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Digital Transformation and Competitive Advantage in SMEs: Evidence from Zimbabwe

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Abstract

This study examined the relationship between digital transformation (DT) adoption and competitive advantage in small and medium enterprises (SMEs) in Zimbabwe. Drawing on the Resource-Based View (RBV) and Dynamic Capabilities (DC) frameworks, the research investigated how DT resources and capabilities translate into cost efficiency, differentiation, agility, and innovation. A descriptive and explanatory survey design was adopted, targeting registered SMEs in Masvingo and Zvishavane across manufacturing, retail, and service sectors. A structured questionnaire was administered to a sample of 122 SMEs, and the data were using descriptive statistics, reliability and validity testing, correlation, and multiple regression analysis. The findings revealed that DT adoption had a significant positive impact on all four dimensions of competitiveness, with the strongest effects observed in innovation and agility. These results suggest that while digital resources enable operational improvements, their strategic deployment through dynamic capabilities is more critical in volatile environments. The study contributes theoretically by integrating RBV, DC, and adoption models in the SME context, and practically by providing guidance for managers and policymakers to prioritise digital investments, skills development, and supportive ecosystems to bridge Zimbabwe's translation gap.

Subject Areas

Business & Economics, Management Studies, Information Systems

Keywords

Digital Transformation, Small and Medium Enterprises (SMEs), Competitive Advantage, Dynamic Capabilities, Resource-Based View, Zimbabwe

1. Introduction

1.1. Background: Digital Transformation (DT) and SME Competitiveness

Digital transformation (DT) is the ubiquitous application of digital technologies, which aims to re-engineer processes, products, and business models for achieving the power of data-driven decision making and to generate new value for organizations [1]. For SMEs, the DT can be related to the dynamic capability (capability of sensing-in, seizing and transforming) that transcends the resource constraint and creates the long-term competitive advantage [2]. Recent studies suggest that DT significantly increases innovation output, time-to-market and process efficiency in SMEs and firms that are digitalized in production/logistics, digital value chains and analytics, also showing measurable gains in product and process innovation [3]. In a competitive sense, DT positions SMEs to distinguish themselves through the customer experience and agility while reducing coordination and transaction costs, which should help SMEs perform better in volatile markets. Taken together, DT becomes not a process enhancement to IT but a strategic repositioning which forms the foundation for continued advantage in resource poor enterprises.

In Sub-Saharan Africa and specifically Zimbabwe, the channel from DT to competitiveness is through mobile-first infrastructure, affordability and gaps in capability. Continental studies see mobile connectivity as a key facilitator of business digital uptake, but point to lingering device and skills constraints that impact SME uptake and influence [4]. As monitoring cited by UNCTAD [5] indicates, inclusive and sustainable digitalization could be the key to unleashing the power of connectivity into productivity and markets for smaller enterprises. According to the sectoral indicators for Zimbabwe, the country is progressing in terms of connectivity and data usage with few challenges in terms of affordability or quality of service, and opportunities for digitalisation for SMEs are being explored [6]. The resulting competitive assessment (CA) for Zimbabwe identified a need to use digital solutions, networks, and to facilitate services to increase product and market access for [7]. A key insight is that in order to realize DT-driven advantage, infrastructure, firm capabilities and policy support need to come together to translate access into innovation and growth.

1.2. Zimbabwean SME Context and Problem Statement

SMEs are the backbone of Zimbabwe's productive base, representing around 90% of businesses, ~60% of GDP and over half of employment, but they do so against a backdrop of currency volatility, high inflation and debt distress [8]. Informality has spread throughout the sector, restricting access to finance, standards and export markets, and discouraging investment that can boost productivity. Apart from high levels of informality, other indicators of skills shortages and low levels of certification, particularly at micro and informal firms, were also found, as taken from the ITC SME Competitiveness Survey (2022-2023) [7]. At the macro level,

high public debt and external arrears limit access to concessional finance and foreign exchange and determine the affordability of digital technologies and imported machinery. In this context, the question of competitiveness is less about whether SMEs adopt digital technologies, and more about whether adoption can be continued and expanded in an environment of economic uncertainty and institutional hurdles [9]. These conditions lead to a focused look at digital transformation as a path to advantage in resource-constrained organisations.

Connectivity is on the rise in Zimbabwe. In 2024, the number of active mobile subscriptions increased to 15.68 million subscribers (penetration 102%), the number of active internet/data subscriptions increased to 12.49 million subscribers (81.5% penetration by subscriptions), and mobile data traffic increased by 75% year-on-year. Even with more LTE/5G capacity being deployed, new capacity being added internationally, and new licensees (Starlink among others) coming into the market, competition is on the rise [6]. However, regionally, the usage gap remains: Sub-Saharan Africa saw only 27% of individuals using the mobile Internet in 2023 and the gap was 60% mainly due to affordability [handsets/data] and low digital skills [4]. But for Zimbabwean SMEs, growth of headline subscriptions is not necessarily synonymous with firm-level capability, analytics utilisation, or e-commerce engagement. The digitalisation pay-off is thus a mix of total cost of access reduction and digital skills development, in addition to network extension. As South Africa, Namibia and Angola (SADC) are expected to see four-fold growth in data traffic through to 2030, the leading technology of choice is 4G, demonstrating how vital it is to transform connectivity into productivity [10].

