

Evaluating the Relationship between Digital Transformation and Resilience of Small and Medium Enterprises in the Post-Covid-19 Era in South Africa

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Abstract

The purpose of this study was to evaluate the relationship between digital transformation and resilience of small and medium enterprises (SMEs) in the post-COVID-19 era in South Africa. The quantitative research approach was selected as the appropriate methodology for this study, while the purposive sampling approach was selected as the appropriate way for selecting the participants for this study. Primary data was acquired from business owners of retail SMEs establishments and then analysed, using SPSS. A total of 132 copies

of a questionnaire were sent out for this study, with 128 of them being returned (for a response rate of 97%). Two statistical tests – regression and Pearson’s correlation – were performed. According to the results, digital transformation has an absolute value (0.329) that explains the most variations in the regression model. The study recommended that entrepreneurs need to invest in digital infrastructure to ensure the smooth running of digital activities. Items like high-speed Internet, the cloud, and secure computing fall under this category.

Keyword: *Business resilience, COVID-19, Digital technologies, Digital transformation.*

JEL codes: M15, O33

1. Introduction

The significance of the function played by small and medium-sized enterprises (SMEs) in the process of commercial expansion and development is well recognised and has been demonstrated by academic research (Gherghina, Botezatu, Hosszu, & Simionescu, 2020). This is expected, given the enormous contribution of SMEs of all sectors to South Africa's economy. When looking at the magnitude of issues such as unemployment, inequality, and poverty in South Africa, it is clear that SMEs are of the utmost importance in the process of finding solutions to these societal and economic issues (Wessels, 2021; Msomi & Kandolo, 2023). Sadly, over 82% of SMEs in South Africa are projected to underperform or continue to stagnate in their first two years of business functioning (Tarr, 2021; Letsoalo, 2023; Nhleko, Msomi & Ogunsola, 2023). This is partially due to several obstacles that hinder the operations of SMEs in the country. The problem is made even worse by the quickly shifting market climate, which is being driven by globalisation, technical improvements, and the constraints of the market (Prasanna et al., 2019). These difficulties hinder SMEs' ability to cultivate survival-critical resilience capabilities. As a direct consequence of this, the significant part that SMEs play in the expansion and growth of South Africa's economy is continually put in jeopardy.

Consequently, it is necessary for South African SMEs, in conjunction with a variety of stakeholders from the public and private sectors, to invent approaches to overcome some of the challenges they encounter so that they can remain resilient in times of uncertainty (Fubah & Moos, 2022). The expansion and progress of SMEs should be a primary focus of the strategies that are developed. SMEs are increasingly dependent on

data analytics, digital technologies, and automation, making digital resilience a crucial factor in their continued success (Corvello et al., 2022). Efforts such as the usage of computers and mobile apps, Internet sites, and social networking sites are considered to be corporate resilience enhancers (Gambo & Ozad, 2020). These kinds of initiatives may assist flexibility and transformation while maximising opportunities and difficulties. SMEs that can establish operational resilience abilities through digital innovation have the potential to better plan for, adjust to, and survive interruptions and uncertainty in the business climate (Klein & Todesco, 2021).

Impacted heavily by the global spread of the COVID-19 pandemic, SMEs have been forced to reevaluate their approach to resilience and digital transformation in the face of severe adversity (Nath et al., 2020). In the post-COVID-19 era, SMEs that have undergone digital transformation are likely to be more resilient and better positioned to withstand future disruptions. Digital tools and technologies can enable SMEs to quickly pivot their business models, adapt to changing customer needs, and operate remotely when necessary (Wong & Kee, 2022). The digital transformation of businesses may improve their resilience by reducing the restrictions placed on their funding. The implementation of digital transformation may improve an organisation's internal control, which will, in effect, strengthen the firm's resilience.

SMEs that undergo a digital transformation may expect to gain new customers and suppliers quickly and also gain access to innovative business strategies designed to enhance their core processes, products, and services to boost their bottom lines (Matarazzo, 2021). Moreover, the discussion around technology adoption among SMEs suggests that doing so is more presumably to boost success, cross-border commerce, and interconnection with other SMEs (Westerlund, 2020). All of these shifts have the potential to increase the viability of SMEs and create resilience that is enabled by digital technology (Ndiege, 2019; Zheng et al., 2022; Oyewobi et al., 2022). Thus, several academics have determined on how SMEs in developing countries might benefit from embracing digital technology, especially SMEs in South Africa that have been reluctant to integrate digital technologies. The adoption of technology by SMEs has typically been driven by a desire to improve operational efficiencies and enhance their ability to compete in their respective markets.

Despite this, there are a variety of obstacles that need to be overcome for SMEs to successfully implement digital technologies.

Firstly, limited financial resources often pose a significant challenge, as many SMEs operate on tight budgets and may struggle to afford the initial investment required for digital infrastructure and tools. Additionally, a lack of digital literacy among employees can hinder adoption, as employees may require training to effectively utilise new technologies. Moreover, concerns around cyber security and data privacy can deter SMEs from fully embracing digital solutions, especially considering the potential risks associated with storing sensitive information online. Furthermore, the fast-paced nature of technological advancements can make it difficult for SMEs to keep up with the latest trends and innovations, leading to concerns about investing in technologies that may quickly become outdated. Finally, organisational resistance to change and a reluctance to depart from traditional methods can also impede the successful implementation of digital technologies within SMEs. However, many SMEs overlook the link between embracing technology and boosting their profit drives. The collapse of many SMEs' digital endeavours can be directly attributed to this crucial component of digital transformation. Numerous digital initiatives in the SME sector fail to deliver relevance and value because they are too disjointed and are not aligned with digital technology and business goals.

The major aim of this study is to improve the reader's understanding and retention of the digital transformation of SMEs in the South African setting to strengthen the resilience of businesses during post-COVID-19.

