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Abstract
Small and medium enterprises (SMEs) are key to economic growth, particularly in emerging markets like Kenya, where they contribute significantly to employment and GDP. However, despite their significance, SMEs face persistent challenges, including technological limitations, regulatory constraints, and weak governance structures, which hinder their competitiveness. This study conducts a systematic literature review using the TCCM (Theories-Contexts-Characteristics-Methods) framework to explore the relationship between strategic flexibility, technology adoption, and competitiveness in Kenyan manufacturing SMEs. Key word search across selected online databases including, JSTOR, ProQuest, Emerald and Google Scholar for the journal articles limiting the search period to 10 years (2015-2025) was conducted. This included studies that mentioned the terms Strategic Flexibility, Technology Adoption and Competitiveness in the title, abstract or keywords list to form the number used for this literature review. The findings reveal that strategic flexibility enhances SMEs' ability to innovate and respond to market changes, while technology adoption serves as a critical moderator in strengthening this relationship. Though, existing research predominantly focuses on developed economies, leaving a gap in context-specific studies for sub-Saharan Africa. This paper highlights the need for further empirical research integrating dynamic capabilities and technological-organizational-environmental (TOE) frameworks to better understand how Kenyan SMEs can leverage strategic flexibility and digital transformation for sustained competitiveness. Methodologically, the study calls for mixed-methods and longitudinal approaches to capture the evolving nature of SME adaptability in resource-constrained environments.

Introduction

Small and medium enterprises (SMEs) are widely recognized as key drivers of job creation and economic development globally. According to the Manufacturing Priority Agenda (2024), SMEs play a central role in most economies by contributing significantly to employment and GDP growth. Kenya being an emerging market, SMEs are responsible for generating approximately 70% of all new jobs. In response to this, the government has prioritized key policy agendas aimed at promoting SME development in manufacturing—particularly among the 52% of Kenya Association of Manufacturers (KAM) members—by focusing on market access, access to finance, and governance reforms.

SMEs in Kenya account for 90% of all private sector enterprises, contribute about 24% to the national GDP, and employ approximately 93% of the total workforce (Government of Kenya, 2018). Despite various past and ongoing policy interventions, SMEs continue to face persistent challenges that hinder their growth and competitiveness. These challenges include technological limitations, regulatory constraints, weak governance structures, and other evolving issues. This situation is not exclusive to Kenya. For instance, in Palestine, SME business practices have undergone substantial changes under the pressures of globalization. As Dwikat, Arshad, and Mohd Shariff (2022) observe, rapidly evolving consumer demands and intensifying competition have compelled firms to adapt their business strategies in order to remain competitive. Consequently, SMEs must innovate and adopt robust business models that support long-term sustainability.

Similarly, research by Seyadi and Elali (2021) in Bahrain emphasized the importance of strategic agility, particularly in the aftermath of the COVID-19 pandemic, which disrupted economies and disproportionately affected SMEs due to liquidity constraints and limited capacity to respond to sudden changes. Strategic agility, defined as a firm's capacity to anticipate, adapt, and respond swiftly to unexpected internal or external changes, is therefore essential for survival.

Alzahrani, Suleiman, and Jouda (2023), in their study of SMEs in Saudi Arabia, established a significant positive association between strategic planning and strategic flexibility, as well as between strategic flexibility and firm performance. The absence of effective strategic planning was frequently cited as a key contributor to poor performance outcomes (Eraqi & Tayachi, 2021). A comparable conclusion was reached by Arsawan et al. (2022) in their study of Nigerian SMEs, which established a significant association between strategic flexibility and firm productivity. The authors emphasized the managerial responsibility to align strategic flexibility with both internal and external environmental factors, including the transitional ecosystem that connects them. Furthermore, Bosco et al., (2023) highlighted that SMEs across the globe are grappling with heightened competition, threatening their sustainability. Their study in Uganda found that strategic planning plays a vital role in sustaining SME competitiveness by offering a clear framework for navigating dynamic business environments.

In the Kenyan manufacturing context, Baariu, Gathungu, and Ndemo (2021) underscored the importance of innovation, strategic flexibility, and competitiveness as interrelated drivers of SME performance. They argued that in order for SMEs to respond effectively to environmental volatility, they must invest in both strategic flexibility and innovation capability. This view aligns with Otache and Usang (2021), who emphasized that adaptability and technological responsiveness are critical enablers of sustained competitiveness in SME sectors.