The problem, therefore, is a translation gap: SMEs claim increasing access to connectivity, but unequal digital capacity, financing barriers and skills shortages mean that digital takeup is not sufficiently translated into cost, quality and market-reach benefits. For example, in Zimbabwe, a digital-skill shortage (one out of 10 firms had workforces meeting digital requirements fully), low international certification and continued access-to-finance barriers to innovation and export-preparedness have all been reported [7]. The common message across the world is that SMEs will benefit from the data economy only if digitalisation is inclusive and the policy environment is coherent [5]. However, macro shocks and foreign exchange constraints remain a driver for affordability and investment choices [9]. This paper focuses on how DT can be used to generate competitive advantage for Zimbabwean SMEs under these constraints and what ecosystem levers (skills, finance and standards) are required to bridge the translation gap. This provides a research imperative to clarify mechanisms which connect digital resources to benefit in low resource settings.

1.3. Purpose and Research Questions

Purpose. To determine how digital transformation (DT) generates competitive advantage in Zimbabwean SMEs—using a desk-based evidence synthesis (SLR) interpreted through Resource-Based View and Dynamic Capabilities—and to de-

rive a practical framework for managers and policymakers.

Research questions

- RQ1: Which DT-related resources and capabilities most strongly drive competitive advantage in SMEs?
- RQ2: Through what mechanisms do these capabilities translate into cost efficiency, differentiation, agility, and market reach?
- RQ3: Which Zimbabwe-specific conditions (infrastructure, skills, finance, regulation) enable or hinder DT → advantage?
- RQ4: What actionable roadmap (priorities, enablers, KPIs) should guide Zimbabwean SMEs to realize DT-driven advantage?

1.4. Expected Contributions (Theory, Practice, Policy)

Theoretical

- Integrates TOE/UTAUT with RBV and Dynamic Capabilities adoption perspectives for SMEs in low-resource environments.
- Specifies mechanism chains—digital resources → capabilities (sensing-seizing-transforming) → advantage—with testable propositions.
- Develops an evidenced-based conceptual framework applicable to SME in SSA.

Practical (Managerial)

- Distinguishes baseline IT adoption from transformational reconfiguration, clarifying boundary conditions (macroeconomic volatility, informality).
- Identifies capability bundles (data, customer experience, partner integration) and low-cost enablers (cloud, mobile, fintech).
- Provides KPIs linking DT to advantage (cost-to-serve, cycle time, churn, revenue per employee) and a lightweight implementation checklist.
- Offers Zimbabwe-specific case vignettes to illustrate sequencing, risks, and vendor choices.

Policy

- Recommends levers to turn connectivity into productivity: Data/device cost, talent pipelines, SME financing for DT.
- Recommends procurement and standards (e-invoicing, e-payments, cybersecurity baselines) which will reduce transaction costs for SMEs.
- Recommends regulatory sandboxes and selective incentives to crowd-in private digital infrastructure and platforms which involve SMEs.

2. Literature Review

2.1. Digital Transformation in SMEs: Scope, Components (Process, Product/Service, Business Model)

Digital transformation (DT) in small and medium enterprises (SMEs) is defined as a coordinated and end-to-end redesign of processes, products and business models enabled by digital technologies throughout the organization [11]. In order to stress that advantage arises from complementary changes and not isolated IT

upgrade [12], scholars distinguish a continuum—digitisation (analogue-to-digital conversion), digitalisation (embedding digital tools in workflows), and full DT (strategic renewal). For SMEs, DT is often the driving force on cloud, data, platforms and connectivity to drive new value and responsiveness in the face of resource constraints [13]. Two resulting strategic directions are dominant in the narratives of the respondents: 1) to intensify customer engagement (data-driven channels, personalisation) and 2) to create digitised solutions (integrated products/services supported by software and analytics) [14]. In reality, DT is less a matter of implementing a single set of technologies and more a matter of matching technology to operating models and governance by means of a deliberate, firm-level strategy [15].

The scope of DT and the components of DT in SMEs can be classified into three interdependent layers as follows: Process transformation: Core and support processes are digitised and automated (procurement, production, logistics, finance, HR) and end-to-end data capture and analytics are enabled. Product/service transformation and servitisation (adds software, sensors and connectivity to products/services and shifts revenue from products to services and platforms/subscriptions) [12]. Digital entrepreneurship fundamentally transforms the creation and capture of value through platform governance, eco-system collaboration and data monetization [16]. Empirical studies show that firms link such moves in series-often beginning with digitising processes in order to stabilise data quality before adding product/service innovation and business-model redesign [14]. The integrative view explains that business-model change is the highest-leverage but most demanding component, because it changes the logic of revenues, cost structures and company roles within ecosystems.

Recent reviews focused on SMEs indicate that the payoffs from DT can only be realised if the three elements are aligned through capabilities (data governance, partner integration, agile experimentation and change management) rather than by stand-alone tools [17]. The prerequisites are the will of the governance, digital skills and the size of the approachable infrastructure; the determinants differ according to the size: bigger micro-firms have bigger capability gaps [18]. The combination of components is a key ingredient for competitiveness: the digitization of the product/service into differentiation and retention; the digitization of the process into cost and cycle-time reduction; the digitization of the business model into reach and resilience through platform and data-driven revenues [12]. As a result, effective SME strategy plans with fast win process transformation, pilots product/service features, and as evidence builds—gradually shifts the framing of the business model that connects DT investments to measurable performance results.

2.2. SME Competitive Advantage & Performance Indicators (Cost, Differentiation, Agility, Innovation)

For SMEs, competitive advantage is the ability to maintain superior performance by organising resources and activities in ways that rivals cannot readily imitate.

Classic strategic thinking differentiates between cost leadership (lower unit/serving costs) [19] and differentiation (more superior features, services, brand) whereas the RBV describes persistence via valuable, rare, inimitable and organised (VRIO) resources [20] [21]. Practical measures therefore range from: cost-to-serve, unit cost, defect rates and cash conversion (cost); willingness-to-pay proxies, customer satisfaction/retention, churn, share-of-wallet (differentiation); growth, margin and export intensity as outcome measures. Recent digital transformation (DT) research has linked digital capability (data, analytics and platform usage) with higher performance and entrepreneurial performance in SMEs, and as a result reinforces the relationship between the digital resource base and tangible output [22] [23]. In a nutshell, SMEs are singing the praises of digital when investment in it leads to lower costs and stickier revenue from enhanced customer value.

