

EVALUATING ICT INTEGRATION IN SME OPERATIONS DURING THE COVID 19 PANDEMIC ERA IN SELECTED SMES IN THE WESTERN CAPE, SOUTH AFRICA

AVALIAÇÃO DA INTEGRAÇÃO DAS TIC NAS OPERAÇÕES DE PMES DURANTE A PANDEMIA DA COVID-19 EM ALGUMAS PMES DA PROVÍNCIA DO CABO OCIDENTAL, ÁFRICA DO SUL

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Abstract

The COVID-19 pandemic introduced unprecedented disruptions to business environments globally, compelling small and medium-sized enterprises (SMEs) to adopt innovative strategies to sustain operations. This study evaluates the extent and impact of ICT integration within selected SMEs in the Western Cape, South Africa, during the pandemic era. Using a qualitative approach, data were collected to investigate how digital tools, platforms, and technologies influenced business performance, operational agility, customer service delivery, and innovation. The findings reveal that ICT adoption played a critical role in enabling SMEs to maintain continuity under lockdown restrictions, enhance workflow efficiency, and respond swiftly to changes in customer behaviour and market conditions. Digital solutions, such as online communication platforms, e-payment systems, social media, CRM systems, and remote-work tools, improved service responsiveness while fostering innovation in business processes. Despite these benefits, the study also highlights persistent challenges, including limited digital readiness, inadequate ICT infrastructure, and uneven levels of digital skills across SMEs. The research concludes that ICT integration significantly strengthened SME resilience during the pandemic and underscores the need for sustained digital investment, capacity building, and supportive policy interventions to enhance SME

Resumo

A pandemia da COVID-19 provocou perturbações sem precedentes nos ambientes empresariais em todo o mundo, obrigando as pequenas e médias empresas (PMEs) a adotar estratégias inovadoras para manter suas operações. Este estudo avalia a extensão e o impacto da integração das TIC em PMEs selecionadas na Província do Cabo Ocidental, na África do Sul, durante o período da pandemia. Utilizando uma abordagem qualitativa, foram coletados dados para investigar como as ferramentas, plataformas e tecnologias digitais influenciaram o desempenho empresarial, a agilidade operacional, a prestação de serviços ao cliente e a inovação. Os resultados revelam que a adoção das TIC desempenhou um papel fundamental ao permitir que as PMEs mantivessem a continuidade sob as restrições do lockdown, aumentassem a eficiência do fluxo de trabalho e respondessem rapidamente às mudanças no comportamento dos clientes e nas condições de mercado. Soluções digitais, como plataformas de comunicação online, sistemas de pagamento eletrônico, mídias sociais, sistemas de CRM e ferramentas de trabalho remoto, melhoraram a capacidade de resposta dos serviços, ao mesmo tempo em que promoveram a inovação nos processos de negócios. Apesar desses benefícios, o estudo também destaca desafios persistentes, incluindo preparação digital limitada, infraestrutura de TIC inadequada e níveis desiguais de competências



competitiveness in an increasingly digital economy.

Keywords: Small and Medium Enterprises. Information and Communication Technology. Innovation. Customer Service. Agility. Business Operations. COVID-19.

digitais entre as PMEs. A pesquisa conclui que a integração das TIC fortaleceu significativamente a resiliência das PMEs durante a pandemia e ressalta a necessidade de investimento digital sustentado, capacitação e intervenções políticas de apoio para aumentar a competitividade das PMEs em uma economia cada vez mais digital.

Palavras-chave: Pequenas e Médias Empresas. Tecnologia da Informação e Comunicação. Inovação. Atendimento ao Cliente. Agilidade. Operações Comerciais. COVID-19.

1 INTRODUCTION

1.1 Background

Small and medium-sized enterprises (SMEs) are central to economic transformation in developing economies such as South Africa and are widely recognised as engines of inclusive growth, employment creation, and sectoral diversification (Meunier & Mickus, 2020). Beyond their direct contributions, SMEs strengthen market competitiveness, stimulate innovation, and support local value-chain development, thereby advancing national development objectives. While Alsaaty and Makhlof (2020) similarly highlight SMEs as key drivers of economic dynamism through job creation, productive expansion, and the provision of essential goods and services across sectors. Despite their importance, SMEs in developing contexts remain highly vulnerable to external shocks and structural uncertainties that threaten operational continuity (Torales *et al.*, 2020). Large-scale disruptions, most notably the COVID-19 pandemic, exposed persistent fragilities in SME ecosystems by disrupting supply chains, reducing demand, eroding liquidity, and forcing many businesses to downsize or close (Winston, 2020). Understanding these vulnerabilities is therefore critical for informing interventions to strengthen resilience and support sustainable growth.

