

Effect of Technology Capability on Business Performance: Does Strategic Flexibility Matter?

Juliana Akushika Andoh^{1*}, Bernard Agyei Aryee¹

¹Department of Marketing

University of Professional Studies, Accra, Ghana

* Corresponding Author Email: akushika.acquaye@upsamail.edu.gh

ABSTRACT

Technology capability is widely recognised as an important driver of adaptation and business performance among small and medium sized enterprises, yet limited evidence explains how it produces value in resource constrained manufacturing environments. Grounded in dynamic capabilities theory, this study examined the direct relationship between technology capability and business performance and the mediating role of strategic flexibility among manufacturing SMEs. Survey data from owners and top-level managers were analysed using partial least squares structural equation modelling. The findings show that technology capability improves business performance directly and also strengthens strategic flexibility, which contributes positively to performance. Strategic flexibility therefore serves as a complementary mechanism through which firms convert technological knowledge, integration and deployment into timely strategic options and resource reconfiguration. The study refines dynamic capabilities theory by positioning technology capability as an enabling operational capability whose value is partly realised through a higher order reconfiguration process. Managers should combine technology investment with digital skills, modular processes, scenario planning and rapid resource redeployment, while enterprise support institutions should integrate technology upgrading with managerial capability development.

Keywords: technology capability; strategic flexibility; business performance; dynamic capabilities; manufacturing SMEs.

1. INTRODUCTION

Small and medium sized enterprises (SMEs) face technological disruption, restricted capital and volatile demand. Technology can reduce coordination costs, improve market access and increase information visibility, but acquisition alone does not guarantee performance. Comparative evidence shows that digitalisation is more valuable when it is combined with innovation capability, managerial skills and enabling infrastructure (Edeh et al., 2025; Skare et al., 2023). This issue is especially important for manufacturing SMEs, where financing constraints, specialist skill shortages and infrastructure uncertainty make unsuccessful investments costly. The central question is therefore whether firms can integrate, deploy and renew technology as operating conditions change.

The Ghanaian manufacturing setting sharpens that question in two ways. First, the constraints that slow technology acquisition, including the cost of finance, specialist-skill shortages, uncertain infrastructure and limited managerial time, also make a failed investment difficult to reverse. Also, smaller manufacturers often combine formal routines with owner-centred

decision-making, creating the possibility of fast adjustment but also dependence on a narrow knowledge base. Technology can reduce that dependence by making operational information visible and transferable, yet only if data are integrated into managerial decisions. A system that digitises a rigid process may improve transaction speed without increasing strategic choice. A capability perspective is therefore more informative than an adoption perspective because it examines what the firm can repeatedly do with technology under changing conditions.

Technology capability is defined here as the firm level ability to acquire, integrate, deploy and renew digital and production technologies in support of operational and strategic priorities. It differs from adoption, which concerns the introduction of a tool, and from digital transformation, which concerns broader changes in value creation and organisational processes. Comparable technology investments can produce different results because they are embedded in different skills, routines and decision structures (Chae et al., 2014, 2018). A modest technology base may therefore be strategically valuable when systems exchange information, employees understand them and managers can modify routines.

A further analytical distinction is required between digital adoption, digital transformation and technology capability. Adoption describes the decision to introduce a tool; transformation refers to broader changes in value creation, structures or processes; capability concerns the repeatable organisational proficiency that permits the firm to obtain value from technologies across successive decisions. These concepts can coincide, but they are not interchangeable. An SME may adopt cloud accounting without integrating the resulting information into production or market decisions, and it may digitise a customer interface while leaving production planning disconnected. Conversely, a modest technology base can be strategically valuable when employees understand it, systems exchange information and managers can modify routines. By focusing on capability, the present study examines the quality of use and renewal rather than assuming a linear progression from expenditure to performance.

Strategic flexibility provides a mechanism through which technology capability can create value. It is the capacity to recognise material change, generate alternative courses of action and reconfigure commitments and resources with acceptable speed and cost (Brozovic, 2018; Zhou & Wu, 2010). Technology capability can widen managerial information, shorten coordination cycles and support modular operations, while flexibility converts those options into changes in production, sourcing or market priorities. Recent studies similarly connect digital capabilities to strategic flexibility and organisational agility rather than to an automatic performance gain (Li et al., 2025; Theodosiou et al., 2026).

The literature leaves three connected gaps. Technology capability research remains concentrated in large firms and advanced or Asian economies, providing limited evidence from resource constrained African manufacturing SMEs. Many studies also estimate a direct technology performance relationship without specifying how technical resources become organisational responses. Moreover, strategic flexibility is often treated as an outcome or

predictor but less frequently tested as the mechanism linking technology capability to performance. A useful mediator must identify a transformation rather than restate the outcome. Strategic flexibility meets this requirement because it captures the creation and exercise of alternatives through revised commitments and resource deployment (Dejardin et al., 2023; Schilke et al., 2018). Testing direct and indirect paths therefore distinguishes operational benefits from an adaptive route.

The study addressed four objectives: to assess the effect of technology capability on business performance; to examine the effect of technology capability on strategic flexibility; to determine the effect of strategic flexibility on business performance; and to test the mediating role of strategic flexibility in the technology capability-performance relationship. These objectives correspond to four research questions: (RQ1) Does technology capability positively relate to business performance among manufacturing SMEs in Ghana? (RQ2) Does technology capability positively relate to strategic flexibility? (RQ3) Does strategic flexibility positively relate to business performance? (RQ4) Does strategic flexibility mediate the relationship between technology capability and business performance?