2. Literature Review

2.1 Digital transformation and resilience of SMEs post-COVID-19

Digital transformation plays a vital role in entrepreneurial organisations by defining and transforming their processes (Goerzig & Bauernhansl, 2018; Proksch, Rosin, Stubner, & Pinkwart, 2021). It offers flexible features that have a significant impact on the innovation, performance, and productivity of organisations (Tian, Dogbe, Pomegbe, Sarsah, & Otoo, 2021). Such features involve linking value creation and the creation of organisational restrictions for time-sensitive strategic action (Papadopoulos, Baltas, & Balta, 2020). Digital transformation refers to a process that leverages a combination of technologies such as information, computing, communication, and connectivity to drive organisational change and innovation to bring about significant changes in the possessions of an organisation, with an objective of improving its

overall performance (Vial, 2019). Scholars have noted that digitalisation is one prominent way for organisations to avoid risk, achieve performance, and adapt to changing environments through resilience. The term ‘resilience’ is defined as an ability or aptitude of an individual, organisation, or society to utilise its available resources and adapt to the environment in a manner that results in positive adjustments and the maintenance of normal operation before, during, and after hardship (Williams et al., 2017). These capabilities must be developed both at the individual and organisational levels, and potentially reach out to the larger network. As SMEs play a vital role within the entrepreneurial ecosystem, the complexity of digital transformation becomes apparent due to the challenges associated with orchestrating technological advancements and operational changes at the level of the broader business environment (Linde, Sjodin, Parida, & Wincent, 2021). This suggests that the improvement of resilience capability may expect collaboration and support from other performers within the ecosystem. In essence, the resilience capacity of SMEs positioned within a larger entrepreneurial environment may be fundamentally multilevel.

Digital transformation is necessary in enhancing resilience, primarily by enhancing human capital, fortifying innovation capabilities, alleviating financing constraints, and reinforcing internal controls. COVID-19 has accentuated the critical role of digitalisation in facilitating efficiency development, and resource allocation which have principally become essential for the recovery and return of the firms (Zhang, Long, & von Schawen, 2021). Consequently, during post-COVID-19, organisations have recognised digital transformation as a decisive strategy for improving resilience to achieve sustainable development in the face of external environment-increased ambiguities (Wang & Chen, 2022).

SMEs face heightened vulnerability to the adverse effects of crises, often requiring swift decision-making amid significant uncertainty (Doern, Williams, & Vorley, 2019). Consequently, as SMEs endeavour to embrace digital technologies for transformation, prioritising resilience becomes imperative. By harnessing their dynamic capabilities to sense market shifts, seize opportunities, and transform operations, SMEs can fortify themselves against the disruptions posed by crises and navigate the evolving business landscape more effectively. Digital transformation, a multifaceted process encompassing the integration of digital technologies and innovative strategies into various aspects of business operations, holds significant potential for enterprises. For instance, the adoption of artificial intelligence (AI) and other digital tools can

empower organisations to make informed decisions amidst crises and bolster the resilience of their supply chains (Dubey et al., 2021). By leveraging these technologies, enterprises can adeptly navigate evolving environments, demonstrating their capacity to adapt and thrive in the face of challenges. However, SMEs' digital transformation possesses opportunities and pitfalls. It can facilitate improvement of products and innovation process while fast moving sterilisation (Ardito, Raby, Albino, & Bertoldi, 2021; Bresciani, Huarng, Malhotra, & Ferraris, 2021). Nonetheless, it brings challenges in adoption for these technologies. This is mainly because of the SMEs' incapacity to effectively transfer from traditional business models to new technologies; for various reasons, they are often crawling behind with the adoption of digital transformation (OECD, 2021). The study conducted by Rupeika-Apoga, Bule and Petrovska (2022) posits that SMEs lack awareness and information, capital shortages, skills, and corresponding assets such as firm culture and technology for digitalisation. Nonetheless, digital transformation is a good strategy to achieve the objectives of the SMEs and in developing their products and services to achieve a competitive advantage.

2.2 Empirical review

Applying digital technology is the first capability of digital transformation in dealing with crises in businesses, as it can increase the degree of automation and intellect in the manufacturing and operation methods of businesses, thereby effectively bolstering production efficiency. In times of crisis, these advantages enable companies to quickly reallocate resources and expertise and launch new production activities, enabling them to grab and create opportunities despite hardship and develop in unconventional ways. Khurana, Dutta and Ghura's (2022) conducted research to evaluate the extent to which SMEs have embraced digital technology and developed the resilience necessary to survive in today's competitive business environment. In this qualitative study, eight Indian SMEs participated. By building sensing, conquering, and changing vibrant skills, SMEs were shown to be able to adopt digital technologies and survive digital transformation, allowing them to weather unforeseen shocks and disruptions like the COVID-19 crisis. Findings from the research also highlighted the significance of the business's core in fostering resilience capabilities and undergoing digital transformation. The study by Khalil, Abdelli and Mogaji (2022) surveyed 96 SMEs across six companies in developing countries which are Bahrain, Egypt,

Pakistan, Saudi Arabia, Tunisia, and the United Arab Emirates, examining the effects of digital technologies on the resilience of small and medium-sized enterprises during the pandemic. The findings indicate a positive link between digital technologies and SMEs' resilience during the pandemic of COVID-19. It was also found that the use of digital technologies positively influenced SMEs' resilience by improving their performance, reducing risks, and ensuring survival. Similarly, implementing digital technologies facilitated SMEs' building abilities for cultivating operational efficiency and responsiveness and providing end-users with unique value. Furthermore, the study revealed that distance working from residential homes positively impacted SMEs' resilience throughout the current crisis, improving employees' efficiency and engagement. Lastly, the study found that government support positively affected SMEs' resilience, helping them persist and minimise the negative effect of the pandemic. Therefore, SMEs must encourage the use of digital technologies, working from home, and government support to enhance their resilience during crises.