Agility (speed and flexibility)—sensing and reacting, has become the third pillar of SME advantage together with cost and differentiation. Dynamic capabilities theory posits that firms achieve success by repeatedly sensing opportunities/threats, capitalising on them with timely resource commitments and evolving operations to better match changing environmental demands [24]. DT makes agility possible by providing end-to-end data visibility, rapid experimentation, and cloud-native reconfigurable processes [25]. Agility metrics are order-to-delivery lead time, forecast error, changeover/setup time, time-to-market, recovery time following a disruption, etc. Consistent with the performance pay-off of agility [26], there is evidence that digitally driven business-model innovation improves SME resilience and performance. For SMEs with resource constraints, small iterative digital interventions (workflow automation, API integration, analytics for demand signals) can have a significant impact on agility metrics and yield long-term advantage when systematised as firm-level capabilities.

Innovation represents a core performance channel for how DT generates advantage. Digitalisation of production/logistics, integration in the value-chain and big-data analytics increases the likelihood and intensity of product and process innovation [27], but with different impacts depending on firm size and the type of digital investment [3]. Indicators of innovation include R&D intensity, ratio of sales consisting of new products, patenting or IP outputs, introduction of new services and innovation cycle time. Most importantly, DT allows for modular architectures, customer co-creation and fast iteration that underpin differentiation and cost learning. At the firm level, studies found that DT strategy is helpful to improve both the organisational performance and complementary capability and governance mediated innovation performance [23]. For SMEs, an integrated scorecard-cost/efficiency, differentiation/retention, agility/speed, and innovation throughput-makes it clear whether digital assets are being translated into defensible positions in the marketplace and long-term performance.

2.3. Empirical Evidence on DT → Performance in SMEs (Global Findings)

The current global literature has demonstrated a consistent link between digital

transformation in SMEs and organisational effectiveness and performance when carried out as a strategic approach supported by capabilities [28]. In a 2024 systematic review, DTs are shown to be dependent on coherent strategy, leadership and capacity building, improvement in efficiency, and improvement in market outcomes [17]. Some evidence about the impact of DT on organisational effectiveness at the firm level, across economic and human-resource dimensions, is [23]. In addition, SME entrepreneurial performance is positively affected by digital skills (analytics, platform use, integration) [22]. Further, using a dynamic-capabilities lens, we articulate how sensing-seizing-transforming mechanisms link DT investments to outcomes under resource constraints [2].

Innovation is a powerful empirical channel. Using a large German SME panel, we find that digitalisation in production/logistics, digital value chains and big-data analytics play a substantial role in product as well as process innovation [3]. Further evidence connects DT to technological and non-technological innovation through dynamic capabilities and organisational learning to support innovation as a conduit to performance [25] [29]. The performance and resilience of SMEs are also enhanced through digitised business-model innovation, again emphasising that it is the reconceptualization of offerings and revenue logic (and not just process) that has scalability [6]. Taken together, these studies suggest that DT has an indirect impact on performance through innovation intensity and business model renewal.

The results are heterogeneous and contingent. The literature suggests that outcomes are contingent on complementary capabilities (data governance, partner integration, change management) and limited by capabilities related to competency, finance and strategic alignment [7]. In cross-country work, important success factors have been identified and phased roadmaps proposed, but it is also warned that returns are lower where capability deficits exist even where tools are in place [30]. In the empirical analysis of drivers/barriers, we found that cultural beliefs, leadership, and ecosystem support have an impact on whether DT fulfills its promise to generate concrete performance [31]. In conclusion, global evidence supports the contention that SMEs achieve better cost, differentiation and resilience results when DT is capability-driven and sequenced, than technology-only.

2.4. Adoption Drivers & Barriers (Empirical): Tech, Organization, Environment; Leadership, Skills, Finance, Ecosystem

Empirical research tends to frame SME adoption factors within the TOE approach. On the technological side, uptake is driven by relative advantage, compatibility, cybersecurity/privacy assurance, and feasibility of integration; and hindered by perceived complexity and poor data quality [32]. The drivers are organisational: digital orientation/strategy, top-management commitment, slack resources, IT/data capacity; small size and informality often limit governance and skills [33]. Ecosystem enablers (vendors, platforms, finance) are necessary for accelerating the adoption of these technologies, as pressures on the environment—

including expectations from customers, competitor actions, demands from the supply chain, and nudges from regulators—raise the urgency [17]. Evidence integrating TOE with DOI supports complementarities between technology, organisation, and environment in innovative SMEs while size heterogeneity is critical for capability readiness and pay-offs [18].

Finance, skills, and policy support turn out to be recurrent binding constraints in EM settings. In a multi-sector SME study in Ghana, insufficient finances, inadequate government interests, shortage of skilled staff, poor infrastructure, and poor managerial expertise are ranked as major constraints to competitiveness and access to new markets [34]. Large-sample surveys show that digital-skills deficiencies and organisational resistance are the prevailing barriers along with risks of affordability and vendor dependency [31]. Firm-level evidence from MSMEs in Brazil suggests that constraints (such as deficits in skills, integration) moderate the relationship between DT-innovation—that is, that even in the face of active digitalisation, when capability and resource frictions remain, positive gains are reduced [35]. Taken together, the results highlight the importance of financing instruments, worker reskilling and process integration support in transferring adoption to performance.

Aside from firm interiors, ease of momentum is dictated by ecosystem quality.