The study contributes in three ways. It first clarifies the theoretical status of the focal constructs: technology capability is treated as an enabling operational capability, while strategic flexibility is treated as a higher-order reconfiguration mechanism. Moreover, it tests the direct and indirect paths together, allowing the study to show whether technology produces value partly because it expands an SME's strategic options. Also, it provides evidence from Ghanaian manufacturing SMEs, a context in which the complementarity between technology and managerial flexibility is theoretically consequential rather than a geographical replication. The remainder of the paper develops the theory and hypotheses, explains the survey and PLS-SEM procedures, reports the measurement and structural results and discusses contributions, implications and limitations.

2. LITERATURE REVIEW

2.1 Dynamic capabilities theory

Dynamic capabilities theory explains how firms purposefully create, extend and reconfigure their resource base under changing conditions (Teece et al., 1997). Teece (2007) organised this process around sensing opportunities and threats, seizing selected opportunities and transforming or reconfiguring assets. Its value lies in explaining resource renewal rather than merely identifying valuable assets, while later work shows that capability outcomes depend on environmental dynamism, managerial cognition and complementary resources (Schilke et al., 2018; Teece, 2018). In the present model, technology capability supplies knowledge, integration and technical options that support current operations. Strategic flexibility is the higher order capacity to form alternatives, shift commitments and redeploy resources. This hierarchy avoids assuming that every technology routine is automatically a dynamic capability.

Capability levels are defined by what a routine accomplishes rather than by a permanently fixed label. A production information system supports ordinary scheduling when it reproduces established plans, but it enables reconfiguration when managers use integrated information to model alternatives during a supply interruption. Technology capability contributes to sensing by revealing changes in demand, quality, inputs and process performance and to seizing by supporting comparison and coordination. Strategic flexibility is most visible in reconfiguration, where the firm changes allocations of people, equipment, supplier relationships or product priorities. Better information without authority to act produces awareness rather than adaptation, while frequent reallocation without reliable information becomes costly improvisation.

This sequence rests on employee interpretation, managerial attention, decision rights and coordination across roles. These microfoundations may be concentrated in a small SME leadership team, which can accelerate communication but also create cognitive and succession risks. Capability development is also path dependent: data structures, skills and vendor relationships constrain what a firm can change economically. Strategic flexibility is therefore not costless freedom from history but the capacity to create feasible alternatives within inherited constraints. Recent SME research shows that dynamic capabilities support digital leadership, culture and shock response when technologies are actively mobilised, although the processes need not form a simple automatic chain (Bai et al., 2026; Held et al., 2026). The cross-sectional model consequently tests a theoretically ordered association rather than directly observing change over time.

The distinction also explains why technology investment can produce heterogeneous outcomes. A technologically equipped firm may process orders efficiently but remain locked into rigid systems, narrow skills or fixed decision rules. Conversely, a firm that uses technology to integrate information across functions, experiment with alternatives and move resources can respond more effectively to change. Information technology-enabled dynamic-capability research supports this indirect logic: technology creates performance value when organisational processes convert digital resources into agility, ambidexterity or resilience (Mikalef & Pateli, 2017; Trieu et al., 2023). Recent evidence that digital technologies, innovation capability and resilience jointly improve business performance further illustrates why technical and organisational mechanisms should be analysed together (Garrido-Moreno et al., 2024; Martín-Rojas et al., 2026). Dynamic capabilities theory is therefore not used as a general label for “good resources”; it predicts a sequence from enabling capability to reconfiguration capacity and then to performance.

2.2 Conceptual framework and hypotheses development

2.2.1 Technology capability and business performance

Technology capability should improve business performance through several connected routes. Integrated systems can reduce information delay, improve process consistency and support faster coordination. Technical knowledge can help firms adapt equipment and digital tools to

local operating needs instead of depending entirely on vendors. Data visibility can also improve pricing, scheduling and customer response. These mechanisms affect both financial and non-financial outcomes, although the present model treats business performance as one reflective construct rather than claiming separate effects on individual performance dimensions.

The empirical record is not uniformly positive. Santhanam and Hartono (2003) reported performance advantages for firms with superior IT capability, while Chae et al. (2014) questioned whether the relationship persisted in later periods and attributed contradictions to measurement and contextual differences. Subsequent evidence indicates that industry conditions and the configuration of technology resources matter (Chae et al., 2018). For SMEs, the more persuasive proposition is therefore capability-based: performance should improve when the firm can integrate and use technology, not when technology is merely present. Recent evidence links digital or IT capability with resilience, ambidexterity and performance, reinforcing the importance of productive deployment (Skare et al., 2023; Trieu et al., 2023).

The expected effect should also be understood as a net organisational relationship rather than a claim that every technological initiative succeeds. Technology capability may lower search, processing and coordination costs, but maintaining systems, protecting data and reskilling employees also consume scarce resources. Positive performance follows when the recurring benefits of integration and informed decision-making exceed those costs. Studies of Vietnamese SMEs show that sensing, seizing and transforming capabilities support digitalisation strategies and sustainable performance (Vo Thai et al., 2024), while mixed-method evidence identifies innovation and resilience as mechanisms through which digitally enabled firms create value under uncertainty (Garrido-Moreno et al., 2024). These findings support a positive average association, yet they also locate value in complementary routines rather than the technology asset alone. Accordingly:

H1: Technology capability has a positive effect on business performance.