Robertson et al.'s (2022) study in South Africa assessed the impact of digital maturity on the organisational resilience of SME retailers and found that digitally established SME retailers were better able to respond to the challenges posed by the COVID-19 pandemic than digitally less mature SME retailers. The qualitative data collected through interviews provided additional depth to the results and helped explain the differences in responses between the two groups. The findings were based on the future prospects theme that digitally mature SMEs were more positive about their current situation and the future and were better able to adapt to the situation by leveraging digital platforms to better understand their customers and customer loyalty. Conversely, findings based on explicit strategies themes revealed that digitally mature retail small businesses had more goal-directed strategies to address the challenges posed by the pandemic and displayed more action in their responses, outlining specific actions they were taking or had taken during the crisis.

Zhang et al.'s (2021) study of 339 Chinese enterprises employed fuzzy-set qualitative comparative analysis (fsQCA) and structural equation modelling (SEM) to study the relationships among digital transformation, two-handed innovation, and organisational resilience. The study found that digital transformation has a positive impact on the organisational resilience of enterprises, and this effect is negotiated by both exploitative innovation and exploratory innovation. The study also

highlights the importance of digital transformation in advancing organisational resilience for enterprises. The study explores the validity mechanism of digital transformation on organisational resilience and proposes a theoretical channel of digital transformation — ambidextrous innovation — organisational resilience. Furthermore, the study identifies a balanced relationship between exploitative innovation and exploratory innovation and the study indicates that there exist three configurations for attaining organisational resilience: a combination of digital transformation and exploitative innovation, a combination of digital transformation and exploratory innovation, and a combination of exploitative and exploratory innovation. These findings provide practical significance for enterprises to actually execute digital transformation and realise organisational resilience.

Chieng and Malatji's (2022) research of the digital transformation of SMEs in sub-Saharan Africa (SSA) found that digital transformation can foster resilience, but the adoption of digital technologies by SMEs in SSA has been slow due to several inhibitions. The objective of the article is to establish how SSA SMEs can develop thorough strategies for incorporating digital technologies into their processes to foster resilience. Arksey and O'Malley's methodical scoping review (SR) was adopted in the study to identify and represent articles over a period of five years, using inclusion and exclusion measures. Forty-four (44) articles were analysed to report the issue under investigation. The results imply that economy-based, market-based, and sociotechnical contextual factors are the main themes that inhibit digital transformation of SMEs in the region of SSA. SMEs in the SSA background face various limitations that create hurdles, such as inadequate access to profitable and enriched markets, in their operations.

Ranatunga, Jayasekara and Priyanath (2022) in Galle District, Sri Lanka examined how usage of ICT and dynamic capabilities of small and medium scale enterprises affect the business resilience during the COVID-19 pandemic. Collection of data was done from 129 SMEs that used ICT using in-person and interviews via telephone, and SmartPLS software was used to analyse data with partial least square-structural equation modelling (PLS-SEM). The study found a favourable relationship among ICT usage and business resilience during the COVID-19 crisis. ICT usage also significantly impacts the dynamic capabilities of the enterprise. The suggestion of results is that dynamic capabilities show a corresponding facilitating function in the relationship between the usage of ICT and resilience of the business. The study also

showed that the ICT adoption and the ability to incorporate, construct, and reconfigure the accessible resources of SMEs with ICT enablers boosted their resilience and certified persistence during the pandemic.

2.3 Conceptual model

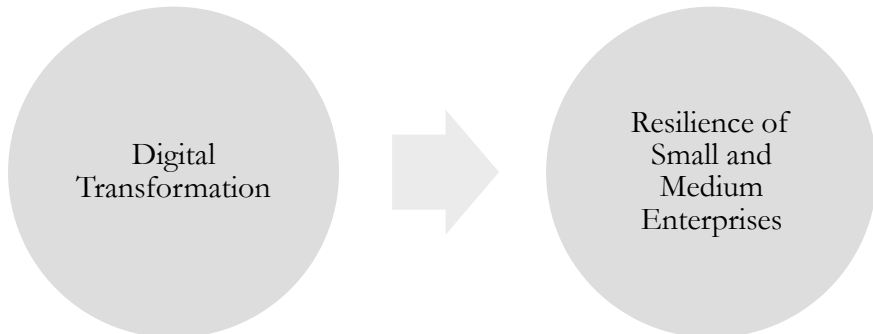


Figure 1: The relationship between independent factors such as digital transformation and the resilience of SMEs (dependent variable).

Source: Authors' design (2024)

2.4 Resource-based theory

Resource-based theory (RBT) is a foundational concept in strategic management that focuses on understanding how a firm's unique resources and capabilities contribute to its competitive advantage and performance (Utami & Alamanos, 2022). Carmona (2022) suggested that at its essence, RBT posits that a firm's resources, including tangible and intangible assets such as technology, human capital, and organisational processes, are the primary determinants of its ability to achieve a sustained competitive advantage. Central to RBT is the notion of resources being heterogeneous and immobile, meaning that resources vary across firms and are not easily transferable or replicated by competitors (Varadarajan, 2023). This perspective emphasises the importance of leveraging internal resources and capabilities to create value and achieve superior performance relative to competitors. In this study, the application of RBT is instrumental in understanding how digital transformation initiatives can enhance organisational resilience, performance, and competitiveness. By utilising the firm's resources, particularly its information technology (IT) assets, RBT provides insights into how firms can strategically deploy their technological capabilities to build and sustain competitive competence. The talents of the staff, the

infrastructure, and the adaptability of the company are considered distinctive resources within the framework of RBT. Digital transformation, as a strategic initiative aimed at leveraging technology to drive organisational change and innovation, aligns closely with RBT principles. Each approach to digital transformation is unique and complex, reflecting the firm's specific resources and capabilities. By pooling together technology resources and aligning them with organisational objectives, firms can enhance their organisational capacity, leading to improved performance outcomes. Therefore, the integration of RBT into the study provides a theoretical lens through which the relationship between digital transformation efforts and organisational resilience, performance, and competitiveness can be examined.