Prior to the COVID-19 outbreak in March 2020, South Africa had approximately 2.6 million formal and informal SMEs, consisting of 1,748,031 informal enterprises (66.9%) and 755,265 formal SMEs (SEDA, 2020). SMEs collectively contributed

11,830,042 jobs in Quarter Four (Q4) of 2019, compared with 10,406,070 in Q4 of 2021, reflecting a loss of 1,423,973 jobs during the height of the pandemic. At the onset of the COVID-19 period and throughout, the total number of SMEs declined from 2.6 million to 2.3 million, with an estimated 11% of SMEs shutting down (Statistics South Africa, 2021). While the decline has been linked to several pandemic-related pressures, such as stringent lockdown regulations that restricted movement and reduced customers' footfall, severe supply-chain disruptions, the loss of contracts with buyers and suppliers, and acute cash-flow shortages, which disrupted many SMEs' business operations (Ahsan, 2021). Further evidence shows that a significant contributor to SME closures was their limited adoption of digital and ICT tools before the COVID-19 outbreak, leaving them unable to transition to online platforms for sales, communication, and remote operations during lockdowns (Wilén, 2018).

While Information and Communication Technology (ICT) is increasingly recognised as a key determinant of organisational resilience and performance. Over recent decades, organisational survival has become closely tied to ICT adoption, particularly technologies driven by artificial intelligence, automation, cloud computing, data analytics, and high-speed mobile internet (Sheikh *et al.*, 2017). These digital tools have supported business continuity by enabling online transactions, enhancing efficiency, and improving customer convenience (Akpan *et al.*, 2020). Furthermore, ICT has strengthened organisational capacity through improved communication systems and broader digital transformation (Zhang *et al.*, 2020). However, SMEs that had not integrated ICT prior to the pandemic encountered significant challenges that impeded business continuity. Given the heightened reliance on digital technologies during the COVID-19 period, this study investigates the extent to which ICT was integrated into SME operations in South Africa during the COVID-19 era.

2 LITERATURE REVIEW

SMEs are commonly defined as enterprises employing fewer than 50 workers, with a maximum of 250 employees for medium-sized firms (Meunier & Mickus, 2020). Beyond numerical criteria, SMEs are characterised by flexibility, creativity, innovation, and adaptability despite limited resources (Bocconcelli *et al.*, 2018). However, definitions

vary globally, and no universal standard exists (Muriithi, 2017). SME growth is strongly linked to national economic development and employment creation, and SMEs contribute significantly to job creation, revenue generation, and socio-economic well-being, accounting for up to 99% of total firm output in some countries (Ndiaye *et al.*, 2018; Nwuzor, Chemezie, Okafor & Ifeanyi, 2019). In South Africa, high unemployment and sluggish economic growth have driven many individuals toward entrepreneurship for survival (Musara, 2020). While SMEs have the potential to alleviate poverty, their impact is constrained by low capital-labour intensity and limited access to finance, particularly given that start-up capital is often excluded from formal financial mechanisms (SEDA, 2016). These challenges intensified during the COVID-19 outbreak, when lockdowns and mobility restrictions led to widespread business disruptions and closures.

The pandemic emerged as one of the most severe public health and economic crises, causing widespread disruption to businesses globally, particularly SMEs (Wenzel *et al.*, 2020). Lockdowns and restrictions on movement significantly reduced customers' physical access to markets, and many SMEs were unable to transition to digital service delivery due to inadequate ICT readiness and preparedness (Winarsih *et al.*, 2020). These disruptions prompted organisations to restructure traditional operations and accelerate the digitalisation of business processes (Cuschieri, 2020). Despite the introduction of ICT-driven interventions, many South African SMEs continued to face severe viability challenges, resulting in widespread closures during the pandemic (Walsh, 2020).

While ICT is defined as digital technologies designed to be used by organisations to process information for communication and transactions through different software and hardware, such as telephones, desktop computers, scanners, printers, and internet modems (Zhang *et al.*, 2020). Furthermore, the business perspective posits that ICT accelerates service delivery, business performance, agility, and competitiveness (Basri, 2020). The resilience and survival of organisations depend on ICT to innovate operating systems (Sheikh *et al.*, 2017), enhance business communication, and improve business capacity development (Zhang *et al.*, 2020). Thus, ICT has become a tool for improving operational efficiency and enhancing business competitiveness (Björkdahl, 2020).