2.2.2 Technology capability and strategic flexibility

Strategic flexibility depends on the availability of credible information, a repertoire of alternatives and the ability to change resource commitments. Technology capability can strengthen each condition. Shared data improve sensing by reducing fragmented interpretations of customers, suppliers and operations. Interoperable systems make it easier to compare scenarios, coordinate decisions and change production or distribution arrangements. Technical skills also reduce dependence on fixed external solutions and expand the actions managers consider feasible.

The relationship is nevertheless conditional on how technology is designed and governed. Closely coupled legacy systems can narrow options and create lock-in, whereas modular architectures and cross-functional knowledge can enlarge them (Chae et al., 2018). Celuch and Murphy (2010) found that SME internet use was associated with strategic flexibility when supported by an IT market orientation. Chen et al. (2017) likewise showed that information

technologies can improve strategic flexibility and performance in an emerging economy. Zhou and Wu (2010) demonstrated a close relationship between technological capability, strategic flexibility and innovation. More recent Industry 4.0 evidence also treats technological capability and strategic flexibility as complementary requirements for implementation (Sony et al., 2022).

Contemporary studies provide a more direct test of the option-creation logic. Li et al. (2025) found that digital platform capability increased strategic flexibility, which in turn supported innovation ambidexterity, and that market turbulence strengthened the first relationship. Evidence from Nigerian SMEs similarly indicates that digitalisation capabilities can strengthen market-capitalising and operational-adjustment agility, although the performance contribution of those agility dimensions is not identical (Theodosiou et al., 2026). The distinction is analytically useful. Technology capability should expand the feasible response set, but managers must still choose which response is commercially relevant. H2 therefore concerns the creation of strategic flexibility, not the success of every action taken through it. The capability argument predicts:

H2: Technology capability has a positive effect on strategic flexibility.

2.2.3 Strategic flexibility and business performance

Strategic flexibility has value because it changes the quality and timing of resource allocation. A flexible SME can preserve viable commitments while redirecting resources away from declining products, delayed inputs or unproductive routines. This does not mean that constant change is desirable. Flexibility carries coordination and switching costs, and unfocused experimentation can dissipate scarce resources. Its expected performance effect follows when options are exercised selectively in response to meaningful environmental information.

The literature generally supports a positive relationship while recognising contingencies. Guo and Cao (2014) found that strategic flexibility supported SME performance in an emerging economy, subject to environmental conditions. Xiu et al. (2017) linked strategic flexibility and innovative human-resource practices to firm performance, while Brozovic's (2018) review concluded that flexibility is consequential but conceptually and contextually heterogeneous. Recent work identifies resilience as a dynamic capacity through which firms anticipate disruption, adapt and protect performance (Garrido-Moreno et al., 2024; Martín-Rojas et al., 2026). Flexibility is not identical to resilience, but the two arguments converge on timely resource adjustment. For resource-constrained Ghanaian manufacturing SMEs, the capacity to adjust priorities without irreversible large-scale investment should reduce exposure to shocks and improve the use of existing assets. Thus:

H3: Strategic flexibility has a positive effect on business performance.

2.2.4 The mediating role of strategic flexibility

The mediation proposition integrates the preceding mechanisms. Technology capability improves information, coordination and technical possibility; strategic flexibility converts those benefits into alternative actions and resource reconfiguration; performance reflects the consequences of better-timed and better-aligned choices. Mediation is therefore not introduced simply because a bivariate model is incomplete. It follows from a specific causal sequence in dynamic capabilities theory.

The sequence also clarifies why a direct effect may remain. Technology capability can improve process efficiency and reliability without a major strategic change, while a separate portion of its value can pass through flexibility. A positive direct effect and a same-signed positive indirect effect would constitute complementary mediation (Zhao et al., 2010). This expectation is consistent with evidence that IT-enabled capabilities influence performance through organisational agility or related reconfiguration mechanisms (Mikalef & Pateli, 2017; Trieu et al., 2023).

Recent studies sharpen this mediation argument. Li et al. (2025) identifies strategic flexibility as the channel connecting digital platform capability with innovation ambidexterity, offering construct-level evidence for a technology-flexibility-outcome sequence. Theodosiou et al. (2026) show in Nigerian SMEs that digitalisation capability strengthens agility dimensions whose performance effects depend on how they work together. Bai et al. (2026) likewise demonstrate that managerial improvisation supports SME performance through the effective deployment of digital networking and operations during shock. Across these studies, technology creates possibility, while an adaptive organisational process determines how that possibility is mobilised. The present study applies that logic specifically to business performance and tests whether strategic flexibility carries a statistically identifiable share of technology capability's association with that outcome. Accordingly:

H4: Strategic flexibility mediates the positive relationship between technology capability and business performance.