In light of these findings, this paper aims to review the literature on the relationship between strategic flexibility and the competitiveness of manufacturing SMEs in Kenya, with a particular focus on the moderating role of technology adoption. As demonstrated across various national contexts, the

integration of strategic planning, adaptability, and innovation is vital for SME sustainability and competitive advantage.

Method

The systematic literature review adopted the TCCM (Theories-Contexts-Characteristics- Methods) framework for developing domain-based review of articles as proposed by Paul and Rosado- Serrano (2019). Theories (T) refer to the various theoretical foundations and paradigms used to explain the relationships and interconnections among the constructs. Contexts (C) explains the range of circumstances and conditions that form the research setting. Characteristics (C) refer to the key attributes of a construct and how they relate to other variables of interest while Methods (M) include the research procedures, sampling techniques, research designs, measurement scales, and analytical tools used in a study.

This framework is particularly appropriate because it facilitates the systematic identification and organization of information related to theoretical perspectives, publication outlets, research contexts, data sources, the origin and development of the field, commonly examined concepts, research designs, and analytical methods. Its generality and versatility have contributed to its widespread application in current systematic and literature review studies (Paul et al., 2024).

The review commenced with a systematic keyword search across selected electronic databases, namely JSTOR, ProQuest, Emerald, and Google Scholar, to identify relevant journal articles. Using Emerald as an illustrative example, the search focused on studies examining the relationship between strategic flexibility, technology adoption, and the competitiveness of manufacturing small and medium-sized enterprises (SMEs). The search strategy was structured around four conceptual categories: strategic flexibility, technology adoption, SME context, and organizational competitiveness. Within each category, identical or related search terms were combined using the Boolean operator **OR**, while the four categories were linked using **AND** to refine the search and retrieve studies addressing the intersection of these concepts. The search was restricted to articles published between 2015 and 2025. The retrieved records were subsequently screened for relevance and eligibility, and the selected studies were analyzed using the Theory–Context–Characteristics–Methodology (TCCM) framework to systematically synthesize the theoretical foundations, research contexts, focal characteristics, and methodological approaches represented in the literature.

Eligibility Criteria and Study Selection

Eligibility criteria were established *a priori* to promote consistency, transparency, and reproducibility in the identification and selection of studies for the systematic literature review. Guided by the Theory, Context, Characteristics, and Methodology (TCCM) framework, the review provided a structured basis for synthesizing the theoretical foundations, research contexts, focal constructs, and methodological approaches represented in the literature.

The review included peer-reviewed journal articles published between 1 January 2015 and 31 December 2025, written in English, and addressing the core research constructs specified in the review objectives. Eligible publications comprised empirical studies employing quantitative, qualitative, or mixed-methods designs. The application of an established theoretical framework was not a requirement for inclusion, provided that the study offered relevant conceptual insights or empirical evidence to inform the review objectives.

Studies were excluded if they were published outside the specified period, did not fundamentally address the focal constructs, or examined populations and contexts beyond the defined scope without

a clear and justified comparative contribution. Reports that lacked sufficient methodological or substantive detail to support meaningful synthesis were also excluded, as well as duplicate publications, withdrawn articles, and other records that did not meet the eligibility requirements.

Study selection was conducted in three sequential stages: duplicate removal, title and abstract screening, and full-text assessment. Studies that satisfied the eligibility criteria were subsequently coded using the Theory, Context, Characteristics, and Methodology (TCCM) framework. The theoretical dimension identified the theories underpinning each study and examined their respective descriptive roles. The contextual dimension captured the geographical, industry, and organizational settings in which the studies were undertaken. The characteristics dimension documented the key constructs investigated and the relationships explored among them. Lastly, the methodological dimension documented the research designs, data sources, sampling procedures, analytical methods, and relevant indicators of methodological quality employed in the selected studies.

Consistent with the PRISMA 2020 guidelines, the review documented the identification and screening procedures, the number of studies retained at each stage, the final number of studies included in the synthesis, and the principal reasons for excluding studies following full-text assessment. The search strategies and information sources were documented in sufficient detail to facilitate reproducibility and transparency of the review process (Page et al., 2021). The PRISMA- based flow diagram is shown in Figure 1. It explains the identification, screening and inclusion of the articles.