2.1 Lack of integration of ICT during COVID-19

COVID-19 severely disrupted SME operations, making ICT the main means of sustaining business continuity. Lockdowns made face-to-face processes impossible, pushing SMEs to adopt digital tools for remote work, communication, online service delivery, and digital payments (Baldwin & Tomiura, 2020). ICT also enabled e-commerce, real-time information sharing, and alternative market access, helping SMEs remain resilient during the crisis (Choi *et al.*, 2020). However, SMEs that did not adopt ICT struggled with business performance, agility, customer service delivery, and innovation.

SMEs' business performance with ICT is critical because it determines how effectively their daily operations are executed and their ability to adapt to changing conditions. While strong performance enables SMEs to manage resources efficiently, maintain productivity, and deliver consistent value to customers. However, during the pandemic, many SMEs experienced severe disruptions to operational continuity due to limited ICT adoption, which prevented them from sustaining cash flow or adjusting their strategies to respond to rapidly shifting market demands (Kumar *et al.*, 2021). However, Nawaiseh (2021) reported that SMEs faced significant operational and financial challenges arising from remote work regulations and supply chain disruptions, leading to an inability to meet new ICT-driven customer service delivery requirements.

While agility in SMEs' business operations is essential, it is defined by their ability to respond quickly to emerging trends in uncertain and turbulent environments, as well as their capacity to navigate the unknown to identify and exploit new business opportunities (Tilman & Jacoby, 2019). Similarly, Serrat (2021) states that, from an organisational perspective, ICT has become an essential tool for responding to the disruptive impact of the COVID-19 pandemic on the global economy, society, and workforce. Additionally, Kniffin *et al.* (2021) note that ICT redefines, reconfigures, disaggregates, automates, and accelerates business operations, thereby enhancing productivity and supporting the development of value chains. However, Baldwin (2019) highlights that many SMEs lacked the agility to adopt ICT due to insufficient financial resources and knowledge gaps, which limited their ability to facilitate through

internet-based and related communication platforms, capabilities that were essential for sustaining business transactions.

Furthermore, customer service delivery is an important component of SMEs' business operations. The use of ICT enables customer service and related activities to be carried out electronically through internet-based platforms, telephone systems, and automated technologies (Djajanto *et al.*, 2014). ICT has also spurred the development of various self-service technologies, new approaches to measuring service quality, and relationship-marketing strategies to enhance customer satisfaction and loyalty. According to Wirtz and Lovelock (2021), customer service encompasses direct engagement activities designed to meet the needs and expectations of clients and customers. However, many SMEs lack ICT-enabled services that support high-quality customer service delivery, which in turn hinders their ability to provide effective e-commerce services

Finally, ICT integration fosters innovative approaches to business operations, enabling SMEs to adapt to and influence the pace of change within the business environment. Am *et al.*, (2020) emphasise that embracing ICT promotes innovation and supports long-term business sustainability. ICT, encompassing digital tools and applications such as cloud computing, the Internet of Things, and artificial intelligence, acts as a catalyst for innovation across supply chains, operations, and customer service processes (Shah, 2020). Similarly, Hamburg (2021) notes that the adoption of ICT contributes to business transformation and value creation. However, many SMEs continue to lack the innovative capacity enabled by ICT, limiting their ability to navigate the demands of the new normal and constraining their overall operational effectiveness.

2.2 Significance impact of ICT adoption on SMEs' business operations

The adoption of ICT within SMEs' business operations, especially during the pandemic, became highly significant, accelerating operational efficiency and enhancing agility, innovation, and innovation in delivering services to customers. This increased digital responsiveness also fostered improved business performance during the COVID-19 crisis (Brancombe, 2020).

The significance of ICT in the business performance of SME operations is substantial, as it enhances organisational productivity and service delivery by improving

communication, collaboration, customer access, managerial decision-making, and data management (Sajuyigbe & Alabi, 2012). Fubah and Moos (2022) further argue that ICT positively influences organisational performance and profitability, broadens market share, supports value creation, and strengthens the link between the demand and supply of goods and services. The integration of ICT during the COVID-19 pandemic aligns with Richter (2020), who asserts that digitalisation facilitated rapid connectivity and responsiveness to the evolving business environment, thereby supporting business continuity. Consequently, swift ICT adoption during the pandemic enabled remote work and the expansion of e-commerce.