3. Methodology

The initial citation, indeed, highlighted a substantial audience of over 500 manufacturing SMEs in Durban, South Africa. However, practical considerations prompted a focused approach in our study. The Cochran formula, as referenced from Msomi (2023), guided our decision-making process for determining an appropriate sample size. Given the inherent challenges in surveying an entire population of such magnitude, particularly with regard to resource constraints and feasibility, we opted to target a representative subset. As such, data were collected from a sample of 132 SMEs, using a non-probability sampling technique, specifically a purposive sampling approach. This method was deemed most effective in situations where the characteristics of the entire population are unknown.

To ensure comprehensive coverage, we reached out to potential participants via email through the Durban Chamber of Commerce and Industry (DCCI) database. This enabled us to target small and medium-sized enterprises operating within the Central Business District of Durban, South Africa, aligning with the scope of our inquiry on the relationship between digital transformation and SME resilience in the post-COVID-19 era. Notably, within the Manufacturing sector, 128 copies of the questionnaire were distributed and subsequently collected, yielding an impressive 97% response rate. This high level of engagement allowed for robust analysis and insights into the dynamics of digital transformation and resilience among SMEs in the specified region.

The structural composition of the items utilised in this investigation and the constructs measured were assessed using the Statistical Package

for the Social Sciences (SPSS) as the primary analytical tool. Employing both descriptive and regression analyses, SPSS facilitated a comprehensive evaluation of the factor structures of the items and constructs under scrutiny. This approach enabled a detailed examination of how these components interrelated and contributed to the overall constructs being studied. Furthermore, it aided in identifying any underlying patterns, relationships, or disparities within the dataset, thereby augmenting the interpretability and robustness of the study outcomes. Specifically, SPSS version 27 was employed to conduct both descriptive and inferential statistical analyses. Descriptive statistics were utilised to analyse the demographic section of the questionnaire, while inferential statistics, including exploratory factor analysis, Pearson correlation coefficient, and regression, were applied to ascertain the factor structure of the scales and accomplish the study objectives.

4. Analysis

This section presents an analysis of demographic information gathered from the surveyed participants. This demographic analysis encompasses variables such as Business Age, Years of Experience in Business, Annual Revenue of SMEs, Prior Experience with Digital Technologies, and Access to High-Speed Internet. Additionally, the respondents were asked to evaluate the extent to which they believe digital transformation has contributed to enhancing their SMEs' resilience in the post-COVID-19 era. The descriptive statistical analysis of this demographic data utilises frequency and percentage distributions depicted in figures within this section.

Table 1: The analysis of the demographic information obtained from the respondents, presenting the percentage distribution of various attributes pertaining to SMEs

Item	Description	Frequency	Percent
Business Age	1-2 years	55	43%
	2-3 years	38	30%
	3-4 years	15	12%
	More than 5 years	20	16%
Years of Experience in Business	1-5 years	61	48%
	06-10 years	28	22%
	11-20 years	22	17%
	more than 21 years	17	13%
Annual Revenue of SME	Less than R50,000	15	12%
	R50,001 - R100,000	23	18%

	R100,001 - R500,000	44	34%
	R500,001 - R1 million	25	20%
	More than R1 million	21	16%
Prior Experience with Digital Technologies	None	32	25%
	Basic	74	58%
	Intermediate	12	09%
	Advanced	10	08%
Access to High-Speed Internet	Yes	55	43%
	No	73	57%
To what extent do you believe digital transformation has contributed to enhancing your SME's resilience in the post-COVID-19 era?	Not at all	05	04%
	Slightly	09	07%
	Moderately	22	17%
	Significantly	38	30%
	Completely	54	42%

Table 1 provides an analysis of the demographic information gathered from the respondents. Regarding the age of businesses represented in the survey, the majority (43%) have been operational for 1-2 years, followed by 30% for 2-3 years, 12% for 3-4 years, and 16% for more than 5 years. This indicates a diverse range of business maturity levels among the respondents.

In terms of the years of experience in business, nearly half (48%) have 1-5 years of experience, while 22% have 6-10 years, 17% have 11-20 years, and 13% have more than 21 years of experience. This suggests a significant proportion of relatively newer businesses in the sample. Regarding annual revenue, the distribution varies, with 12% reporting revenue less than R50,000, 18% between R50,001 and R100,000, 34% between R100,001 and R500,000, 20% between R500,001 and R1 million, and 16% reporting revenue exceeding R1 million. This indicates a diverse representation of SMEs across different revenue brackets.

In terms of prior experience with digital technologies, the majority (58%) have a basic level of experience, followed by 25% with none, 9% with intermediate, and 8% with advanced experience. This suggests that a significant proportion of the respondents already have some level of familiarity with digital technologies. Regarding access to high-speed Internet, 43% of the respondents have access, while 57% do not. This indicates that a sizable portion of SMEs may face challenges related to Internet connectivity. Finally, the respondents were asked to assess the extent to which they believe digital transformation has contributed to enhancing their SME's resilience in the post-COVID-19 era. The majority (42%) believe it has contributed completely, followed by 30%

significantly, 17% moderately, 7% slightly, and 4% not at all. This suggests a widespread recognition among the respondents of the importance of digital transformation in building resilience in the face of the pandemic's challenges.

Exploratory factor analysis (EFA)

In this study, EFA was employed to ascertain the underlying factor structure of the latent variables (Pallant, 2020). Put simply, the EFA aimed to identify the factors that are coherently associated in measuring each of the variables under investigation. Additionally, the EFA served as a means for data screening. Consequently, the items with factor loadings below 0.50 were excluded from further analysis, following the recommendation by Hair, Sarstedt, Hopkins, and Kuppelwieser (2014). The findings of the EFA, conducted using SPSS version 27, are delineated in the table provided below.