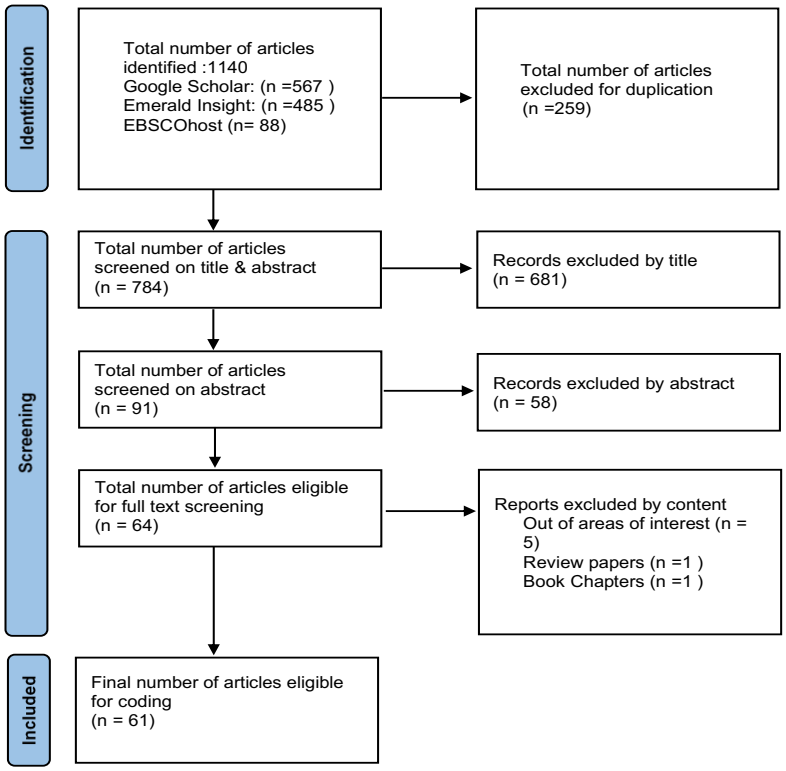


Figure 1: The PRISMA 2020 flow diagram (adapted from Page et al., 2020)

Subsequently, the full texts of potentially eligible studies were independently assessed by two reviewers. Disagreements regarding study eligibility were resolved through discussion and consensus; where necessary, a third reviewer was consulted to make the final determination. The final set of eligible studies was retained for data extraction and synthesis.

Data Extraction

Data extraction was guided by a structured procedure developed around the Theory–Context–Characteristics–Methodology (TCCM) framework, which provides a systematic approach to classifying and synthesizing prior research across theoretical foundations, contextual settings, focal characteristics, and methodological approaches (Paul & Rosado-Serrano, 2019; Paul et al., 2021). The extraction template captured bibliographic details, underlying theories and conceptual frameworks, research contexts, key constructs and their interrelationships, methodological features, principal findings, acknowledged limitations, and potential avenues for future research. Relevant information was extracted from the full texts of eligible studies and systematically recorded in a structured spreadsheet.

Following extraction, the data were classified and coded according to the four dimensions of the TCCM framework. The theory dimension documented the theories, models, and conceptual perspectives underpinning the reviewed studies. The context dimension captured the geographical locations, industrial settings, organizational characteristics, and populations investigated. The characteristics dimension focused on the principal constructs, variables, relationships, and explanatory mechanisms examined in the literature. The methodology dimension recorded the research designs, methodological approaches, sampling strategies, data sources, measurement instruments, and analytical techniques employed. This multidimensional classification facilitated a structured comparison of the included studies and supported the identification of similarities and differences across the literature. Data extraction under TCCM has been presented in the subsequent tables.

Table 1: Theoretical Foundations

Author/Year	Theory identified	How the theory was applied	Extraction code
Teece, Pisano & Shuen (1997)	Dynamic Capabilities Theory	Proposes that organizations must be aware of the opportunities and threats in the business environment to be able to develop and configure their strategic decisions	DCT
Wernefelt, 1984)	Resource-Based View Theory	Resource Base View theory claim that firms should look from within to discover sources of competitive advantage rather than looking for it from the external competitive environment.	RBV
Porter (1980)	Competitiveness	Michael Porter defined competitiveness as the capacity of an organization "to produce products and services of superior quality and lower costs than its domestic and international competitors."	COMP
Tornatzky and Fleischer (1990)	Technological-Organizational-Environmental	Provides a comprehensive theoretical lens for analyzing the factors that influence successful technology adoption, particularly in information systems	TOE

Table 2: Contextual Considerations

Study	Country/region	Organization/population	Context code
Kafetzopoulos et al. (2023)	Greece	SME's	GR-MAN-FIRM
Bashir (2023)	Saudi Arabia	SME's	SAUD-SME
Alzahrani et al. (2023)	Saudi Arabia	SME's	SAUD-SME
Hossain et al. (2024)	Malaysia	SME's	MAL-MAN-SME
Kuankuan and Zhang (2022)	China	SME's	CHIN-SME
Zahoor and Lew (2023)	Pakistan	SME's	PAKT-SME
Seyadi and Elali (2021	Bahrain	SME's	BAH-SME