The integration of ICT into SME operations during the COVID pandemic prompted organisations to implement digitalisation within short timeframes to ensure survival and continuity. Organisational agility during the COVID pandemic was characterised by investments and effective utilisation of ICT infrastructure and resources to adapt to the disruptive changes in the environment (Elali, 2021). Further, ICT enabled remote work via the internet and related communication platforms, easing transactions during the COVID-19 pandemic (Wilén, 2020). This aligns with Serrat (2021), who states that, from an organisational perspective, ICT has become an essential tool for responding to the disruptive impact of the COVID-19 pandemic on the global economy, society, and workforce. He further notes that ICT accelerated business transformation and enhanced organisational agility during the turbulent, rapidly changing COVID-19 business environment.

While customer service delivery is a critical aspect of SMEs' business operations, ICT enables these firms to meet customer demands through online platforms (Cao, 2021). Wirtz and Lovelock (2021) emphasised that ICT has catalysed the development of diverse self-service technologies, sophisticated measures of service quality, and relationship-marketing strategies designed to strengthen customer satisfaction and cultivate enduring loyalty. These findings align with those of Ceylan *et al.* (2020), who highlight that ICT applications provide fast, reliable channels that significantly enhance customer service delivery during the COVID-19 pandemic. Consequently, ICT contributed to the restructuring of business models throughout the pandemic, enabling SMEs to meet evolving customer expectations and adapt to emerging shopping and delivery methods (Carvalho *et al.*, 2020).

Finally, the COVID-19 pandemic accelerated digital transformation and process re-engineering within business operations, driving paradigm-shifting changes across multiple areas of organisational performance and efficiency (Papagiannidis *et al.*, 2020). The disruptive impacts of the pandemic compelled organisations to adopt innovative approaches that leveraged cutting-edge technologies to support sustainable business operations and long-term development. This aligns with OECD (2020), which emphasised that the rapid transition to digitalisation helped bridge operational gaps, enabling organisations to adapt and survive amid heightened environmental uncertainty while enhancing their capacity to exploit emerging opportunities during the crisis. Accordingly, Walsh (2020) argues that the implementation of ICT during the pandemic improved customer satisfaction, increased business efficiency, and facilitated the emergence of new innovative services that strengthened organisational competitiveness.

3 METHODOLOGY

The study adopted a qualitative research approach to explore participants' meanings, experiences, and perceptions regarding the phenomenon of interest, drawing from a population of SMEs located within the Blackheath Industrial Park in Cape Town, South Africa. Semi-structured interviews were conducted with 20 SME participants. Prior to data collection, participants were informed about the study's purpose, and consent was obtained through signed consent forms. All collected data were analysed using ATLAS.ti software. The study was grounded in an inductive paradigm and an interpretivist methodology (Pervin & Mokhtar, 2022). Consequently, an exploratory design was employed to identify emerging insights into

the role of ICT in supporting operational continuity and adaptive responses among SMEs during the COVID-19 period.

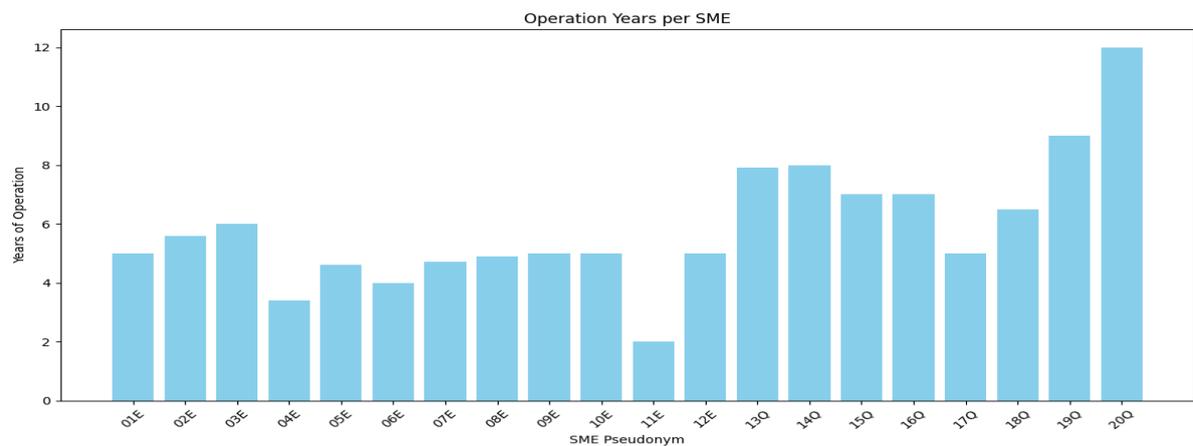
3.1 Sample

The sample of the current study comprised 20 SMEs operating within the Blackheath Industrial Park in Cape Town, Western Cape Province, South Africa. Several criteria informed the selection process. Specifically, the SMEs selected had been in