Table 2: Exploratory factor analysis (EFA)

Items	Factor 1	Factor 2	Factor 3
DIGT1	.893		
DIGT2	.895		
DIGT3	.924		
DIGT4	.913		
DIGT5	.920		
SME_RES1		.799	
SME_RES2		.793	
SME_RES3		.934	
SME_RES4		.923	
BUS_TRAM1			.887
BUS_TRAM2			.970
BUS_TRAM3			.923
BUS_TRAM4			.944

KMO = .882; $\chi^2=2305.243$; df = 66; $p < .001$

The results of the exploratory factor analysis (EFA) indicate a robust and suitable fit for the model. The Kaiser-Meyer-Olkin (KMO) measure, which assesses the sampling adequacy, yielded a high value of 0.882, suggesting that the data was highly suitable for factor analysis. Additionally, the chi-square test resulted in a statistically significant value of 2305.243 with 66 degrees of freedom and a p-value of less than 0.001, indicating that the model adequately fits the data. Examining the factor loadings, several noteworthy patterns emerge. For the "DigT" items (DigT1, DigT2, DigT3, DigT4, DigT5), all exhibit substantial loadings on Factor 1, ranging from 0.893 to 0.924. This suggests a strong association between these items and a common underlying factor, possibly related to digital technologies. Similarly, the "SME_RES" items (SME_RES1, SME_RES2, SME_RES3, SME_RES4) demonstrate significant loadings on Factor 2, ranging from 0.793 to 0.934, indicating a shared association

likely related to small and medium-sized enterprise (SME) research. Lastly, the "BUS_TRAM" items (BUS_TRAM1, BUS_TRAM2, BUS_TRAM3, BUS_TRAM4) display substantial loadings on Factor 3, ranging from 0.887 to 0.970, suggesting a coherent association possibly linked to business transformation.

Table 3: Statements on the digital transformation

Statements on the Digital Transformation	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Our company effectively utilises digital technologies	03 02%	11 09%	18 14%	46 36%	50 39%
We have invested in upgrading our digital infrastructure	05 04%	05 04%	20 16%	25 20%	78 61%
Our employees are proficient in using digital tools	00	06 5%	21 16%	38 30%	62 48%
Digital transformation has improved our operational efficiency	01 01%	12 09%	15 12%	43 34%	57 45%
Our company embraces innovation in digital processes	08 06%	09 07%	22 17%	52 41%	37 29%

The results from the survey indicate varying degrees of alignment within the organisation regarding digital transformation initiatives. Firstly, a significant portion of the respondents, 85%, either agree or strongly agree that the company effectively utilises digital technologies. This suggests a general acknowledgment of the importance of digital tools in the company's operations. However, there seems to be a lesser consensus when it comes to investing in upgrading digital infrastructure, with only 81% either agreeing or strongly agreeing. This indicates a potential gap between recognising the importance of digital infrastructure and actual investment in it. Moreover, while the majority of the respondents agree that their employees are proficient in using digital tools (78% agree or strongly agree), there are still a notable 21% who are neutral or disagree. This implies that there may be room for improvement in digital skills training or support for employees. Furthermore, the survey reveals a high level of agreement (79%) that digital transformation has improved operational efficiency. This suggests that, despite any existing challenges,

the digital initiatives implemented thus far have had a positive impact on the company's efficiency. Lastly, the survey indicates a somewhat lower level of consensus regarding the company's embrace of innovation in digital processes. While 70% agree or strongly agree, a substantial 15% are neutral, and 13% disagree or strongly disagree. This suggests that there may be differing perceptions within the organisation regarding the company's commitment to fostering innovation in its digital endeavours.

Table 4: Statements on the SMEs' resilience

Statements on the SMEs' Resilience	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Our company has effectively embraced digital transformation amidst the challenges posed by COVID-19.	01 01%	01 01%	15 12%	42 33%	69 54%
We have expanded our digital product/service portfolio to enhance resilience against risks.	00	05 04%	20 16%	30 23%	78 61%
Our business has forged strategic digital partnerships and alliances with suppliers and collaborators.	00	02 02%	31 24%	49 38%	46 36%
We have implemented a comprehensive digital contingency plan to navigate unforeseen disruptions seamlessly.	04 03%	09 07%	22 17%	56 44%	37 29%

The survey results reflect a positive stance towards digital transformation within the organisation, particularly in response to the challenges posed by COVID-19. A significant majority, 87%, either agree or strongly agree that the company has effectively embraced digital transformation amidst these challenges. This indicates a strong recognition of the importance of digital adaptation in navigating turbulent times. Furthermore, there is considerable support for the notion that the company has diversified its digital product and service offerings to enhance resilience against risks, with 84% of the respondents either agreeing or strongly agreeing. This suggests a proactive approach to leveraging digital platforms to mitigate potential vulnerabilities. The survey also reveals a high level of satisfaction with the company's efforts in forging strategic digital partnerships and alliances, with 74% either agreeing or strongly agreeing.

This indicates a recognition of the importance of collaboration and ecosystem building in the digital landscape. However, there seems to be a slight discrepancy in perceptions regarding the implementation of a comprehensive digital contingency plan. While the majority, 73%, agree or strongly agree that such a plan is in place, there is a notable 17% who are neutral, indicating potential uncertainty or gaps in awareness regarding the effectiveness of the plan.

A regression was established to establish the effect of digital transformation and resilience of SMEs in the post-COVID-19 era. Table 5 displays the results of the statistical study.

Table 5: Effects of digital transformation and resilience of SMEs

Variables in the equation	B	Beta	T	p-value	R ²	F	df	pvalue
Constant (Digital transformation)	15.317		6.388	<.005				
SMEs' resilience	.789	.579	7.282	<.005	.329	53.034	1; 105	<.005

DV – SMEs' resilience

Predictor (Constant) – Digital transformation

Table 5 showcases the summary of the outcome of the regression analysis conducted to establish the effect of digital transformation and SMEs' resilience in the post-COVID-19 era. The result reveals R2 value of .329. This result implies that digital transformation accounts for 32.9% of the variance in SMEs' resilience. There is a significant linear relationship between digital transformation and SMEs' resilience, $F(1, 105) = 53,034, p < .005$. Based on this outcome, the independent variable digital transformation is a significant predictor of SMEs' resilience ($B = .579, p < .005$).