Table 3: Characteristics of the Constructs

Study	Independent Variable	Dependent Variable	Relationship
Teece (2007)	Strategic Flexibility	International relationships in organizations	Create, extend, or modify international relationships.
Lahiri et al., (2020),	Strategic Flexibility	Strategic reorientation	Allow SMEs to reorient their strategies quickly in the face of changing market dynamics
Miroshnychenko et al., (2021)	Strategic Flexibility	Competitive Advantage	Proactively sense and respond to environmental shifts to secure a competitive advantage in volatile conditions.
Papadopoulos et al. (2020)	Technology adoption	Firm Agility	Plays a complementary role in enhancing firm agility
Kristianto et al. (2012)	Technology adoption	Strategic flexibility	Technology adoption acts as catalyst for strategic flexibility,
Lafuente et al. (2020)	Competitiveness	Financial performance	The dimensions collectively determine a firm's ability to deliver value and outperform rivals.
Sahoo (2021)	Competitiveness	Business Success	Forms the basis of the business ability to achieve and sustain competitive advantage.
Lukmandono and Purnama (2018).	Competitiveness	Organizational performance	Defines industrial competitiveness in terms of organizational performance, which can be measured through customer satisfaction and market outcomes

Table 4: Methodology

Study	Approach	Sample/data source	Data collection	Analysis
Arsawan et al. (2022)	Cross Sectional Quantitative study.	414 managers and assistant managers of SMEs	Questionnaires	**Partial Least Squares Structural Equation Modeling (PLS-SEM**
Bashir (2023)	Cross Sectional Quantitative study.	200 SMEs in Saudi Arabia	Questionnaires /Survey	**Amos 23 SEM software**
Alzahrani et al. (2023)	Cross Sectional Quantitative study.	400 SME owners and managers in Saudi Arabia.	Questionnaires /Survey	**PLS-SEM** to conduct both correlation and mediation analyses.
Zahoor and Lew (2023)	Cross Sectional Quantitative study.	129 emerging market SMEs in Pakistan.	Questionnaires /Survey	**Hierarchical-moderated regression model**
Kafetzopoulos et al. (2023)	Empirically Literature Review	370 Greek manufacturing and service firms	Questionnaire/survey	Structural equation modelling (SEM
Hossain et al. (2024)	Cross-sectional, quantitative study	395 respondents selected	Questionnaires	Structural equation modelling (SEM)
Seyadi and Elali (2021)	Conceptual Literature Review	Not Indicated	Not Indicated	Not Indicated
Dwikat et al. (2023)	Cross-sectional, quantitative study	380 manufacturing SMEs in Palestine	Structured Survey/ Questionnaires	Smart PLS **4.0**, applying PLS-SEM
Kuankuan and Zhang (2022)	Empirical Research	General Managers of 425 high-tech SMEs	Questionnaires	Principal Component Analysis (PCA).

Data Synthesis and Analysis

This review employed a thematic narrative synthesis approach structured around the Theory, Context, Characteristics, and Methodology (TCCM) framework to systematically integrate findings across the selected studies (Paul & Rosado-Serrano, 2019). Following data extraction, the studies were coded and classified according to their theoretical underpinnings, geographical and industrial contexts, focal constructs, and methodological characteristics. A cross-study comparison was subsequently conducted to identify recurring themes, conceptual associations, areas of convergence and divergence, and emerging research trends relating to strategic flexibility, technology adoption, and SME competitiveness.

The theoretical dimension examined the application of key theoretical perspectives, including the Resource-Based View (RBV), Dynamic Capabilities Theory, and the Technology–Organization–Environment (TOE) framework. The contextual dimension considered the geographical distribution

of the studies and the industrial settings in which the research was conducted. The characteristics dimension focused on the principal constructs, variables, and relationships examined across the literature. The methodological dimension evaluated the research designs, data collection procedures, sampling strategies, and analytical procedures employed in the selected studies.

The synthesized evidence was subsequently used to identify theoretical, contextual, conceptual, and methodological gaps in the existing literature and to formulate recommendations for future research. A quantitative meta-analysis was not conducted because the review sought to integrate diverse theoretical perspectives, research contexts, constructs, and methodological approaches rather than statistically aggregate comparable effect sizes. Data synthesis under TCCM framework has been presented in Table 5 below.