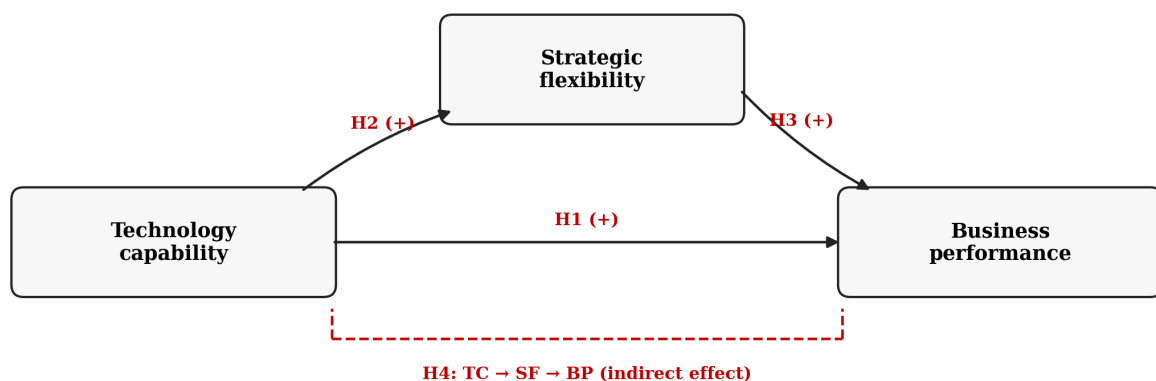


Figure 1. Conceptual model.

Note. H4 represents the indirect effect of technology capability on business performance through strategic flexibility.

3. METHODS

3.1 Research design, unit of analysis and sample

The study used a cross-sectional explanatory survey to test the proposed relationships. The unit of analysis was the manufacturing SME, and one knowledgeable owner or top-level manager served as the key informant for each firm. Eligible informants held responsibility for technology-related investment, strategic decisions or firm performance and possessed sufficient organisational knowledge to evaluate the constructs. Data were collected by questionnaire from manufacturing SMEs; no interview or pharmaceutical supply-chain sample formed part of the study.

Manufacturing SMEs were identified using the applicable Ghanaian enterprise classification, which distinguishes small and medium firms by employment and turnover bands. Firms were purposively approached because the study required a respondent with cross-functional knowledge of technology, strategy and performance. Purposive selection was also practical because a complete, current national register linking manufacturing firms to qualified key informants was unavailable at the time of the study. The survey records did not preserve manufacturing-subsector and regional counts. Consequently, the sample is analytically useful for testing relationships but should not be interpreted as statistically representative of all Ghanaian manufacturing SMEs.

Four hundred questionnaires were distributed and 305 were retained as complete and usable, producing a usable response rate of 76.25%, reported as 76.3%. Each retained response represented one firm. Respondents were 53.5% men and 46.5% women. Educational attainment was 9.4% doctoral, 33.9% master's and 56.7% bachelor's, summing to 100%. A power-based adequacy checks for the most complex endogenous regression, with two predictors, $\alpha = .05$ and a conservative small effect of $f^2 = .05$, indicates a minimum near 196 cases for 80% power; the sample of 305 exceeded that benchmark. The calculation was treated as a sensitivity-oriented adequacy check and not as a substitute for evaluating measurement quality or sampling coverage (Faul et al., 2009).

3.2 Measures

All three constructs were modelled reflectively because the indicators were treated as manifestations of an underlying capability or performance assessment and were expected to covary. Technology capability captured the firm's ability to acquire, integrate, deploy and renew relevant digital and production technologies. The original instrument contained a broader item pool; four indicators (TC1, TC7, TC8 and TC9) were retained after measurement-model assessment. The conceptualisation was anchored in validated technology/IT-capability research and adapted to the SME setting (Chae et al., 2018; Santhanam & Hartono, 2003; Zhou

& Wu, 2010). Because the final analytical documentation preserved indicator codes rather than full wording, the study does not claim verbatim adoption from any one source.

Strategic flexibility captured the firm's capacity to recognise changes, develop strategic alternatives and reallocate resources or commitments. Three indicators (SF1, SF3 and SF4) were retained. Its conceptual and measurement basis was aligned with established strategic-flexibility studies rather than the unrelated humanitarian-fit source previously cited (Brozovic, 2018; Chen et al., 2017; Zhou & Wu, 2010). Business performance was defined as the key informant's comparative assessment of the firm's financial and non-financial outcomes. Six indicators (BP1, BP5, BP8, BP9, BP10 and BP12) were retained. The construct was modelled as a single reflective performance assessment; the analysis did not estimate separate effects on capacity utilisation, sales or product innovation. This approach is consistent with the practical use of multidimensional subjective performance measures where privately held SMEs may not disclose audited financial values (Hudson et al., 2001; Ndiaye et al., 2018).

Responses were recorded on a five-point agreement scale. The original questionnaire labelled 1 as strongly agree and 5 as strongly disagree. Before model estimation, items were reverse-coded so that higher numerical scores consistently represented stronger technology capability, stronger strategic flexibility and better business performance. This coding step is essential to the interpretation of positive path coefficients. The questionnaire was piloted with 33 participants who were not included in the final analytical sample. Two academics and three industry practitioners reviewed clarity, relevance and contextual fit. The surviving pilot record reports Cronbach's α above .70 and average variance extracted above .50, but item-level pilot statistics and a formal content-validity index were not preserved; no stronger content-validity claim is made.

3.3 Data collection, ethics and data quality

Potential respondents received an explanation of the study, the voluntary nature of participation and their right to decline or withdraw before submitting the questionnaire. No personal names are reported, firm-level responses were handled confidentially and results are presented only in aggregate. Permission from participating firms and informed consent from participants were obtained. The study documentation identifies the fieldwork as occurring during the COVID-19 period but does not preserve exact fieldwork dates or an independent institutional ethics approval number. These documentation limitations constrain the procedural audit trail.