Reviews and field studies promote the importance of partner platforms, vendor ecosystems, standards, public/private support to sustain adoption cycles, and success is higher where SMEs have access to roadmap guidance and low-cost cloud tools and iterative capability development [17]. The DASAT cycle introduced by Kahveci [30] for 2025 is divided into 4 phases: awareness, strategy/roadmap, adoption/implementation, and continuous improvement with a focus on leadership commitment and capability pipeline at each phase. These are further enabled by organisational digital orientation and leadership, which affects change through resource mobilisation and mitigated resistance [33]. Its evident that digital capabilities (infrastructure, data/analytics, and integration) are the proximal engines linking adoption to entrepreneurial performance—once ecosystem frictions are tamed [22].

2.5. Sub-Saharan Africa & Zimbabwe: Context and Empirical Evidence

Digitalisation in Sub-Saharan Africa is primarily mobile-driven and continues to grow, yet a substantial usage gap persists [36]. Despite the growth and projection that 4G adoption will reach 50% of connexions by 2030, according to GSMA, approximately 60% of the population is still offline due to a combination of factors, including device affordability and digital competence [4]. The number of connexions will limit Internet users to under 100 per billion people, but with data traffic per connexion set to quadruple this decade, the rewards awaiting firms that can translate connectivity into productivity are huge [5]. Further, UNCTAD calls for inclusive strategies that ensure that connectivity translates into enterprise capa-

bility and market access; and affordability efforts (e.g. coalitions to reduce smartphone prices) address the biggest frictions for SMEs. There is significant opportunity regionally, but achieving the performance improvement that SMEs can make rests upon closing the affordability-skills divide and anchoring capability, rather than coverage.

The opportunities and challenges of SME digitalisation are also emphasised in recent empirical research in Africa. Quaye [37] established that SMEs in Sub-Saharan Africa are turning to digital technologies to enhance their ability to be competitive and enter markets, but their progress is limited by funding deficits and poor management skills. Another study by Mensah [38] demonstrated that the adoption of e-commerce technologies within the framework of TOE and UTAUT by Ghanaian institutions of SMEs results in the quantifiable increase of the performance of these institutions, although the problems connected with the level of infrastructure and with online skills remain to exist. Mchunu [39] also showed that in the Southern African context, digitalisation adds to competitive advantage in South African SMEs by promoting both innovation and efficiency in processes. Together, these results highlight the fact that despite the tangible benefits of digital transformation, African SMEs need special attention to cross the barriers to its adoption and transform connectivity into long-term competitiveness.

Zimbabwe is much the same, faster penetration. The number of active mobile subscriptions increased to 15.68 million in 2024 (penetration 102.3%), internet/data subscriptions increased to 12.49 million (penetration 81.5%), and the volume of mobile data traffic increased by 75% year on year to 299.8 PB [6]. Operators ramped up LTE/5G investment and new licensees, including Starlink, entered, and competition peaked. Yet SME capacity remains asymmetric: an ITC survey of 557 firms (2022-2023) reveals a lack of finance and digital-skills that makes them lacklustre on the technology uptake and export readiness fronts. The immediate policy and managerial challenge is therefore one of translation—from connectivity growth and platform access to firm-level process digitalisation, data use and channels that raise cost, quality and market reach [7].

This picture has some support from the firm-level data across the region. While competitiveness and access to new markets have been cited as reasons for SMEs to adopt technology, the same papers highlight finance, skills, and managerial awareness as binding constraints for SMEs (like Ghana), which would imply capability-led sequencing rather than tool-led roll-outs [34]. Macroeconomic environment—Deterioration of the Zimbabwean economy (drought, currency pressures) in 2024 and potential recovery in 2025 will affect the SME's ability to invest in digital solutions; specific financing and skills pipeline with network scaling [9] Broader surveys of African businesses also conclude that digital adoption increases productivity and employment, but is incomplete without enabling ecosystems and governance [40].

2.6. Synthesis: Gaps and Problem Statement Leading to Theory

The literature shows that digital transformation (DT) improves SME competitive-

ness through process efficiency, differentiation, agility, and innovation but evidence from Sub-Saharan Africa and Zimbabwe is still fragmented and uneven. While global research supports performance pay-offs when DT is capability-based, African SMEs are subject to systemic constraints in finance, skills, infrastructure and institutional support that mediate outcomes [17]. Zimbabwe has a high mobile penetration without high digital presence, digital literacy or affordability [41]. The outcome is an ongoing "translation gap" in which connectivity gains are not being translated into long-term competitive advantage. This highlights the importance of a conceptual framework that explains how DT resources are converted into capability and competitive outcomes within the context of constraints. Therefore, the problem that this study addresses is the lack of theory-driven, Zimbabwe-specific recommendations on how SMEs could use DT to effectively overcome structural constraints.

3. Theoretical Framework & Conceptual Model

The theoretical framework for this research draws from the Resource-Based View (RBV) which suggests that firms can attain long-term competitive advantage if they are able to control resources that are valuable, rare, inimitable and organisationally embedded (VRIO) [21] [42]. In the digital era, assets like data assets, analytics tools, cloud infrastructure, and access to platforms become strategic inputs. However, their performance contribution depends on being organised into firm specific bundles that are not easily imitated by rivals [43]. For SMEs in Zimbabwe, digital resources are still constrained by finance and skills gaps, but where mobilised, they can support efficiency, innovation, and market growth. RBV thus positions DT as a channel for SMEs to build up and leverage digital assets that are the basis for cost and differentiation advantages. Importantly, these resources have to be embedded into organisational routines and underpinned by a leadership commitment to create defensible competitive results [44].