Table 5: Data Synthesis

TCCM dimension	Illustrative observation across studies	Research Gap
Theory	Different theories explain capabilities, resources, and technology adoption	Limited integration of complementary theories.
Context	Studies cover other countries and industries	Limited comparative evidence across African manufacturing settings.
Characteristics	Studies examine adoption, flexibility, and competitive outcomes	Limited examination of the combined effects of strategic flexibility and technology adoption.
Methodology	Survey-based quantitative methods predominate	Need for longitudinal or mixed-method studies

Results

The results section presents the findings of the systematic literature review, organized using the Theory, Context, Characteristics, and Methodology (TCCM) framework to systematically synthesize the theoretical foundations, research contexts, key characteristics, and methodological approaches adopted in the selected studies. It also identifies emerging trends and gaps for future results.

Theoretical foundations

Dynamic Capabilities Theory

Teece, Pisano and Shuen (1997) provide the theoretical foundation for understanding how organizations recognize opportunities and threats in their business environments and reconfigure their resources and capabilities accordingly. The reviewed literature associates this perspective with strategic flexibility, particularly the ability of firms to adjust strategic decisions and respond to changing market conditions (Harsch & Festing, 2020; Ferreira, Coelho & Moutinho, 2020; Weaven et al., 2021). Studies focusing on SMEs indicate that strategic flexibility enables firms to reconfigure their limited resources, adjust business plans and respond proactively to environmental changes (Lahiri et al., 2020; Miroshnychenko et al., 2021).

Resource-Based View Theory

The Resource-Based View, introduced by Wernerfelt (1984), explains firm competitiveness through the strategic deployment of tangible and intangible resources. Tangible resources include financial capital, equipment, property and inventory, while intangible resources include organizational knowledge, expertise, intellectual property and brand reputation. Paul and Feliciano-Cestero (2021)

emphasize that the RBV perspective locates the sources of competitive advantage within the firm's internal resources and capabilities.

Porter's Theory of Competitive Advantage

Porter's (1980) competitive advantage perspective explains how firms achieve superior market positions through cost efficiency, differentiation and effective competitive positioning. The reviewed literature associates competitiveness with the ability to deliver superior-quality products and services at competitive costs. Lafuente, Szerb and Rideg (2020) identify ten interrelated dimensions of firm competitiveness: "human capital, product, domestic market, networks, technology, decision-making, strategy, marketing, internationalization and online presence." Lukmandono and Purnama (2018) operationalize industrial competitiveness through organizational performance indicators, particularly customer satisfaction and market performance.

Technology-Organization-Environment Framework

The TOE framework, developed by Tornatzky and Fleischer (1990), provides a theoretical explanation of the factors influencing technology adoption. It categorizes adoption determinants into three dimensions: Technological factors (availability, suitability and perceived benefits of technologies), Organizational factors(organizational resources, management support, employee capabilities and readiness) and Environmental factors (competitive pressure, regulatory requirements and external market conditions).The framework has been applied to investigate technology adoption decisions, implementation barriers and the contribution of technological integration to organizational efficiency and growth (Marthandan et al., 2009; Abed, 2020; Chau et al., 2021).

Contextual Considerations

To evaluate the geographic scope of the literature, reviewed studies were categorized by country of origin, primary research focus, and institutional setting.

- *Middle East & North Africa (MENA):* The region was represented by four studies exploring firm performance, agility, and human capital under environmental turbulence (Alzahrani et al., 2023; Bashir, 2023; Dwikat et al., 2023; Seyadi & Elali, 2021).
- *Asia:* Three studies investigated strategic flexibility in relation to technological infrastructure, absorptive capacity, and export resilience (Hossain et al., 2024; Kuankuan & Zhang, 2022; Zahoor & Lew, 2023).
- *Europe:* A single investigation analyzed organizational ambidexterity within the Greek business context (Kafetzopoulos et al., 2023).

Overall, while research is geographically widespread, empirical assessments linking strategic flexibility and technology adoption to manufacturing SME competitiveness in sub-Saharan Africa remain underrepresented in the current body of literature.

Characteristics of the Core Constructs

The systematic literature review synthesized three core constructs central to organizational adaptation and performance: strategic flexibility, technology adoption, and firm competitiveness.

Strategic Flexibility

The synthesized literature highlights six primary dimensions of strategic flexibility: resource reconfiguration, responsiveness to environmental changes, strategic adaptability, innovation and opportunity recognition, flexibility in business planning, and reduced response time to market shifts.