Questionnaires were screened for completeness and internal consistency. Expectation maximisation was identified in the analysis record as the procedure used for missing values, but the amount and pattern of missingness were not retained. The final analytical sample comprised 305 usable cases after screening. Because the data came from one informant and one survey, common-method bias was addressed procedurally through confidentiality assurances, separation of construct blocks and neutral wording. Harman's single-factor

diagnostic did not produce one factor explaining more than 50% of variance (Fuller et al., 2016; Podsakoff et al., 2003).

3.4 Data analysis

SPSS was used for screening and descriptive checks, and SmartPLS was used to estimate the partial least squares structural equation model (PLS-SEM). PLS-SEM was appropriate because the objective was prediction-oriented explanation of a mediation model with latent constructs and because it places limited distributional demands on survey data (Hair et al., 2019). The analysis followed two stages. The reflective measurement model was assessed with outer loadings, Cronbach's α , composite reliability and average variance extracted. Indicator VIFs were examined for collinearity.

The structural model was assessed using standardised path coefficients, R^2 and the standardised root mean square residual (SRMR). Significance was evaluated with 5,000 bootstrap resamples and a two-tailed α of .05. The analytical table retained β , standard error and t values but not percentile or bias-corrected bootstrap limits. Accordingly, 95% confidence intervals in Table 2 were calculated as $\beta \pm 1.96SE$ and are explicitly labelled normal-approximation intervals.

4. RESULTS

4.1 Measurement model

Table 1 reports the final measurement output. Outer loadings ranged from .701 to .948 and therefore met the conventional .70 benchmark, with BP9 marginally above the threshold. Cronbach's α ranged from .800 to .847 and composite reliability from .869 to .911. Average variance extracted ranged from .538 to .775, exceeding .50 for all constructs. These results support internal consistency and convergent validity for the retained indicators (Hair et al., 2019). Indicator VIFs ranged from 1.327 to 2.627, indicating no problematic indicator-level collinearity.

Table 1

Reflective measurement-model results

Construct / indicator	Loading	Cronbach's α	CR	AVE	VIF
Business performance		.830	.875	.538	
BP1	.716				1.782
BP10	.777				1.882
BP12	.740				1.683
BP5	.730				1.847
BP8	.735				1.888
BP9	.701				1.692

Construct / indicator	Loading	Cronbach's α	CR	AVE	VIF
Strategic flexibility		.847	.911	.775	
SF1	.941				2.074
SF3	.736				1.327
SF4	.948				2.627
Technology capability		.800	.869	.625	
TC1	.756				1.555
TC7	.838				1.892
TC8	.770				1.597
TC9	.796				1.744

Note. CR = composite reliability; AVE = average variance extracted; VIF = indicator variance inflation factor. Blank cells indicate construct-level statistics reported once. Only indicators retained in the final analytical output are shown.

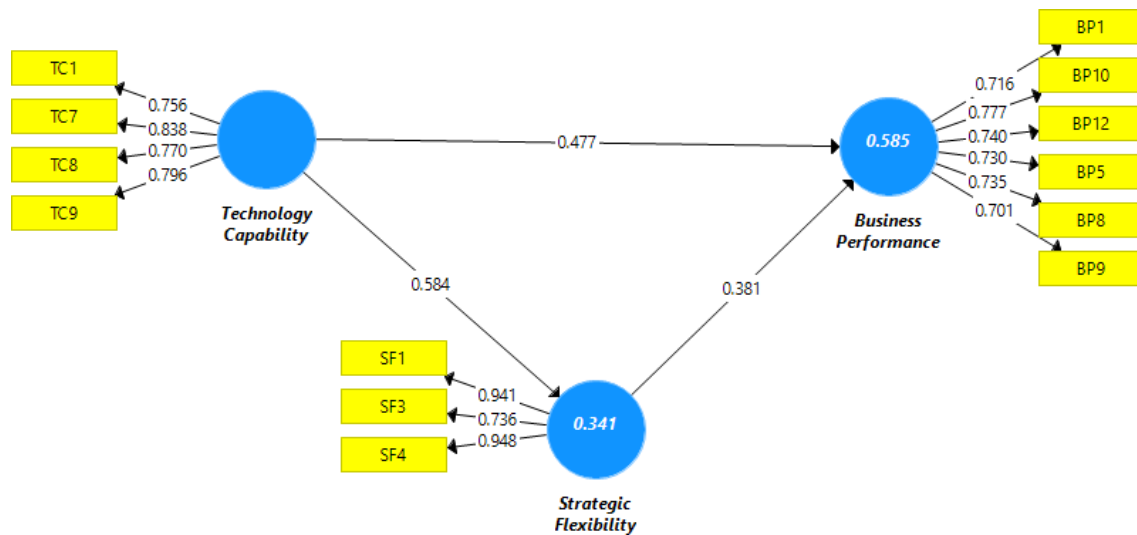


Figure 2. PLS algorithm results for the retained measurement and structural model.

4.2 Structural model and hypothesis tests

The structural model explained 34.1% of the variance in strategic flexibility and 58.5% of the variance in business performance. The SRMR was .0713, below the commonly applied .08 guideline. SRMR is reported as an approximate descriptive fit index and not as proof that the model is true (Henseler et al., 2016).