operation for a minimum number of years sufficient to demonstrate business continuity and experience, thereby ensuring participants could provide rich, informed insights relevant to the study. The chosen sample size was deemed adequate to yield comprehensive insights into how ICT supported SME operations during the COVID-19 pandemic, as shown in Figure 1 below.

Figure 1

Operation year per SME



Source: Authors' constructs

3.3 Study approval

The study received ethical clearance from the University of the Western Cape under HSSREC Reference Number HS21/8/12. Informed consent was secured from all participants prior to the commencement of data collection. At the outset, participants were provided with a comprehensive explanation of the study's purpose, scope, and procedures, and were explicitly informed that their participation was voluntary, with the unequivocal right to withdraw at any point without consequence. To safeguard anonymity, no personally identifiable information was collected, and participants were assured that all data would be treated with strict confidentiality and utilised exclusively for research purposes.

4 RESULTS AND DISCUSSION

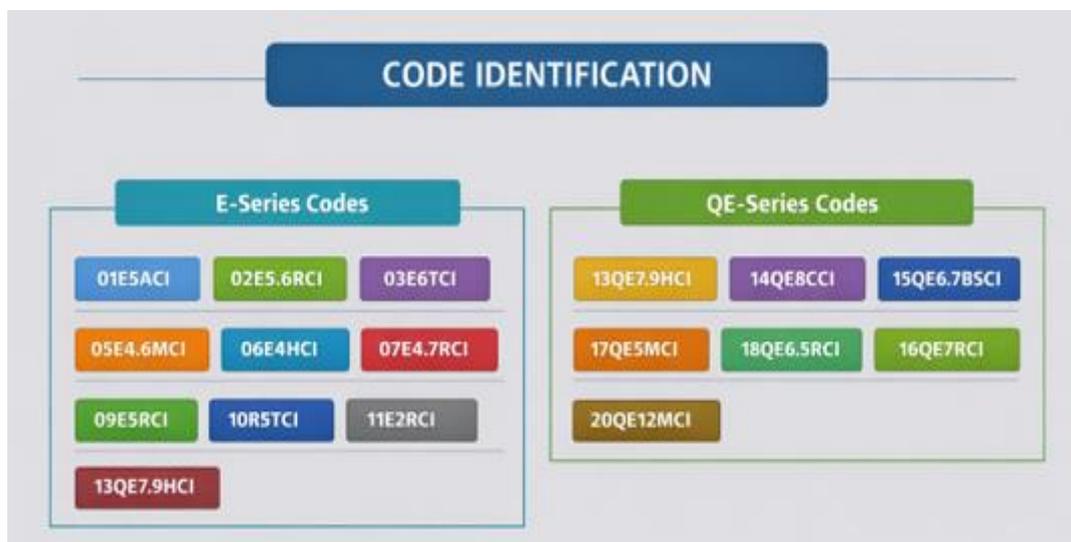
The study sought to assess the effectiveness of ICT integration within SMEs' business operations in South Africa during the post-COVID-19 "new normal," with the aim of determining the extent to which these enterprises adapted and responded to digitalisation.

4.1 Classification of SMEs codes

To ensure clarity and consistency in referencing, each SME was assigned a unique identification code. This coding framework was developed to distinguish participants and classify them by business sector. Such segmentation enables systematic analysis of the data, as illustrated in Figure 2 below.

Figure 2

Code identification



Source: Authors' constructs

4.2 The result

4.2.1 Business performance

Regarding business performance during the pandemic, most respondents (82%) reported rapidly embracing digitalisation and leveraging emerging opportunities within the COVID-19 business landscape. This shift enabled them to operate more effectively, adapt to remote working environments, and remain competitive. These businesses indicated that they invested in essential digital tools and infrastructure, such as 5G networks, online payment platforms, artificial intelligence applications, social media platforms like Facebook and Instagram, as well as customer relationship management (CRM) systems, which collectively enhanced their performance during this period (Dubey *et al.*, 2019).