Collectively, these characteristics reflect an organization's capacity to dynamically realign structural assets and strategic priorities in volatile environments. This conceptualization is broadly supported across prior empirical and theoretical contributions (Zhou & Wu, 2010; Xiu et al., 2017; Lahiri et al., 2020; Miroshnychenko et al., 2021; Brozović et al., 2023).

Technology Adoption

The synthesis identified several dominant technologies driving organizational adaptability and competitive advantage, most notably automation, artificial intelligence (AI), big data analytics, digital marketing platforms, blockchain, and the Industrial Internet of Things (IIoT). The literature demonstrates that deploying these technologies yields distinct operational and strategic benefits, including enhanced operational efficiency, accelerated process innovation, superior product quality, data-driven decision-making, and heightened market responsiveness (Kristianto et al., 2012; Guo & Cao, 2014; McKnight, 2017; Papadopoulos et al., 2020).

Firm Competitiveness

Finally, the review revealed a multi-faceted set of indicators used to operationalize and assess firm competitiveness. Key performance metrics identified include market share, profitability, customer satisfaction, product quality, continuous innovation, operational efficiency, overall market performance, and strategic competitive positioning. Scholars offer varied conceptual frameworks and measurement approaches for these dimensions, reflecting the multidimensional nature of competitive advantage across industrial contexts (Lukmandono & Purnama, 2018; Lafuente et al., 2020; Sahoo, 2021).

Methodological Approaches

The empirical literature in this domain relies overwhelmingly on quantitative paradigms. As detailed in Table 6 the existing research is characterized by a strong reliance on cross-sectional survey designs paired with advanced multivariate analytical procedures—specifically structural equation modeling (SEM) and hierarchical regression techniques.

Across the empirical studies reviewed, sample sizes ranged from 129 to 414 target entities, primarily focusing on decision-makers within small and medium-sized enterprises (SMEs), such as owners, general managers, and assistant managers (e.g., Alzahrani et al., 2023; Arsawan et al., 2022). High-variance estimation techniques predominate: Partial Least Squares Structural Equation Modeling (PLS-SEM) was frequently adopted to test complex structural models (Alzahrani et al., 2023; Arsawan et al., 2022; Dwikat et al., 2023), whereas covariance-based approaches (CB-SEM) via AMOS were also deployed (Bashir, 2023; Kafetzopoulos et al., 2023). A notable exception to the empirical trend is the conceptual work by Seyadi and Elali (2021), which utilized a theoretical literature synthesis to build frameworks prior to quantitative validation.

Table 6: Summary of Methodological Approaches and Sample Characteristics across Reviewed Studies

Authors	Sample & Target Population	Research Design & Primary Analytical Strategy
Arsawan et al. (2022)	N = 414 SME managers and assistant managers	Quantitative cross-sectional survey; PLS-SEM
Bashir (2023)	N = 200 SMEs	Quantitative cross-sectional survey; AMOS-SEM
Alzahrani et al. (2023)	N = 400 SME owners and managers	Quantitative cross-sectional survey; PLS-SEM
Zahoor & Lew (2023)	N = 129 SMEs	Quantitative cross-sectional survey; Hierarchical moderated regression
Kafetzopoulos et al. (2023)	N = 370 firms	Quantitative survey; Exploratory/Confirmatory Factor Analysis & SEM
Hossain et al. (2024)	N = 395 respondents	Quantitative survey; SEM
Dwikat et al. (2023)	N = 380 SMEs (n = 245 usable questionnaires)	Quantitative cross-sectional survey; PLS-SEM (SmartPLS 4.0)
Seyadi & Elali (2021)	Not applicable	Conceptual review & theoretical framework synthesis

Discussion

The primary objective of this review is to unpack the complex interrelationships between strategic flexibility, technology adoption, and firm competitiveness, with a particular focus on manufacturing SMEs. Rather than viewing these constructs in isolation, the synthesized literature indicates that superior firm performance emerges from the dynamic interplay between internal organizational routines, technological capabilities, and external environmental contingencies.

This section presents a critical discussion of the reviewed evidence structured around five core themes. First, it establishes an integrated, multi-lens theoretical framework synthesized from Dynamic Capabilities Theory, the Resource-Based View, Porter's competitive strategy, and the Technology-Organization-Environment (TOE) framework. Second, it critically evaluates the constructs strategic flexibility and technology adoption both as direct performance drivers and as mutually reinforcing organizational capabilities. Third, it examines the structural nuances of these relationships, contrasting mediating and moderating mechanisms. Fourth, it contextualizes these insights within the distinct institutional and economic realities of manufacturing SMEs in Kenya. Finally, this section addresses the predominant methodological paradigms in the field, detailing key research gaps and outlining strategic directions for future empirical inquiry.