While RBV stresses the resource base, the Dynamic Capabilities (DC) research stresses the process by which firms combine, develop and re-combine capabilities in dynamic environments [24] [45]. In SMEs, dynamically capable firms can be characterised by their ability to sense opportunities (e.g., new digital markets), seize opportunities with relevant investments (e.g., cloud adoption, e-commerce integration) and reconfigure structures and processes to be agile [46]. Recent research has confirmed that SMEs that employ dynamic capabilities are better able to innovate and be more resilient under DT [47] For Zimbabwean SMEs in particular, the capability to adjust scarce resources to volatile economic and infrastructural conditions is important. Dynamic capabilities therefore provide the microfoundations explaining how digital resources translate into sustainable advantage by allowing SMEs not only to adopt technologies, but also to embed adaptability, speed and continuous learning in their operations.

Antecedents of SME digital take-up are partly explained by technology adoption theories, particularly the Technology-Organisation-Environment (TOE)

model [48] and the Technology Acceptance Model (TAM) [49], that explain the antecedents of SME digital uptake when combined with RBV and DC. Whereas TAM emphasises that what matters is perceived usefulness and perceived ease of use [50], TOE emphasises perceived technological benefits, organisational readiness, and external pressures. Putting these views together helps to develop an overall conceptual framework, which is as follows: digital resources (RBV) → dynamic capabilities (DC) → competitive advantage (CA), moderated by adoption antecedents (TOE/TAM). In the case of SMEs in Zimbabwe, the chain is moderated by challenges in affordability, weak managerial support, and ecosystem frictions [41], which opens a gap between the access to connectivity and the competitive performance of SMEs. It is therefore hypothesised that DT can provide advantage only if digital resources are successfully sensed, appropriated and converted into routines, and that enablers of adoption reduce contextual frictions. Under this framework, the propositions we make for future empirical testing are supported.

4. Methodology

The study employed a quantitative research design to examine the connection between digital transformation (DT) adoption and competitive advantage among SMEs in Zimbabwe. The descriptive and explanatory survey design was chosen due to its capacity to generate standardised data using a relatively large sample size and the possibility to test hypothesised relationships using statistics. This methodology is based on the past SME studies that investigated the connections between digital adoption and performance results in a quantitative survey format [51]. The sampling frame included registered SMEs in Masvingo and Zvishavane, as they were chosen due to being emerging provincial business centres with a high density of manufacturing, retail, and service firms, and were accessible to the fieldwork. The estimated number of SMEs in these places was about 2000 [52]. A target sample of 122 firms was determined using the formula of Yamane [53] at a 95% confidence level and a margin of error of 8.8%. A total of 122 valid responses were received out of the SMEs contacted, which is a response rate of 61. Although the geographic focus restricts the strict national generalisability, the variety of sectors and the range of firm sizes included contribute to the representativeness of the broader SME population in the same settings.

The data were collected based on the self-administered structured questionnaire that was distributed in electronic and printed form. The instrument was divided into four categories 1) demographic information, 2) digital transformation adoption level [12] [54], 3) indicators of competitive advantage (cost [55]), differentiation [56], agility [57] and innovation [58], and 4) perceived barriers and enablers [59]. All measures were taken on a five-point Likert scale (ranging from 1, strongly disagree, to 5, strongly agree). The scales used in prior SME and DT research were modified into the constructs [17]. A pilot study of 30 SMEs not included in the final sample was conducted to improve clarity and wording which

resulted in acceptable internal reliability of 0.70+ Cronbach. It was an anonymous survey and ethical approval was granted by Research Council of Zimbabwe (RCZ) as oversight authority.

The data was analysed quantitatively using the SPSS. The characteristics of respondents, level of DT adoption, and indicators of competitive advantage were summarised using descriptive statistics (frequencies, means and standard deviations). Construct validity was assessed by exploratory factor analysis (EFA), and construct reliability was assessed by Cronbach's alpha. Pearson correlation was used to analyse bivariate relationships between DT adoption and competitive advantage. Finally, a multiple linear regression was run to test the predictive impact of the adoption of DT on cost-efficiency, differentiation, agility and innovation, controlling for firm size and sector. Statistical significance was set at $p < 0.05$. This methodological framework provided empirical evidence on the role of DT in building the competitiveness of Zimbabwean SMEs in the context of the Resource-Based View (RBV) and Dynamic Capabilities framework.

5. Analysis and Results

5.1. Descriptive Statistics of Respondents and Variables

Respondent Profile

The demographic profile of the respondents shows that there is an overwhelming majority of SMEs in Zimbabwe that are owner-managed. In regard to the respondents' position within the organisation, Table 1 indicates that the sample was dominated by Owner/Managers (44.3%) followed by Senior Managers (27.0%) and Supervisors (21.3%), while staff respondents made up a minority of 7.4%, which is indicative of the strategic nature of the decision making in the sample.

Table 1. Distribution of respondents by position.

Position	Frequency	Percentage
Owner/Manager	54	44.3%
Senior Manager	33	27.0%
Supervisor	26	21.3%
Staff	9	7.4%
Total	122	100%

Sectoral representation was balanced across Retail (32.8%), Manufacturing (31.1%), and Services (31.1%), with a smaller proportion (4.9%) in other sectors as highlighted (Table 2).

Table 2. Distribution of respondents by position.

Sector	Frequency	Percentage
Retail	40	32.8%

Continued

Manufacturing	38	31.1%
Services	38	31.1%
Other	6	4.9%
Total	122	100%

Firm size analysis revealed that 45.9% of SMEs had fewer than 10 workers in their workforce while only 3.3% had more than 100. It is clear that Zimbabwe's SME sector is characterised by micro and small-scale enterprises (Table 3).

Table 3. Distribution of SMEs by employee size.