Respondent 06E4HCI, a medical service provider, stated: *“The use of digital tools in providing services enhances our business performance during COVID, despite the impromptu adaptability.”*

Respondent 19QE9RCI, the owner of an IT shop outlet, highlighted the situation as follows: *“The acquisition of ICT resources was a major challenge for SMEs both before and during the COVID-19 pandemic. However, integrating laptops into our operations enabled my workforce to work remotely, which significantly improved our business performance and ensured business continuity.”*

4.2.2 Agility

While agility is essential to SMEs' business operations, all participants indicated that adopting and utilising ICT applications and tools enhanced their ability to respond swiftly to the disruptive business environment created by the COVID-19 pandemic.

Respondent 02E, operating in the fast-food sector, highlighted the benefits of smartphones during the pandemic, explaining: *“As the owner/manager of fast-food outlets, I benefited significantly from using smartphones. With my smartphone, I upload and display my menu and receive online orders and delivery locations. For instance, the*

Uber Eats app became highly popular during the pandemic, so I incorporated it into my business application.”

Similarly, Respondent 11E, owner/manager of a butchery, stated:

“ICT has simplified my business ecosystem by eliminating time wastage; for example, I could place orders at my convenience and make payments using the app on my smartphone. These ICT tools proved valuable and helpful during the pandemic and reduced the risk of spreading diseases.”

Respondent 17Q from the manufacturing sector noted that:

“All SMEs embraced ICT because of the negative experiences of the pandemic. We could not have survived without migrating to ICT. However, in South Africa, SMEs face two major ICT challenges: load shedding by Eskom, which immediately cripples our businesses when the power goes out, and the need for IT teams to guarantee data security from cybercriminals.”

During crisis periods such as the COVID-19 pandemic, digitalisation enhances organisational agility, innovation, and competitiveness as well as improves visibility in the marketplace (Yang *et al.*, 2020). Online platforms enabled businesses to align their operations and exploit new opportunities during the COVID-19 crisis (Vargo *et al.*, 2020).

4.2.3 Customer service delivery

ICT as a tool for effective and efficient customer service delivery, especially in the pandemic era. Most respondents reported that the adoption of ICT enhanced customer service delivery during the COVID-19 pandemic.

Respondent 10E from the Transport sector explained: *E-hailing services such as Uber operate as outbound logistics business models supported by internet-enabled mobile applications. During the COVID-19 pandemic, I started using a smartphone specifically to download the Uber app and register as a new user, which enabled me to receive ride requests through the mobile app. Moreover, the usefulness of my smartphone during this period of disruption encouraged me to further explore the adoption of ICT. Initially, I viewed smartphones merely as devices for show off, but this experience significantly changed my perception*

Respondent 13Q in the health sector stated that: *“The most used ICT tools are the laptops that enable us to work remotely. We adopted the online Application software, such as NupayAPP for scheduled debit orders, Ocumail for reports, and Latepoint for appointments. In addition, our accountant activated electronic payments for all our customers for monthly payments. Therefore, laptops were quickly provided to all our staff who were using desktop computers for business continuity...”*

Respondent 18Q reported that: *“During the COVID-19 pandemic, we utilised the online payment method to pay our distributors for goods and services supplied. Also, the order is being placed via email with Just-In-Time suppliers from the Manufacturers. This bridged the gaps by helping enforce distancing regulations and eliminating time-wasting in my shop during the pandemic. Furthermore, the utilisation of laptops and an APP (check free) in our grocery shop helped in online shopping, which gives our customers a convenient and safer shopping experience”*

ICT-driven-payment platforms and digital devices significantly enhanced customer service during the COVID-19 pandemic (Cao, 2021). Organisations leveraged ICT to realign their operations and service delivery processes with shifting customer behaviours, evolving market structures, and disrupted supply chains throughout the pandemic period (Carvalho *et al.*, 2020). Likewise, SMEs used ICT to restructure their business models and build new capabilities to respond to emerging customer demands within the expanding online shopping landscape during COVID-19 (Sandberg *et al.*, 2020). Furthermore, ICT strengthened organisational capacity to introduce and scale new customer engagement channels, thereby fostering customer loyalty and improving service quality during the pandemic (Ceylan *et al.*, 2020).

4.2.4 Innovation

ICT and the capacity to innovate within SMEs' business operations are essential. The majority of participants indicated that adopting ICT tools in a disruptive business environment enabled them to strategically reposition their businesses, making them more innovative and competitive (Ramírez & Selsky, 2016).