Table 2 shows that all four hypothesised effects were positive and statistically significant. Technology capability had a positive direct effect on business performance ($\beta = .477$, $SE = .043$, $t = 11.021$, $p < .001$) and a positive effect on strategic flexibility ($\beta = .584$, $SE = .052$, $t = 11.279$, $p < .001$). Strategic flexibility positively affected business performance ($\beta = .381$, $SE = .035$, $t = 10.754$, $p < .001$). The indirect effect of technology capability on business performance through strategic flexibility was positive ($\beta = .222$, $SE = .029$, $t = 7.596$, $p < .001$). H1–H4 were therefore supported.

The direct effect remained positive and significant after the mediator was included, and the indirect effect had the same sign. The pattern is complementary mediation rather than a claim that mediation is “partial” solely because the indirect path is significant (Zhao et al., 2010). The estimated total effect of technology capability on business performance was .699 (.477 + .222). A confidence interval for the total effect cannot be recovered without the covariance between direct and indirect estimates; it is therefore reported only as a point estimate. The coefficients are standardised associations: $\beta = .477$ does not mean that a one-unit increase causes a 47.7% improvement in performance.

Table 2

Structural-model and mediation results

Hypothesis / path	β	SE	t	p	95% CI	Decision
H1: TC $\rightarrow$ BP	.477	.043	11.021	< .001	[.393, .561]	Supported
H2: TC $\rightarrow$ SF	.584	.052	11.279	< .001	[.482, .686]	Supported
H3: SF $\rightarrow$ BP	.381	.035	10.754	< .001	[.312, .450]	Supported
H4: TC $\rightarrow$ SF $\rightarrow$ BP	.222	.029	7.596	< .001	[.165, .279]	Supported

Note. TC = technology capability; SF = strategic flexibility; BP = business performance.

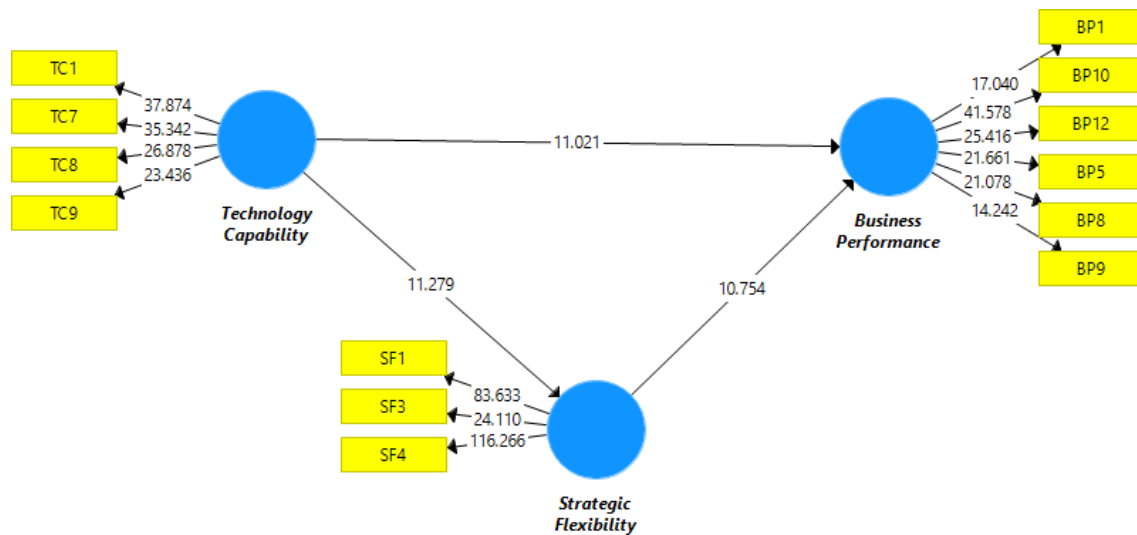


Figure 3. Bootstrapping results for the structural model.

5. DISCUSSION

The study examined whether technology capability improves business performance directly and through strategic flexibility. All hypothesised relationships were supported, indicating that technology capability creates operational value while also strengthening a reconfiguration mechanism. The pattern supports a capability complementarity explanation rather than a simple technology adoption argument.

H1 showed that technology capability was positively associated with business performance. In standardised terms, a one-standard-deviation increase in technology capability was associated with a .477-standard-deviation increase in performance when strategic flexibility was held constant. This is a substantial direct relationship, but it should not be interpreted as a percentage gain or a causal effect because the design was cross-sectional. The finding is consistent with studies showing that integrated technology capabilities support performance (Chae et al., 2018; Santhanam & Hartono, 2003) and with recent SME evidence linking digital capability to resilience and performance (Skare et al., 2023; Trieu et al., 2023). It also helps reconcile contradictory findings. Chae et al. (2014) questioned a universal IT-capability advantage; the present result suggests that capability may remain valuable in a setting where integration, information visibility and technical adaptability address material operating constraints. The Ghanaian context may therefore increase the marginal value of well-deployed capability while simultaneously making it harder to build.