Theoretical integration:

The relationship between strategic flexibility, technology adoption and competitiveness

The findings suggest that no single theoretical perspective sufficiently explains the relationship between strategic flexibility, technology adoption and firm competitiveness. Rather, the four identified theories provide complementary explanations of different dimensions of the relationship.

Dynamic Capabilities Theory provides an explanation of how firms develop the capacity to sense environmental changes, seize emerging opportunities and reconfigure resources. This is particularly relevant to manufacturing SMEs operating in unpredictable markets, where the ability to adjust production processes, business models and strategic priorities can determine survival and competitiveness.

Secondly, the Resource-Based View complements Dynamic Capabilities Theory by explaining the importance of internal resources in achieving competitive advantage. Whereas RBV emphasizes the resources available to the firm, Dynamic Capabilities Theory explains how these resources can be reconfigured in response to environmental changes. This distinction is particularly important for SMEs, which frequently operate under resource constraints.

Porter's competitive advantage perspective explains the potential outcomes of effectively deploying resources and capabilities. Strategic flexibility and technology adoption can contribute to cost efficiency, product differentiation, innovation and improved market positioning.

Finally, the TOE framework explains the conditions that facilitate or constrain technology adoption. While Dynamic Capabilities Theory explains the firm's adaptive capabilities, TOE identifies the technological, organizational and environmental conditions influencing its adoption decisions.

Taken together, these perspectives provide a more comprehensive theoretical foundation for examining how manufacturing SMEs can leverage technological adoption and strategic flexibility to strengthen competitiveness.

Characteristics of the Core Constructs

Strategic flexibility as a driver of firm competitiveness

The findings reinforce the importance of strategic flexibility as an organizational capability for responding to environmental uncertainty. Studies by Kafetzopoulos et al. (2023), Miroshnychenko et al. (2021), and Irungu (2017) associate strategic flexibility with innovation, organizational responsiveness and improved performance.

However, the relationship between strategic flexibility and competitiveness should not be understood as automatic. The ability to change strategic direction does not necessarily translate into superior performance unless firms possess the necessary resources, managerial capabilities and implementation mechanisms. For manufacturing SMEs in Kenya, strategic flexibility may be particularly important in responding to fluctuations in raw material prices, changing customer preferences, technological disruptions, competition from imports and changing regulatory requirements. Therefore, strategic flexibility should be understood not simply as the ability to change, but as the ability to make timely and appropriate strategic adjustments that create value.

Technology adoption as an enabler of strategic flexibility

The reviewed literature suggests that technology adoption and strategic flexibility are complementary rather than independent organizational capabilities. Technology adoption provides firms with tools

for improving information processing, operational efficiency, communication, innovation and decision-making. Strategic flexibility, in turn, determines how effectively firms can integrate these technologies into their business models and operational processes.

For example, manufacturing SMEs adopting data analytics may be better positioned to anticipate changes in customer demand, while automation can improve production efficiency and responsiveness. Similarly, digital platforms can strengthen customer engagement and facilitate access to new markets.

However, technology adoption alone does not guarantee competitiveness. Its contribution depends on organizational readiness, management commitment, employee competencies, financial resources and the firm's ability to integrate technological investments into its strategic priorities.

This suggests that the relationship between technology adoption and competitiveness may be influenced by the level of strategic flexibility within an organization.

Strategic flexibility and technology adoption

An important theoretical implication emerging from the review concerns the nature of the relationship between strategic flexibility and technology adoption. The literature provides grounds for examining two possible relationships.

Mediating relationship: - Strategic flexibility may explain how technology adoption translates into firm competitiveness. Technology adoption provides new capabilities and information, while strategic flexibility enables firms to reconfigure their resources and processes to exploit technological opportunities. Alternatively, technology adoption could mediate the relationship between strategic flexibility and competitiveness. In this case, strategically flexible firms are better positioned to identify and implement appropriate technologies, which subsequently improve competitiveness.

Moderating relationship: - Strategic flexibility may also strengthen the relationship between technology adoption and competitiveness. Firms with high strategic flexibility may derive greater competitive benefits from technological investments because they can adjust their structures, processes and strategies to accommodate technological changes.

These are alternative theoretical specifications and should not be treated as interchangeable. The appropriate model should be established through a clearly articulated conceptual framework and supported by the study's research questions and hypotheses.

