findings offer an inclusive synopsis of the current state of IT adoption among RuSMEs of North-West and Masvingo. The results demonstrate very low levels of IT uptake in both regions, confirming assertions of existing literature (Aruleba & Jere, 2022; Jongwe et al., 2025). This low adoption rate is difficult since the increasing business environments digitalisation globally and the potential of IT to enhance competitiveness, productivity, and market access for RuSMEs.

A substantial intuition from the study is the shared nature of barriers across both regions. Digital infrastructure, high costs, limited digital literacy, inadequate unreliable electricity supply, and weak government support impede IT adoption. These challenges resemble other developing rural contexts and highlight the complex nature of the digital that divide affecting RuSMEs (Lolebo & Tshidzumba, 2024; Sithole et al., 2021). The prevalence of basic technology usage [mainly mobile phones and social media] recommends that while some technological penetration exists, it is still undeveloped and inadequate to manage large business growth or innovation. This pattern also stresses the need for enhanced training and sensitisation to advanced digital tools beyond simple communication technologies.

Financial restrictions appear to be a critical barrier. RuSMEs in these provinces struggle to access affordable financing for technology acquisition and maintenance. High interest rates and the lack of subsidies or government-backed financial incentives restrict RuSMEs' ability to invest in IT infrastructure (Martino, 2023; Guma, 2024). This financial holdup is further compounded by infrastructural deficiencies: unreliable electricity, and poor internet connectivity, which inhibits IT adoption and affects the sustainability of IT use over time.

Digital literacy arrears among RuSME operators constitute the underusage of IT benefits. The limited ability to use IT tools reduces the perceived usefulness of digital technologies and creates resistance or passive use. This restricts the full awareness of competitive advantages (Ebrahim & Van den Berg, 2024; Jongwe et al., 2025). This illustrates the importance of targeted ICT literacy programs tailored to the specific needs and contexts of rural entrepreneurs.

Government support and policy execution weaknesses spread across both provinces. RuSMEs reported either ineffective support mechanisms or poorly formulated policies that inadequately consider the rural digital ecosystem (Botha, 2024; Sithole et al., 2021). The difference between the two provinces in bureaucratic barriers shows relatively less significance in North-West and more significant in Masvingo. They disclosed that policy settings differ and that tailored government interventions are necessary.

The IT adoption impact RuSMEs' competitiveness, productivity, market access, and financial inclusion reveals a clear disparity. North-West RuSMEs benefited from moderate to advanced IT adoption. This

led to improved business outcomes: broader market, broader market reach, increased efficiency, innovation, and through e-commerce and fintech platforms (Martino, 2023; Lolebo & Tshidzumba, 2024). In contrast, Masvingo's RuSMEs experience constraints that limit these benefits. They underscore the way infrastructure and financial factors directly affect business performance and resilience.

Digital tools (such as e-commerce and fintech) are key for enhancing business growth and economic resilience. They are underutilised mainly because of infrastructural and financial fences. The higher fintech engagement in North-West, through mobile banking and digital payments, contrasts with Masvingo's reliance on more basic mobile money services. They indicate that there is a developmental gap in digital financial services uptake that limits economic diversification and inclusion.

The study emphasises a multifaceted strategy to enhance IT adoption. These include interventions to decrease the high cost of digital technologies. They expand infrastructure investment (mainly in internet connectivity and stable electricity), launch robust, targeted ICT literacy and training programs customised to rural SME operators. In addition, improving government support through clear policies, financial incentives, subsidies, and better coordination is essential to create an enabling environment. Facilitating collaborative platforms and networking opportunities could mitigate the isolation that limits market expansion and knowledge exchange for RuSMEs.

Conclusion

This study offers a wide-ranging overview of the IT adoption state among RuSMEs in North-West and Masvingo provinces. It exposes consistently low levels of acceptance controlled by many shared barriers. Some key challenges are high technology costs, inadequate digital infrastructure, insufficient government support, limited digital literacy, and unreliable electricity. These factors, jointly, deter RuSMEs' ability to leverage IT for enhanced competitiveness, financial inclusion, market access, and productivity. Basic technology use is rampant, but mainly mobile phones and social media. However, it is deficient for driving business growth and innovation. This highlights the pressing need for advanced digital learning initiatives.

The financial limitations identified are predominantly fundamental. Many RuSMEs experience hitches accessing reasonable financing for IT investments. This is heightened by infrastructural deficits. Likewise, governmental policies and support mechanisms presently cannot address the unique rural digital ecosystem and the assorted needs across provinces. Remarkably, North-West RuSMEs show relatively higher IT adoption and associated benefits compared to Masvingo. This climaxes the importance of context-specific strategies.

Recommendations

To promote increased IT adoption among RuSMEs, a dynamic approach is essential and the next bullet points provide a five-fold set of study recommendations:

- Decrease the cost barriers by improving access to reasonably priced digital technologies using financial incentives, subsidies, and government-backed funding schemes.
- Increase and advance digital infrastructure with a focus on dependable internet connectivity and stable electricity supply in rural areas.
- Implement customised ICT literacy and training programs developed for specific skills and knowledge gaps of rural entrepreneurs and surpass basic communication tools.
- Improve government support with stronger, customized policies, upgraded coordination, and steadfast interventions that consider the rural context and regional variations.
- Encourage collaborative podiums and networking opportunities to enable knowledge sharing and market expansion while overcoming isolation barriers.

Recommendations for Further Studies

A once off analysis does not capture the changes in understanding progress of RuSMEs. Future research is needed to explore longitudinal studies for tracking IT adoption dynamics over time in understanding evolving barriers and enablers within RuSMEs. There should also be comparative analyses that involve more rural regions to offer wider perspectives into regional disparities and best practices. Moreover, there should be studies into the effectiveness of interventions of specific policies, ICT training programs, and financial support mechanisms. These can be appreciated to inform evidence-based strategies. Lastly, there should be research focusing on the role of digital financial services.

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