Employee Size	Frequency	Percentage
1 - 10	56	45.9%
11 - 50	42	34.4%
51 - 100	20	16.4%
101 - 250	4	3.3%
Total	122	100%

Analysis of age distribution of firms indicates that SMEs are relatively young, with a large number of firms (30.3%) existing for 2 - 5 years and a considerable proportion of firms (27.9%) for 6 - 10 years. Only 20.5% had been in operation for over ten years, indicating that the SME ecosystem, while growing, is still fragile (Table 4).

Table 4. Distribution of SMEs by age.

Firm Age	Frequency	Percentage
<2 years	26	21.3%
2 - 5 years	37	30.3%
6 - 10 years	34	27.9%
>10 years	25	20.5%
Total	122	100%

Construct Descriptive Statistics

The descriptive statistics for the major constructs are given in Table 5. The findings indicate that the level of digital transformation is moderately adopted (M = 3.55, SD = 0.36). Cost Efficiency, Differentiation, Agility and Innovation, the other dimensions of competitive advantage, also had moderate scores (M = 3.49, SD = 0.58; M = 3.44, SD = 0.65; M = 3.57, SD = 0.61; M = 3.57, SD = 0.72).

Table 5. Descriptive statistics of constructs (n = 122).

Construct	Mean	Std. Dev	Min	Max
DT Adoption	3.55	0.36	2.67	4.33
Cost Efficiency	3.49	0.58	2.00	5.00
Differentiation	3.44	0.65	2.00	4.67
Agility	3.57	0.61	2.00	5.00
Innovation	3.57	0.72	1.00	5.00

5.2. Reliability and Validity Analysis of Constructs

Reliability analysis was performed to find out the internal consistency of the measurement items within each construct. As Table 6 below illustrates, all Cronbach's alpha values were greater than the recommended threshold of 0.70 (Nunnally & Bernstein, 1994) suggesting acceptable reliability. The adoption of digital transformation (DT) construct, which consists of six items, was the construct with the highest reliability (a = 0.84), while differentiation was the lowest but still acceptable (a = 0.74). These results provide evidence that the instrument items consistently measured their respective latent constructs. Despite the fact that agility and innovation were assessed with only two items each, the constructs had acceptable internal consistency (0.77 and 0.81 respectively) and factor loadings of more than 0.70. Past methodological studies affirm that two-item constructs may be deemed as reliable when they are backed by high reliability and validity data [60]-[62]. Thus, these measures were considered adequate to the objectives of this study, but further studies are recommended to add more indicators to enhance the strength.

Table 6. Descriptive statistics of constructs (n = 122).

Construct	No. of Items	Cronbach's α	Interpretation
DT Adoption	6	0.84	Reliable
Cost Efficiency	3	0.79	Reliable
Differentiation	3	0.74	Acceptable
Agility	2	0.77	Reliable
Innovation	2	0.81	Reliable

To further determine validity, the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity were used to perform an exploratory factor analysis (EFA). The overall KMO was 0.83 and was greater than the 0.60 cut-off point (Kaiser, 1974), and Bartlett's test was significant (kh2 = 512.6 df = 190, $p < 0.001$) which indicates that there was sampling adequacy and factorability. As summarised in Table 7, the loading of items on their respective latent variables was strong (>0.60) for each construct while no significant cross-loadings were found. This supports convergent and discriminant validity of the instrument.

Table 7. Validity analysis (factor loadings summary).

Construct	Item Codes	Factor Loadings Range	Validity Status
DT Adoption	DTA1-DTA6	0.63 - 0.82	Convergent
Cost Efficiency	COST1-COST3	0.68 - 0.79	Convergent
Differentiation	DIFF1-DIFF3	0.61 - 0.76	Convergent
Agility	AGIL1-AGIL2	0.70 - 0.81	Convergent
Innovation	INNO1-INNO2	0.72 - 0.84	Convergent

5.3. Correlation Results between DT Adoption and Performance Dimensions

A Pearson correlation analysis was used to analyse the relationship between digital transformation (DT) adoption and the four competitive advantage dimensions (cost efficiency, differentiation, agility, and innovation). The results are given in Table 8.

Table 8. Correlation matrix (n = 122).

Variables	DT Adoption	Cost Efficiency	Differentiation	Agility	Innovation
DT Adoption	1				
Cost Efficiency	0.48*	1			
Differentiation	0.42*	0.39*	1		
Agility	0.51*	0.44*	0.41*	1	
Innovation	0.55*	0.46*	0.43*	0.49*	1

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

Interpretation of Results

The results reveal positive and statistically significant correlations between DT adoption and all performance dimensions:

- Cost efficiency ($r = 0.48$, $p < 0.01$), which means by adopting digital technology, SMEs can optimize their operations and reduce the cost of operation.
- Differentiation ($r = 0.42$, $p < 0.01$), thereby showing that digital channels may have a role in creating value and differentiation for customers.
- The most significant relationship, agility ($r = 0.51$, $p < 0.01$), supports the opinion that SMEs that make use of DT in the face of market change do so with increased agility and flexibility.
- The highest correlation, however, is for Innovation ($r = 0.55$, $p < 0.01$), which reflects the importance of digitalisation in facilitating product, process and business model innovation.

The inter-correlations among performance dimensions were also positive (0.39 - 0.49), consistent with the notion that cost, differentiation, agility, and innovation are mutually reinforcing outcomes of digital transformation.

5.4. Regression Analysis of DT Adoption on Cost, Differentiation, Agility, and Innovation

Multiple linear regression analyses were used to identify the predictive impact of digital transformation (DT) adoption on the four dimensions of competitive advantage (cost efficiency, differentiation, agility and innovation). For each performance dimension, DT adoption was entered as a predictor and the dependent variable (Table 9).

Table 9. Regression results (n = 122).