Respondent 11E2RCI, the owner-manager of a butchery store, elaborated on the benefits of ICT adoption and utilisation during the COVID-19 pandemic, stating that:

“Digitalisation and e-commerce have brought a paradigm shift and rapid development in our garment stores, as it is the wheel that sustains the bus. We maintained inventory, sales, marketing, and supply chain in business operations, through social media such as Facebook, WhatsApp status, Twitter, smartphones, etc.”

4.3 Discussion

During the pandemic, ICT-driven strategic tools emerged as critical enablers of business performance, offering SMEs a first-mover advantage by allowing them to respond quickly, transform operations, and realign processes with the rapidly changing business environment. According to Nawaiseh (2021), many SMEs had limited ICT integration prior to the pandemic, a gap that significantly constrained their operational capacity and overall business performance during the lockdown period. However, as the crisis unfolded, the increased adoption of ICT, such as laptops, reliable internet connections, and social media platforms, enabled SMEs to transition to remote work arrangements. This shift not only facilitated business continuity but also improved communication, enhanced customer engagement, and strengthened operational efficiency, ultimately contributing to improved business performance throughout the pandemic.

While digitalisation enhances the strategic agility of SMEs operating in ever-changing and uncertain environments, it also fundamentally reshapes business operations and internal processes (Baldwin, 2019). The absence of ICT integration within SMEs’ operational structures has historically reduced efficiency and productivity, limiting their ability to respond effectively to market shifts. The findings of this study align with Vargo *et al.* (2020), who observed that the incorporation of ICT tools into SMEs’ business operations significantly improves operational efficiency and productivity by streamlining workflows, enhancing information flow, and supporting more effective decision-making. Consequently, ICT integration played a crucial role during the pandemic by strengthening SMEs’ agility and enabling them to respond more promptly and effectively to client requests, thereby sustaining business continuity and competitiveness under disruptive conditions.

Furthermore, SMEs utilised ICT to redefine and reconfigure customer service delivery by enhancing online communication, streamlining digital transactions, and improving service responsiveness through innovation and automation enabled by internet-based platforms and ICT devices (Wilén, 2020). The findings of this study indicate that the adoption and effective utilisation of ICT during the COVID-19 pandemic significantly enhanced SMEs' ability to deliver timely, accessible, and efficient customer services despite the restrictions imposed by lockdowns. This is consistent with Carvalho *et al.* (2020), who reported that ICT integration digitalised business operations and facilitated seamless online transactions during the crisis period. Consequently, the integration of ICT into SMEs' business processes not only enabled them to transition to remote working arrangements but also supported the activation and expansion of e-commerce capabilities, allowing them to continue serving their customers effectively in a highly disrupted environment.

Finally, ICT enabled SMEs to realign their operational strategies, innovate their business processes, strengthen internal capacity, and enhance their overall ability to achieve sustainable competitiveness (Kraus *et al.*, 2020). By adopting a wide range of digital tools and platforms, SMEs introduced new service delivery methods, optimised internal workflows, and developed value-adding digital solutions that contributed to long-term resilience and business growth. This finding supports Ramírez and Selsky (2016), who emphasise that ICT plays a transformative role in repositioning and reshaping business operations. Consequently, the swift and proactive adoption of ICT by SMEs during the pandemic not only facilitated continuity under disruptive conditions but also stimulated the development of innovative solutions tailored to emerging customer needs and operational challenges.