Contextual implications for manufacturing SMEs in Kenya

Although the reviewed literature demonstrates increasing international interest in strategic flexibility and technology adoption, its geographical distribution raises questions about the applicability of existing findings to developing economies. Manufacturing SMEs in Kenya for instance, operate within a distinctive institutional and economic environment characterized by financial constraints, infrastructure challenges, technological capability gaps and competitive pressures.

Consequently, findings from developed economies and other emerging markets cannot necessarily be generalized to Kenyan manufacturing SMEs without considering these contextual differences. The Kenyan context presents an opportunity to examine how firms balance technological investments with resource limitations while maintaining strategic responsiveness.

This is particularly important because the competitive benefits of technology adoption may depend on contextual factors such as access to finance, employee skills, infrastructure, managerial support

and the regulatory environment. The study can therefore contribute to the literature by providing context-specific evidence on the interaction between strategic flexibility, technology adoption and manufacturing SME competitiveness in Kenya.

Methodological implications and future research directions

The methodological findings indicate that quantitative cross-sectional surveys and SEM dominate research in this field. Although these approaches are appropriate for examining relationships among variables, they provide limited insight into how strategic flexibility and technology adoption evolve over time.

Strategic flexibility is inherently dynamic, involving continuous organizational learning, resource reconfiguration and strategic adjustments. Similarly, technology adoption involves multiple stages, including awareness, evaluation, implementation, integration and utilization. Cross-sectional research may therefore fail to capture the processes through which these capabilities develop and influence firm competitiveness.

Future studies could consider mixed-method approaches that combine quantitative surveys with qualitative interviews involving SME owners, managers and technology specialists. Longitudinal studies would also provide opportunities to examine how technological investments and strategic adjustments influence competitiveness over time.

For the Kenyan manufacturing SME context, a mixed-method design could provide both statistical evidence of relationships among the constructs and deeper explanations of the organizational and environmental conditions influencing those relationships. Table 7 presents the summary of the research gaps.

Table 7: Summary of the research gaps

Research gap	Explanation	Contribution of the proposed study
Theoretical gap	Limited integration of Dynamic Capabilities Theory and TOE in examining technology adoption and strategic flexibility.	Integrates complementary theoretical perspectives.
Construct gap	Limited examination of the interaction among strategic flexibility, technology adoption and competitiveness.	Examines the relationships among the three constructs.
Contextual gap	Limited empirical evidence from manufacturing SMEs in Kenya and sub-Saharan Africa.	Provides evidence from Kenyan manufacturing SMEs.
Methodological gap	Dominance of cross-sectional quantitative research.	Considers a mixed-method or longitudinal approach to capture organizational dynamics.

Conclusion

This study emphasized the critical role of strategic flexibility and technology adoption in enhancing the competitiveness of manufacturing SMEs in Kenya. Applying the TCCM framework revealed several underexplored areas in the literature. The literature review demonstrated that strategic flexibility enabled firms to adapt to dynamic market conditions, fostering innovation and operational resilience. Meanwhile, technology adoption amplified these benefits by improving efficiency, decision-making, and market responsiveness. However, the existing body of research remains skewed toward developed economies, with limited empirical focus on sub-Saharan Africa's unique challenges, such as infrastructural deficits and financial constraints.

Theoretical insights from Dynamic Capabilities Theory, Resource-Based View, and the TOE framework suggested that SMEs must integrate strategic adaptability with technological advancements to sustain competitive advantage. Yet, methodological limitations in prior studies—primarily reliance on cross-sectional quantitative designs highlighted the need for more nuanced approaches, including longitudinal and mixed-methods research, to better capture the evolving dynamics of SME growth. The African context, particularly Kenya, is underrepresented in empirical research, and methodological approaches lack depth and longitudinal insight. Therefore, to address these methodological limitations, future research should consider incorporating longitudinal studies, case studies, or mixed-methods approaches (Creswell & Plano Clark, 2017; Yin, 2018). Such designs would offer a more nuanced understanding of how SMEs develop, apply, and refine strategic flexibility and technology adoption over time, particularly in resource-constrained environments.

For policymakers, the findings emphasized the importance of fostering an enabling environment through targeted interventions in digital infrastructure, access to finance, and governance reforms. For SME managers, investing in strategic agility and technology-driven innovation is imperative for long-term sustainability. Future research should therefore explore the mediating and moderating mechanisms between these constructs, particularly in African contexts, to provide actionable insights for SME resilience in an increasingly volatile global economy. By bridging these gaps, this study contributed to the broader discourse on SME competitiveness while advocating for context-specific strategies that align with Kenya's socio-economic realities.

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