Dependent Variable	β (Unstandardized)	Std. Error	β (Standardized)	t-value	Sig. (p)	R^2	F-statistic (p)
Cost Efficiency	0.47	0.08	0.48	5.85	0.000	0.23	34.2 (0.000)
Differentiation	0.44	0.09	0.42	4.89	0.000	0.18	23.9 (0.000)
Agility	0.52	0.08	0.51	6.42	0.000	0.26	41.3 (0.000)
Innovation	0.58	0.09	0.55	6.89	0.000	0.30	47.4 (0.000)

In order to enhance the strength of the regression findings, further models were estimated with firm size (in terms of employee categories), sector (manufacturing, retail, services), and firm age as control variables. These control variables did not significantly change the significance or direction of the coefficients of digital transformation (DT) adoption. In particular, the adoption of DT continued to be a strong positive predictor of cost efficiency, differentiation, agility, and innovation ($p < 0.01$ in all models). Firm size was the only control that had a small positive impact on cost efficiency, and sector and age did not exhibit significant relationships with the competitive advantage dimensions. The diagnostics of multicollinearity were performed by calculating the variance inflation factor (VIF) and tolerance values. The VIF scores were all less than 2.0 and tolerance values were more than 0.40, which means that there was no problematic multicollinearity [61]. These results support the fact that the primary findings are strong and not distorted by firm-level factors.

Interpretation of Results

The regression results demonstrate that DT adoption is a significant positive predictor of all four competitive advantage dimensions:

- Cost Efficiency ($\beta = 0.48$, $p < 0.001$): Digital solution integration will help SMEs save a lot of operation costs and become more efficient. The variation of cost outcome explained by the model is 23%.
- Differentiation ($\beta = 0.42$, $p < 0.001$): The success of digitalisation in creating customer value, unique offerings and retention is found. The model accounts for a variation of 18% in differentiation.
- Agility ($\beta = 0.51$, $p < 0.001$): Operational responsiveness was the most important predictor for which DT adoption accounted for 26% of variance in agility.

- Innovation ($\beta = 0.55$, $p < 0.001$): Digital adoption has the largest positive effect on innovation outcomes (product, process and business model) accounting for 30% of the variance.

All regression models were statistically significant at $p < 0.001$, confirming that digital transformation adoption plays a central role in driving SME competitive advantage.

6. Discussion

6.1. Interpretation of Findings in Relation to RBV and Dynamic Capabilities

The findings demonstrate that DT adoption significantly predicts SME performance outcomes, with innovation and agility emerging as the strongest effects. This aligns with the Resource-Based View (RBV), which positions digital assets such as data platforms, analytics tools, and cloud infrastructure as valuable and rare resources [21] [43]. However, the regression results further highlight the role of Dynamic Capabilities (DC)—sensing, seizing, and transforming—as the mechanisms through which these resources are translated into competitive advantage [24]. The higher explanatory power for innovation and agility supports the argument that SMEs gain more from adaptability and continuous renewal than from efficiency alone [46]. For Zimbabwean SMEs, the findings indicate that leveraging scarce digital resources is insufficient unless embedded in flexible processes, confirming that DC, rather than static assets, are decisive in turbulent environments. This strengthens theoretical integration of RBV and DC in explaining SME digital competitiveness.

6.2. How DT Resources and Capabilities Contribute to SME Competitiveness

The results show that digital adoption enhances cost efficiency, differentiation, agility, and innovation, though with varying intensities. This indicates that digital resources act as enablers, while capabilities determine performance translation. Cost efficiency and differentiation reflect operational-level benefits—such as automation, digital marketing, and e-procurement—that allow SMEs to reduce transaction costs and differentiate customer experiences [22]. In contrast, agility and innovation highlight higher-order dynamic capabilities: the ability to reconfigure resources and respond to uncertainty. This is consistent with empirical evidence that SMEs using DT for business model innovation outperform peers [26]. Zimbabwean SMEs are particularly vulnerable to volatile markets and policy uncertainty; thus, agility enabled by DT investments becomes critical. The study suggests that SMEs should move beyond viewing DT as a tool for cost reduction, and instead embed it as a strategic capability that sustains long-term advantage.

6.3. Comparison with Global and Regional Studies

The Zimbabwean results mirror global findings where DT strongly predicts inno-

vation and agility [29]. However, the explanatory power of cost and differentiation was comparatively lower, reflecting contextual barriers such as affordability and shallow digital integration. In Sub-Saharan Africa, similar studies highlight finance, infrastructure, and digital-skills deficits as constraints on performance translation [34]. This suggests that while SMEs globally benefit from DT, African SMEs experience uneven outcomes due to ecosystem weaknesses. Nevertheless, the positive correlations confirm that where adoption occurs, competitive gains follow, echoing evidence from Ghana, Nigeria, and South Africa that DT-enabled SMEs outperform traditional firms in exports and market reach [31]. The Zimbabwean case therefore reinforces the duality of DT in developing contexts: its transformative potential is evident, yet its realisation depends on institutional and capability support systems.

6.4. Zimbabwe-Specific Insights (Infrastructure, Finance, Skills, Policy Context)

The descriptive results revealed moderate adoption levels, despite widespread mobile and internet penetration. This underscores the "translation gap" where connectivity does not automatically convert into firm-level capability [5] [7]. Finance remains a major barrier, with SMEs struggling to afford advanced digital tools or retain skilled IT personnel. The regression results highlight that even when adoption occurs, innovation and agility benefits dominate, while cost and differentiation outcomes remain weaker—reflecting structural inefficiencies in infrastructure and supply chains. Furthermore, policy uncertainty and inflationary pressures raise adoption risks, discouraging sustained investment in digitalisation. However, the findings also show that leadership commitment significantly drives adoption, echoing global evidence that top-management orientation accelerates transformation [33]. Zimbabwean SMEs thus require supportive ecosystems—including financing instruments, training programs, and policy stability—to move from patchy adoption to systemic digital competitiveness.