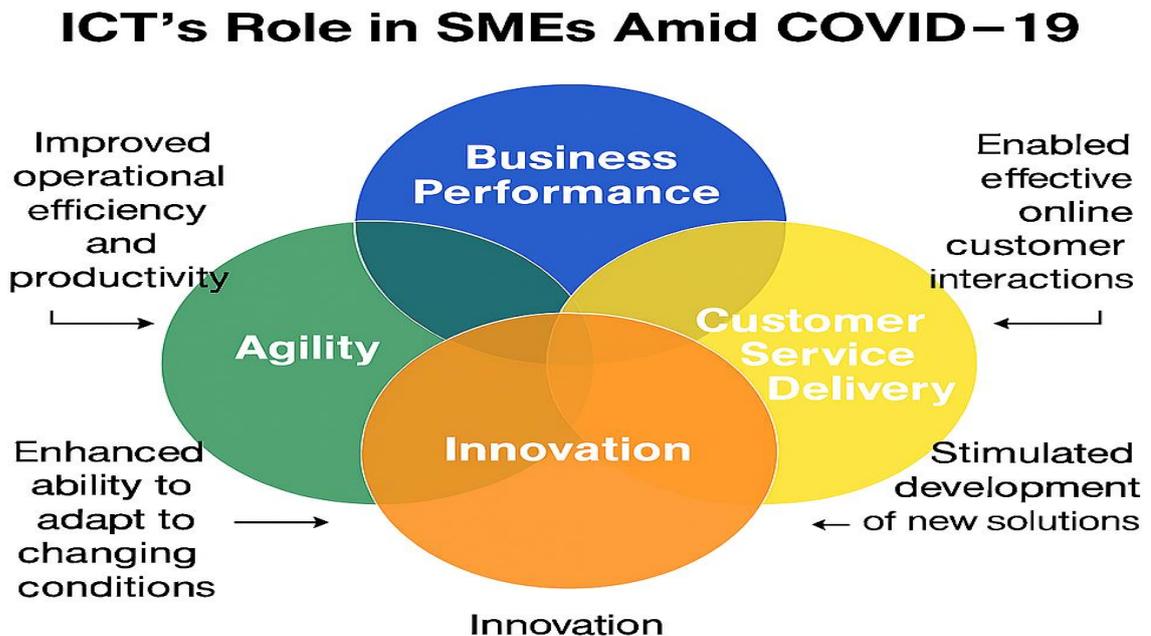
4.4 Summary

Figure 3, which illustrates the evaluation of ICT integration within SMEs' business operations during the pandemic, shows that digital tools and platforms were adopted to support operational continuity, enhance customer service delivery, and strengthen overall business performance. The figure provides a visual representation of the extent to which ICT-related strategies were implemented, highlighting the adaptive

measures SMEs employed to navigate the uncertainties and disruptions brought about by COVID-19.

Figure 3

ICT's Role in SMEs Amid COVID-19



Source: Authors' compilation

5 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The findings of this study revealed that ICT integration had a significant and multifaceted impact on SMEs' business operations during the pandemic, particularly in the areas of business performance, strategic agility, customer service delivery, and innovation. Participants consistently reported that the adoption of ICT tools enhanced overall business performance by enabling operational continuity, improving workflow efficiency, and supporting data-driven decision-making. Similarly, ICT strengthened

organisational agility by allowing SMEs to respond quickly to disruptions, adjust to changing market conditions, and realign their business strategies in real time.

In terms of customer service delivery, the study found that ICT tools, such as online communication platforms, digital payment systems, and social media, enabled SMEs to maintain close customer engagement, deliver timely services, and expand access to their products despite mobility restrictions. These technologies facilitated seamless interactions and improved responsiveness, thereby enhancing service quality during the pandemic.

Moreover, ICT adoption stimulated innovation among SMEs by enabling the redesign of business processes, encouraging the development of new digital services, and supporting the introduction of technology-driven solutions tailored to emerging customer needs. Through digitalisation, SMEs were able to experiment with new business models, automate routine tasks, and explore innovative approaches to value creation, ultimately contributing to long-term resilience and competitiveness.

5.2 Limitations

The main limitations of this dissertation were time and financial constraints, which restricted the study to SMEs located in the Blackheath Industrial Area of Cape Town. A broader research setting may have produced more diverse insights.

5.3 Recommendations

The recommendations aim to strengthen the SME ecosystem to ensure resilience and preparedness for future, unpredictable, and disruptive crises that may have consequences equal to or more severe than those experienced during the COVID-19 pandemic.

- Governments and SME associations should conduct regular ICT audits to assess digital readiness, identify infrastructural and skills gaps, and ensure SMEs remain aligned with evolving digital trends. These audits will strengthen SME resilience and preparedness for future disruptions.

- SMEs must continuously improve and update ICT tools to safeguard business continuity during crises. Lessons from the COVID-19 pandemic show that low digital adoption heightens vulnerability, making ongoing investment and government-supported ICT capacity-building essential
- To build a resilient SME ecosystem, ICT must be fully integrated into business processes. This includes using digital tools for e-bookings, online orders, CRM, e-invoicing, cloud computing, e-commerce, and supply chain coordination
- Regular ICT training is necessary to address skills gaps and ensure effective use of digital tools. Training should include digital skills, ICT applications, innovative business models, and creative problem-solving. Government and stakeholder support is essential to sustain sector-wide ICT capability.

NOTE

The authors participated fully throughout the research until the final version was approved.

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Authors' Contribution

All authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

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