The findings are consistent with research on digital transformation and resilience of SMEs, which found that SMEs espoused digitalisation and strategies alliances during the COVID-19 crisis which is crucial for their resilience for survival (Klein & Todeso, 2021). In contrast, the study conducted by Robertson et al. (2022) found that SMEs that were digitally mature, with high digital capability and leadership, exhibited higher levels of organisational resilience than those with lower levels of digital maturity. This was true across all dimensions of resilience. The study also found that digitally mature SMEs responded better to the challenges

posed by the COVID-19 pandemic. They were more optimistic about future prospects, had more explicit strategies, and used innovative solutions to adapt to the pandemic's challenges. In sub-Saharan Africa, Forson et al. (2022) found that digital transformation has a favourable significant relationship between SMEs' resilience and digital transformation, specifically the expansion of online sales during the COVID-19 pandemic. The study finds that increasing the percentage of online sales had a decreasing outcome on sales and cash-flow drops and progressed financial resilience at an onset of 40% during the pandemic. This suggests that SMEs who adopted or expanded their online sales during the pandemic were more resilient than those who did not.

A Pearson correlation coefficient was conducted to establish the extent of relationship between digital transformation and resilience of SMEs. The result of the Pearson correlation is presented in Table 6.

Table 6: Correlation between digital transformation and SMEs' resilience in the post-COVID-19 era

Construct A	Construct B	Pearson's correlation (r)	p -value
Digital Transformation	SMEs' resilience	.579**	<.005

**Correlation is significant at the 0.01 level (2-tailed)

The result of the Pearson correlation coefficient in Table 6 shows that there is a statistically significant association between digital transformation and SMEs' resilience in the post-COVID-19 era ($r = .579$, $p < 0.005$). The positive correlation between constructs A (digital transformation) and B (SMEs' resilience) is an indication of a direct relationship between the two constructs. This implies that digital transformation can improve SMEs' resilience through investments since digital transformation allows enterprises to become more integrated and coordinated. Also, the implementation of digital transformation by SMEs in the post-COVID-19 era is an important strategic choice for their sustainable operation and growth in the rapidly developing digital economy era. This result implies that leveraging digital transformation can enhance the resilience of SMEs by enabling them to adapt and thrive in the face of uncertainty and disruption. The integration of digital technologies and processes empowers enterprises to operate more efficiently, respond to market changes swiftly, and enhance coordination

across various functions. Overall, digital transformation assists SMEs in becoming more resilient by enhancing their skills in the areas of agility, efficiency, customer interaction, market access, and decision-making. Yet, it is essential for small and medium-sized enterprises to properly plan and carry out digital transformation initiatives to guarantee that these activities are aligned with enterprise objectives and the requirements of customers.

The study highlights that the implementation of digital transformation strategies by SMEs in the post-COVID-19 era is a strategic imperative for ensuring their sustainable operation and growth in the rapidly evolving digital economy landscape. By embracing digitalisation, SMEs can not only streamline their operations and improve productivity but also enhance their ability to innovate, reach new markets, and meet evolving customer demands effectively. The findings underscore the critical role of digital technologies in building the resilience of SMEs, enabling them to navigate challenges, capitalise on opportunities, and remain competitive in an increasingly digitalised business environment. These results align with findings from studies conducted in other countries, such as research by Lee and Trimi (2020) in South Korea and Wang et al. (2021) in China, which have also highlighted the positive impact of digital transformation on SMEs' resilience. These studies illustrate how digitalisation can empower SMEs to overcome disruptions, enhance their agility and adaptability, and position themselves for long-term success in a digital-first world. The collective evidence underscores the transformative potential of digital technologies for SMEs, emphasising the importance of proactive investment in digital transformation initiatives to build resilience, drive growth, and thrive in the face of uncertainty and rapid technological change.

Drawing from resource-based theory, we can interpret this positive correlation as evidence of a direct relationship between digital transformation initiatives and the resilience of SMEs. RBT posits that a firm's resources, including its digital technology infrastructure, play a crucial role in shaping its competitive advantage and ability to withstand external disruptions. In line with this perspective, the implementation of digital transformation by SMEs represents a strategic investment in enhancing their resilience and sustainability. By becoming more integrated and coordinated through digital technologies, SMEs can improve their agility, efficiency, customer interaction, market access, and decision-making capabilities. However, it is imperative for SMEs to align

their digital transformation initiatives with their broader strategic objectives and customer needs. Proper planning and execution are essential to ensure that these initiatives effectively contribute to enhancing SMEs' resilience and competitiveness in the digital economy era.

5. Conclusion and Recommendation

The purpose of this study was to establish the relationship between digital transformation and the resilience of SMEs in the post-COVID-19 era in South Africa. Based on the summary of findings, the study concludes that digital transformation has an absolute value (0.329) which uniquely accounts for the largest proportion of the variance in the regression model. Digital transformation has the potential to significantly improve the resilience of SMEs in the post-COVID-19 era. To keep up with the fast-paced digital landscape, it is essential for enterprises to expedite the digital transformation process. As the impact of digital transformation varies based on a company's attributes, it's imperative for them to create a tailored digital transformation strategy that aligns with their goals and characteristics, considering their unique circumstances. SMEs must explore innovative strategies that improve the core of the business and enhance their operational efficiencies with core processes, products, and services. Lastly, SMEs should work in conjunction with public and private sector stakeholders to develop strategies that will help in overcoming the digital transformation challenges they may face. This will involve developing a supportive environment; private sector stakeholders could grant the SMEs support through investments and mentorship programmes, while the government could support with funding for SMEs to invest in digital technologies. This support initiative can result in SMEs developing digital skills that can enable them to better use digital technologies to improve their productivity.