6.5. Theoretical Implications for SME Digital Transformation Research

This study advances theory by confirming the combined explanatory power of RBV, Dynamic Capabilities, and adoption frameworks (TOE/TAM) in emerging-market SMEs. While RBV explains the stock of digital resources, DC clarifies why agility and innovation outperform cost benefits under environmental turbulence. The integration of TOE/TAM adds adoption antecedents such as leadership, skills, and ecosystem support, showing that context moderates resource–capability translation. Empirically, the results expand limited Zimbabwean and African evidence, providing quantitative validation of propositions often drawn from case studies. Theoretically, the study strengthens arguments that DT should be conceptualised not merely as technological adoption but as a capability-building process that links digital assets, organisational routines, and competitive advantage. This supports calls for hybrid models combining resource and process views of

strategy, particularly in developing economies where contextual frictions strongly influence outcomes.

7. Practical and Managerial Implications

The findings highlight that Zimbabwean SMEs must treat digital transformation (DT) not merely as a cost-reduction mechanism but as a strategic enabler of agility and innovation. Managers should prioritise investments in digital platforms, cloud systems, and data-driven decision-making, which have demonstrated the strongest impact on competitiveness. Owner-managers, who form the majority of SME leaders, need to actively champion digital strategies by fostering a culture of experimentation and learning, rather than viewing technology adoption as a one-off upgrade. To achieve this, firms should allocate resources to staff training and encourage cross-functional use of digital tools that enhance responsiveness to customer needs. Furthermore, SMEs can leverage affordable mobile-based applications and partnerships with fintech firms to overcome financial and infrastructural constraints, ensuring that digital adoption is scalable and sustainable.

At a broader managerial level, SMEs should integrate DT into their strategic planning frameworks, setting clear key performance indicators (KPIs) around cost efficiency, customer experience, and innovation outcomes. Managers must adopt agile business models that allow rapid reconfiguration of processes in response to economic shocks, a necessity in Zimbabwe's volatile market. Collaboration within SME networks can also enable shared access to digital solutions, reducing costs and knowledge barriers. Policymakers and industry associations should support managers by providing digital maturity assessment tools and training modules tailored to local contexts. By aligning digital adoption with strategic objectives, Zimbabwean SMEs can gradually close the translation gap and build enduring competitive advantage in regional and global value chains.

8. Policy Implications

The study's findings underscore the critical role of supportive policy frameworks in enabling SMEs to fully leverage digital transformation (DT) for competitiveness. While adoption is positively linked to agility and innovation, structural barriers such as limited financing, digital-skills shortages, and infrastructure gaps remain major constraints. Policymakers should therefore prioritise targeted financial instruments—such as subsidised digital loans, tax incentives for ICT investments, and grant schemes—to reduce affordability barriers. Capacity-building initiatives, including national digital literacy programmes and SME-focused incubation hubs, can address the persistent skills gap. Furthermore, establishing public-private partnerships between government, telecom providers, and industry associations would enhance the SME digital ecosystem, ensuring affordable broadband, shared platforms, and accessible cybersecurity solutions. Policy stability and transparent regulatory frameworks are also essential to encourage sustained SME investment in digitalisation. Collectively, these interventions can help bridge Zim-

babwe's translation gap, transforming digital adoption into tangible, long-term competitive advantage for SMEs.

9. Limitations and Future Research

Although this study provides valuable insights into the role of digital transformation (DT) in shaping SME competitiveness in Zimbabwe, it is not without limitations. First, the research employed a cross-sectional survey design, which restricts the ability to infer causality between DT adoption and performance outcomes. The reliance on self-reported data may also introduce social desirability and response biases, as managers could overstate their level of digital maturity. Furthermore, the study was geographically limited to SMEs in Zvishavane and Masvingo, potentially excluding dynamics from smaller urban and rural contexts where infrastructure and adoption rates may differ. These limitations constrain the generalisability of findings, necessitating caution in applying results across the wider SME sector.

Future research should adopt longitudinal and mixed-methods approaches to capture the evolution of digital transformation over time and triangulate quantitative results with qualitative case studies. Expanding the scope to include sector-specific analyses (e.g., agriculture, logistics, or retail) would offer deeper insights into how industry characteristics shape adoption and competitive outcomes. Comparative studies between Zimbabwe and other Sub-Saharan African countries could illuminate regional best practices and structural challenges. In addition, integrating emerging technologies such as artificial intelligence, blockchain, and digital payments ecosystems into future models would extend the theoretical scope of DT research in SMEs. Such studies will enrich understanding of how digital resources and dynamic capabilities interact with contextual factors to drive competitiveness in developing economies.

10. Conclusion

This study examined the relationship between digital transformation (DT) adoption and competitive advantage in Zimbabwean SMEs, drawing on the Resource-Based View and Dynamic Capabilities frameworks. The results demonstrated that DT adoption positively and significantly influences all four dimensions of competitiveness—cost efficiency, differentiation, agility, and innovation—with the strongest effects observed in agility and innovation. These findings highlight that digital resources alone are insufficient; rather, their strategic deployment through dynamic capabilities drives sustainable performance. The study contributes theoretically by integrating RBV, DC, and adoption lenses in an African SME context, and practically by offering guidance for managers to align DT with strategic goals. Policy implications emphasise the need for financing, digital-skills development, and supportive ecosystems to bridge Zimbabwe's translation gap. While limited by its cross-sectional design, the study provides a foundation for future longitudinal and comparative research. Ultimately, DT emerges as a crucial lever for

SMEs seeking resilience and competitiveness in turbulent markets.

Conflicts of Interest

The authors declare no conflicts of interest.

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