The H1 result is also compatible with more recent evidence that separates digitalisation from the organisational capabilities surrounding it. Vo Thai et al. (2024) found that sensing, seizing and transforming capabilities shaped SME digitalisation strategies and sustainable performance, whereas Edeh et al. (2025) showed that digitalisation alone did not overcome weak infrastructure and became more valuable when coupled with innovation capability. Read together with the present estimate, these studies suggest that technology capability is

productive because it embodies integration and use, not because it records expenditure. The analysis therefore does not warrant a recommendation for indiscriminate technology acquisition. It supports investment whose data, skills and technical routines are aligned with recurring operational and strategic decisions.

Technology capability also had a strong positive relationship with strategic flexibility. Shared information, interoperable routines and internal technical knowledge can widen feasible responses and reduce the time and cost required to reconsider commitments. This interpretation is consistent with research linking information technology and technological capability to strategic flexibility (Chen et al., 2017; Zhou & Wu, 2010) and with evidence that digital platform capability expands strategic choice (Li et al., 2025). The result does not imply that every system creates flexibility, since rigid legacy designs may produce lock in. It shows that an integrated capability can enlarge the response set, while managers still determine which options are commercially relevant.

H3 showed that strategic flexibility positively predicted business performance ($\beta = .381$) after technology capability was controlled. This supports prior emerging-economy SME evidence (Guo & Cao, 2014) and the broader review conclusion that flexibility can improve outcomes when it enables timely, coherent adjustment (Brozovic, 2018). The result is theoretically relevant because SMEs possess little slack. A large firm may absorb delayed decisions or duplicate resources, whereas a manufacturing SME often must adjust within an existing asset base. Strategic flexibility can allow it to resequence production, alter sourcing priorities, target a different customer segment or redirect limited managerial attention. Those actions provide a plausible contextual route to the observed firm-level performance construct, although the model did not test individual operational actions separately.

The positive H3 path also corresponds with the recent resilience literature while remaining conceptually distinct from it. Garrido-Moreno et al. (2024) found that innovation and organisational resilience helped firms convert digitally connected resources into performance, and Martín-Rojas et al. (2026) showed that digital technologies, leadership and innovation fostered resilience that improved SME performance. Resilience emphasises anticipation, absorption and recovery; strategic flexibility emphasises the availability and reallocation of commitments. The shared performance logic is disciplined adaptation. The present results do not show which particular response produced the performance assessment, but they demonstrate that flexibility retained explanatory value after technology capability was controlled.

The mediation result provides the study's central insight. Technology capability contributes to performance through direct operational benefits and through the strategic flexibility it enables. This is consistent with dynamic capabilities theory: integrated information and technical connectivity support sensing and seizing, while flexibility represents the reconfiguration of commitments and resources. Similar mechanisms appear in research connecting IT enabled

capabilities to agility, ambidexterity and resilience (Mikalef & Pateli, 2017; Trieu et al., 2023). The result extends studies of Chinese manufacturing firms and Nigerian SMEs by demonstrating the mechanism for business performance among Ghanaian manufacturing SMEs (Li et al., 2025; Theodosiou et al., 2026). Differences among flexibility, agility, improvisation and resilience should nevertheless be preserved rather than treating all adaptive processes as interchangeable.

The relative effects indicate complementarity rather than substitution. Operational efficiency and information quality can create direct benefits, while option creation and resource redeployment add a distinct route. An SME may therefore be operationally competent but strategically rigid or willing to change without dependable systems and technical knowledge. The strongest performance logic combines both capabilities. Because the evidence comes from one cross sectional model, the mediation pattern establishes a theoretically consistent indirect association, not a proven temporal chain. Managerial quality, turbulence and financial slack may influence the observed relationships.

The combined pathway is especially meaningful under resource constraints. Firms may be unable to replace systems frequently, recruit every specialist or absorb prolonged implementation failure, making the flexible use of existing resources more valuable. Technical knowledge combined with rapid managerial redeployment can improve the return from smaller investments and limit irreversible commitments. The findings therefore specify a contextual proposition rather than a universal claim: technology capability contributes to performance when it supports, but does not substitute for, strategic reconfiguration.

6. CONCLUSION

This study examined technology capability, strategic flexibility and business performance among 305 manufacturing SMEs in Ghana. Technology capability was positively related to performance and to strategic flexibility; strategic flexibility was positively related to performance; and the indirect technology capability-flexibility-performance path was positive. Because the direct and indirect effects remained significant and same-signed, strategic flexibility operated as a complementary mediator. The results answer the four objectives with a coherent mechanism: technology capability creates some operational value directly, while part of its value is realised when managers convert technical information, integration and skills into strategic options and resource redeployment. The study consequently supports a qualified dynamic-capabilities explanation rather than the proposition that technology acquisition alone guarantees superior performance.

7. IMPLICATIONS

7.1 Theoretical implications

Firstly, the study clarifies capability hierarchy. It treats technology capability as an enabling operational capability and strategic flexibility as a higher-order reconfiguration mechanism.

This avoids conceptual circularity in which any beneficial resource is labelled a dynamic capability. The significant technology capability-flexibility path identifies how a lower-order capability can supply information, connectivity and technical options to a dynamic process.

Additionally, the complementary mediation result refines the performance mechanism. Dynamic capabilities theory predicts reconfiguration, yet empirical models often jump from a capability stock directly to performance. The indirect effect shows that part of technology capability's value passed through strategic flexibility, while the remaining direct effect is consistent with operational efficiency benefits. The model therefore separates two routes instead of treating technology capability as a single undifferentiated advantage. It also complements Li et al. (2025), who identify strategic flexibility as a mediator of digital platform capability and innovation ambidexterity, by demonstrating that the mechanism extends to an overall business-performance outcome in Ghanaian manufacturing SMEs.