It has been concluded that SMEs in the post-COVID-19 era can enhance their production, operation, and management models, foster industrial chain collaboration, and spur innovation by leveraging emerging digital technologies such as cloud computing, big data, artificial intelligence, blockchain, the Internet of Things, and 5G. This, in turn, promotes deeper digital transformation and boosts the resilience of enterprises against potential risks. However, in the process of scaling digital technology applications, companies must comply with state regulations and be mindful of the reasonable-use boundaries of such

technology. They must also actively fulfil their social responsibilities, cooperate with the government's digital governance initiatives, and mitigate data risks associated with digital transformation. The following are some recommendations for enhancing digital transformation to guarantee the resilience of SMEs:

- SMEs should create a digital transformation plan that is both comprehensive and aligned with their company goals and the requirements of their customers. The strategy should emphasise increasing the operating effectiveness, bettering the experience of the customers, and fostering innovation.
- SMEs should spend on digital infrastructure to guarantee that digital operations run efficiently. SMEs need to make investments in digital infrastructure. This includes things like high-speed Internet, cloud computing, and cyber security.
- For SMEs to realise the benefits of digital transformation, they must prioritise the user experience. To keep existing clients, it is essential to provide them with intuitive user interfaces, individualised experiences, and prompt responses to any questions they may have.
- It is necessary for SMEs to develop an innovative culture in order to remain relevant and competitive in the digital era. To foster creativity among workers, SMEs should encourage workers to adopt new technology, experiment with new ideas, and share their opinions.
- Automation may assist SMEs in streamlining their operations, lowering their expenses, and improving their accuracy. By automating routine processes, small and medium-sized businesses are freed up to concentrate their efforts on higher-value endeavours that call for the application of human skills.
- SMEs need to implement decision-making processes that are driven by data in order to acquire insights into consumer behaviour, market trends, and SMEs' resilience. With data analytics, SMEs may improve their ability to make educated choices and locate chances for development.
- SMEs may increase their access to resources, knowledge, and money for digital transformation efforts by forming partnerships with other companies, government agencies, and academic institutions.

The research does have several drawbacks and limitations. Firstly, the research design, which employed a quantitative approach, may have

inherent constraints in capturing the nuanced and multifaceted nature of digital transformation and resilience within SMEs. While quantitative methods offer statistical rigour, they may overlook qualitative insights and contextual factors that could provide a richer understanding of the phenomenon under investigation. Secondly, the utilisation of purposive sampling to select participants from retail SME establishments may introduce bias into the sample, potentially limiting the generalisability of the findings to other types of SMEs or industries. Moreover, the reliance on self-reported data from business owners via copies of the designed questionnaire raises concerns regarding response bias and social desirability bias, which may affect the validity and reliability of the collected data.

Furthermore, the study's focus on digital infrastructure investment as a recommendation for enhancing SME resilience may oversimplify the complex interplay of factors influencing resilience, such as organisational culture, leadership, and external environmental factors. A more holistic approach considering a broader range of variables could offer more actionable insights for SMEs navigating the challenges of the post-COVID-19 era. Lastly, the study's geographical scope limited to South Africa may restrict the generalisability of the findings to SME contexts in other regions or countries, where social, economic, political, and technological landscapes may differ significantly.

References

- Achieng, M. S., & Malatji, M. (2022). Digital transformation of small and medium enterprises in sub-Saharan Africa: A scoping review. *The Journal for Transdisciplinary Research in Southern Africa*, 18(1), 13.
- Ardito, L., Raby, S., Albino, V., & Bertoldi, B. (2021). The duality of digital and environmental orientations in the context of SMEs: Implications for innovation performance. *Journal of Business Research*, 123, 44-56.
- Bresciani, S., Huarng, K. H., Malhotra, A., & Ferraris, A. (2021). Digital transformation as a springboard for product, process, and business model innovation. *Journal of Business Research*, 128, 204-210.
- Carmona, L. J. D. M. (2022). Analyzing the path of Resource-based and Dynamic Capabilities Theories for explaining the differentiated performance of firms. *Revista de Negócios*, 27(4), 107-125.

- Corvello, V., Verteramo, S., Nocella, I., & Ammirato, S. (2022). Thrive during a crisis: The role of digital technologies in fostering antifragility in small and medium-sized enterprises. *Journal of Ambient Intelligence and Humanized Computing*, 1-13.
- Doern, R., Williams, N., & Vorley, T. (2019). Special issue on entrepreneurship and crises: business as usual? An introduction and review of the literature. *Entrepreneurship & Regional Development*, 31(5-6), 400-412
- Dubey, R., Gunasekaran, A., Childe, S. J., Fosso Wamba, S., Roubaud, D., & Foropon, C. (2021). Empirical investigation of data analytics capability and organizational flexibility as complements to supply chain resilience. *International Journal of Production Research*, 59(1), 110-128.
- Fubah, C. N., & Moos, M. (2022). Exploring COVID-19 challenges and coping mechanisms for SMEs in the South African entrepreneurial ecosystem. *Sustainability*, 14(4), 1944.
- Gambo, S., & Özad, B. O. (2020). The demographics of computer-mediated communication: A review of social media demographic trends among social networking site giants. *Computers in Human Behavior Reports*, 2, 100016.
- Gherghina, Ș. C., Botezatu, M. A., Hosszu, A., & Simionescu, L. N. (2020). Small and medium-sized enterprises (SMEs): The engine of economic growth through investments and innovation. *Sustainability*, 12(1), 347.
- Kergroach, S., & Bianchini, M. M. (2021). *The digital transformation of SMEs*. OECD Publishing.
- Khalil, A., Abdelli, M. E. A., & Mogaji, E. (2022). Do Digital Technologies Influence the Relationship between the COVID-19 Crisis and SMEs' Resilience in Developing Countries? *Journal of Open Innovation: Technology, Market, and Complexity*, 8(2), 100.
- Khurana, I., Dutta, D. K., & Ghura, A. S. (2022). SMEs and digital transformation during a crisis: The emergence of resilience as a second-order dynamic capability in an entrepreneurial ecosystem. *Journal of Business Research*, 150, 623-641.
- Kleis, L., Chwelos, P., Ramirez, R. V., & Cockburn, I. (2012). Information technology and intangible output: The impact of IT investment on innovation productivity. *Information Systems Research*, 23(1), 42-59.

- Letsoalo, M. E. (2023). *A cross-country analysis of small and medium-sized enterprise owners' perspectives of factors affecting business performance: a case of South Africa and China* (Doctoral dissertation).
- Linde, L., Sjödin, D., Parida, V., & Wincent, J. (2021). Dynamic capabilities for ecosystem orchestration A capability-based framework for smart city innovation initiatives. *Technological Forecasting and Social Change*, 166, 120614.
- Matarazzo, M., Penco, L., Profumo, G., & Quaglia, R. (2021). Digital transformation and customer value creation in Made in Italy SMEs: A dynamic capabilities perspective. *Journal of Business Research*, 123, 642-656.
- Msomi, T. S. Enhancing financial inclusion for small and medium-sized enterprises in South Africa through digital finance. In *Mbali Conference 2023 Proceedings* (p. 401).
- Msomi, T. S., & Kandolo, K. M. (2023). Sustaining small and medium-sized enterprises through financial awareness, access to digital finance in South Africa. *Investment Management and Financial Innovations*, 20(1), 317-327.
- Nath, S. V., Dunkin, A., Chowdhary, M., & Patel, N. (2020). *Industrial Digital Transformation: Accelerate digital transformation with business optimization, AI, and Industry 4.0*. Packt Publishing Ltd.
- Ndiege, J. R. A. (2019). Social media technology for the strategic positioning of small and medium-sized enterprises: Empirical evidence from Kenya. *The Electronic Journal of Information Systems in Developing Countries*, 85(2), e12069.
- Nhleko, M. A. N., Msomi, T. S., & Ogunsola, S. A. (2023). Challenges of Women Entrepreneurship and Empowerment in South Africa: Evidence from Rural Areas. *International Journal of Environmental, Sustainability, and Social Science*, 4(5), 1398-1407.
- Oyewobi, L., Adedayo, O. F., Olorunyomi, S. O., & Jimoh, R. A. (2022). Influence of social media adoption on the performance of construction small and medium-sized enterprises (SMEs) in Abuja–Nigeria. *Engineering, Construction and Architectural Management*, (ahead-of-print).
- Papadopoulos, T., Baltas, K. N., & Balta, M. E. (2020). The use of digital technologies by small and medium enterprises during COVID-19: Implications for theory and practice. *International journal of information management*, 55, 102192.
- Prasanna, R. P. I. R., Jayasundara, J. M. S. B., Gamage, S. K. N., Ekanayake, E. M. S., Rajapakshe, P. S. K., & Abeyrathne, G. A. K.

- N. J. (2019). Sustainability of SMEs in the competition: A systemic review on technological challenges and SME performance. *Journal of Open Innovation: Technology, Market, and Complexity*, 5(4), 100.
- Ranatunga, R. V. S. P. K., Jayasekara, M. D. R., & Priyanath, H. M. S. (2022). Impact of ICT Usage and Dynamic Capabilities on the Business Resilience of SMEs During the COVID-19 Pandemic: A Case of Galle District. *Journal of Management Matters*, 9(2).
- Robertson, J., Botha, E., Walker, B., Wordsworth, R., & Balzarova, M. (2022). Fortune favors the digitally mature: the impact of digital maturity on the organizational resilience of SME retailers during COVID-19. *International Journal of Retail & Distribution Management*, (ahead-of-print).
- Rupeika-Apoga, R., Bule, L., & Petrovska, K. (2022). Digital transformation of small and medium enterprises: Aspects of public support. *Journal of Risk and Financial Management*, 15(2), 45.
- Tarr, M. (2021). *The impact of disruptive technologies on the growth and development of small businesses in South Africa* (Doctoral dissertation, Cape Peninsula University of Technology).
- Tian, H., Dogbe, C. S. K., Pomegbe, W. W. K., Sarsah, S. A., & Otoo, C. O. A. (2021). Organizational learning ambidexterity and openness, as determinants of SMEs' innovation performance. *European Journal of Innovation Management*, 24(2), 414-438.
- Utami, H., & Alamanos, E. (2022). Resource-Based Theory. *Resource-based theory: A review. Water Act*, 2016, 1-26.
- Varadarajan, R. (2023). Resource advantage theory, resource based theory, and theory of multimarket competition: Does multimarket rivalry restrain firms from leveraging resource Advantages?. *Journal of Business Research*, 160, 113713.
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118-144.
- Wang, D., & Chen, S. (2022). Digital transformation and enterprise resilience: Evidence from China. *Sustainability*, 14(21), 14218.
- Wessels, E. M. C. (2021). *An investigation of key aspects in township economies that influences the rate of unemployment* (Doctoral dissertation, North-West University (South Africa)).
- Williams, T. A., Gruber, D. A., Sutcliffe, K. M., Shepherd, D. A., & Zhao, E. Y. (2017). Organizational response to adversity: Fusing crisis management and resilience research streams. *Academy of Management Annals*, 11(2), 733-769.

- Wong, A. P. H., & Kee, D. M. H. (2022). Driving factors of Industry 4.0 readiness among manufacturing SMEs in Malaysia. *Information*, 13(12), 552.
- Worku, Z. (2015). Risk factors for failure in newly established small, micro and medium-sized enterprises in the tourism sector of Gauteng Province, South Africa. *Journal of Risk Governance and Control: Financial Markets and Institutions*, 5(3), 9-19.
- Zhang, J., Long, J., & von Schaewen, A. M. E. (2021). How does digital transformation improve organizational resilience?—findings from PLS-SEM and fsQCA. *Sustainability*, 13(20), 11487.
- Zheng, S., Ye, X., Guan, W., Yang, Y., Li, J., & Li, B. (2022). Assessing the influence of Green Innovation on the market performance of small-and medium-sized enterprises. *Sustainability*, 14(20), 12977.