Again, the Ghanaian manufacturing-SME setting adds a meaningful boundary condition. Resource scarcity can constrain capability development, but it can also raise the value of using existing technology flexibly. The findings do not establish universality; they suggest that the technology-flexibility complement is particularly consequential where firms have limited slack and must reconfigure without repeated large investments. This contextual interpretation extends, rather than merely repeats, evidence from larger firms and other emerging economies. It is also consistent with the recent African evidence that digitalisation capability contributes to agility, but that distinct adaptive capacities need not have identical performance consequences (Theodosiou et al., 2026).

Furthermore, the study supports a process-sensitive interpretation of dynamic capabilities. Held et al. (2026) find that higher-order capabilities can cultivate digital leadership and digital culture through parallel rather than automatically sequential paths, while Martín-Rojas et al. (2026) show that digital technologies operate alongside leadership and innovation in building resilience. The present results likewise indicate that capability relationships should be specified, measured and tested rather than presumed. Strategic flexibility is one significant route, not an exhaustive representation of every managerial, cultural or innovative mechanism through which technology may produce value.

7.2 Practical and policy implications

Managers should evaluate technology investments by the strategic options they create, not only by purchase price or immediate automation. Four actions follow. First of all, SMEs should develop cross-functional digital skills so that technology knowledge is not confined to one employee or vendor. Next, managers should favour interoperable and modular systems that allow data exchange and incremental change, reducing lock-in. Furthermore, firms should connect dashboards and operational data to scenario planning, with clear thresholds for changing product, sourcing or capacity decisions. Fourth, managers should periodically

rehearse resource redeployment by identifying who can authorise it, which assets are movable and what customer or supplier alternatives exist.

Technology governance is equally important. Each investment should have an accountable owner, a capability-development plan and a review of whether employees can use the system to make different decisions. Measures should include decision lead time, data availability and the cost of switching processes, alongside conventional utilisation or financial outcomes. These practices translate sensing, seizing and reconfiguring into observable managerial routines without assuming that technology itself performs those functions.

Managers should also distinguish readiness indicators from outcome indicators. Employee proficiency, system interoperability, data timeliness and alternative-response time show whether capability is being built; sales growth, cost, quality and customer retention show whether the capability is creating value. Monitoring only outcomes can delay diagnosis, while monitoring only readiness can preserve technically impressive projects that do not improve the business. A balanced review should therefore ask which strategic decision the technology changed, how quickly the firm acted and whether the action improved a defined performance dimension. This recommendation follows the evidence that digitalisation is most productive when it is embedded in innovation, resilience or agility rather than managed as an isolated technical programme (Garrido-Moreno et al., 2024; Vo Thai et al., 2024).

For policymakers and enterprise-support institutions, funding hardware or software alone is unlikely to produce the full performance benefit. Ghanaian SME support programmes should combine technology grants with diagnostic support, managerial training, cybersecurity basics, process redesign and peer-learning networks. Vendor-neutral advice can help SMEs avoid proprietary lock-in. Shared training and technical-resource centres can also reduce the fixed cost of specialist skills. Programme evaluation should assess whether supported firms develop faster decision cycles and greater redeployment capacity, not only whether they purchased equipment. This combined approach is supported by evidence that infrastructure, digitalisation and innovation capability interact in shaping SME outcomes (Edeh et al., 2025).

A staged support model would make these recommendations implementable. At the diagnostic stage, an SME can map critical decisions, data gaps and process dependencies before selecting technology. At the acquisition stage, funding conditions can require interoperability, staff training and a named internal process owner. At the utilisation stage, advisers can help managers convert system outputs into scenarios and pre-agreed response rules. At the renewal stage, periodic reviews can identify obsolete routines, vendor dependence and emerging skill needs. These stages recognise that capability develops through repeated use and learning. They also give public programmes more meaningful indicators, such as decision-cycle time, data completeness, employee proficiency and reconfiguration speed, than equipment counts alone.

8. LIMITATIONS AND FUTURE RESEARCH

Several limitations define the scope of the findings. The cross-sectional design establishes association, not temporal or causal order. Longitudinal or panel research should measure technology capability, subsequent changes in flexibility and later objective performance. One informant represented each firm, which creates measurement risk for firm-level constructs and common-method variance. Future studies should combine responses from technology, strategy and finance roles and link them to archival sales, productivity or survival data.

Purposive sampling and the absence of a recoverable national frame, regional profile and manufacturing-subsector distribution limit statistical generalisation. Replication should use a documented GEA or business-register frame, stratify by subsector and region and report nonresponse tests fully. The surviving records also lacked exact fieldwork dates, a formal ethics reference, item wording, deleted-item statistics, HTMT, f^2 , Q^2 and PLSpredict output. Future data management should preserve the questionnaire, codebook, ethics documentation, timestamped sampling records and complete SmartPLS files. These materials would permit stronger content-validity, discriminant-validity, predictive and reproducibility assessments. Finally, comparative work could test whether infrastructure reliability, financial slack or environmental turbulence strengthens or weakens the technology capability-strategic flexibility pathway across African economies.

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