

Knowledge, IT Infrastructure, and Business Performance: The Sequential Mediation of Digital Maturity and Organizational Agility in Saudi SMEs

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Research Article

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Abstract

Saudi Arabia's Vision 2030 positions small and medium enterprises as central engines of economic diversification, yet the mechanisms through which knowledge and technological resources translate into business performance remain underexplored. Building on the resource-based view and dynamic capabilities theory, the research examines the extent to which digital maturity and organizational agility operate as sequential mediators linking knowledge management and technological infrastructure to business performance. The analysis of data from 116 private-sector Saudi SMEs employed PLS-SEM, with bootstrapping procedures used to generate bias-corrected confidence intervals. The empirical evidence indicates that knowledge management and technological infrastructure significantly enhance digital maturity, which strongly predicts organizational agility, which in turn drives business performance. The sequential indirect effects through digital maturity and organizational agility were significant for both knowledge management and technological infrastructure, supporting all six hypotheses. These findings confirm that knowledge and technological resources generate performance benefits only after being converted into digitally mature operations and, subsequently, into agile capabilities, with implications for managers directing resource investments and for policymakers advancing the digitalization objectives of Vision 2030.

Introduction

Saudi Arabia's Vision 2030 has positioned small and medium enterprises as central engines of economic diversification, targeting an increase in their GDP contribution from 20 to 35 percent by 2030 [1]. Yet SMEs face distinct barriers in this transformation journey, limited financial access, constrained human capital, and difficulties in scaling their business models [14] which makes it hard for many traditional and expanding firms to convert technological and knowledge investments directly into improved outcomes [1].

This conversion problem is rooted in the distinction between resource endowments and dynamic capabilities. The Resource-Based View posits that firms can achieve competitive advantage when they possess resources that are valuable, rare, difficult for competitors to replicate, and without readily available substitutes [5]; however, this theory has been criticized for its limited explanation of how firms sustain advantage in turbulent environments, since static resources alone rarely generate lasting competitive advantage amid continuous change [5]. Dynamic Capabilities Theory addresses this by explaining how organizations reconfigure their resource base to adapt. Within this integrated logic, knowledge management and IT infrastructure represent foundational resource inputs that must first be transformed into higher-order organizational capabilities before driving performance, a logic supported by evidence that KM infrastructural factors affect performance only through knowledge process capabilities [27], and that knowledge management capabilities enhance business performance via organizational agility [35].

Empirical evidence reinforces this concern. In a survey of 460 respondents from 150 Saudi SMEs, Digital transformation showed no direct correlation with improved business performance, with the effect transmitted through smart technologies [3]. Likewise, evidence from 280 Finnish SMEs shows that digital transformation alone cannot enhance performance unless coupled with intermediate technologies that fully mediate the relationship [31]. These findings indicate that digital and knowledge resources operate on performance through intervening organizational capabilities rather than directly.

Yet the specific capability chain through which these effects travel remains underexplored, particularly in the Saudi SME context. Extant studies have predominantly tested single-mediator explanations, smart technologies [3, 31], human capital [26], or organizational agility [35, 36], and even recent Saudi serial-mediation research has examined intention-to-use and government support pathways rather than organizational capability chains [41]. As a result, empirical evidence remains scarce regarding the ways in which technological infrastructure and knowledge management foster overall digital maturity, and of how this maturity translates into organizational agility to sustain long-term performance.

This study fills that gap by pursuing four objectives: (1) to evaluate the direct influence of Knowledge Management and Technological Infrastructure on Digital Maturity in Saudi SMEs; (2) to assess the immediate influence of Digital Maturity on Organizational Agility; (3) to evaluate the unmediated effect of Organizational Agility on Business Performance; and (4) to analyze how Digital Maturity and Organizational Agility act as serial mediators linking input resources to Business Performance. Accordingly, the study answers four research questions: How do Knowledge Management and Technological Infrastructure directly affect Digital Maturity among Saudi SMEs? To what extent does Digital Maturity directly influence Organizational Agility? Does Organizational Agility directly enhance overall Business Performance? And Does a serial mediation path—from Digital Maturity to Organizational Agility—link knowledge and technological resources to Business Performance? By specifying Digital Maturity and Organizational Agility as two sequentially ordered capability mediators, the research provides a more comprehensive explanation of how Saudi SMEs convert knowledge and technological resources into sustained performance ($KM + TI \rightarrow DM \rightarrow OA \rightarrow BP$). The findings are expected to inform SME resource allocation decisions and support the digital transformation goals of Saudi Arabia's Vision 2030.

The structured outline of this paper proceeds as follows: an overview of theoretical background and hypothesis development, a description of the methodology and scales, presentation of empirical results, and a concluding discussion covering implications and limitations

Literature Review & Hypotheses Development

Theoretical Foundations

Grounded in the Resource-Based View (RBV), a firm's sustainable edge relies on its internal collection of distinct resources characterized by value, rarity, inimitability, and non-substitutability [6, 44]. In

contemporary digital business environments, knowledge resources and technological infrastructure serve as foundational organizational capital [17, 16]. Knowledge Management (KM) comprising processes to acquire, store, and apply intellectual capital and Technological Infrastructure (TI) represent valuable strategic inputs that enable firms to optimize operations, enhance decision-making, and exploit market opportunities [43, 22, 36, 40].

Conversely, standard RBV logic acknowledges that static resources alone rarely generate sustainable competitive advantage, particularly in dynamic or volatile markets [34, 28, 16]. In the realm of Small and Medium Enterprises (SMEs), standalone technological infrastructure or stored knowledge assets remain static capabilities unless the organization possesses the structural alignment and processes to leverage them effectively [28; 40]. Consequently, KM and TI act as the foundational resource layer that must be transformed into higher-order organizational capabilities (28).

Consistent with this logic, the empirical digital-transformation literature shows that resource-level digital inputs do not influence performance directly. In a study of 150 SMEs in Saudi Arabia, AlMulhim demonstrated that the digital transformation–performance relationship is fully mediated by smart technologies, with no observed direct effect between the primary constructs [3]. Similar results emerge beyond the Saudi context: among 280 Finnish SMEs, [31]. demonstrated that digital transformation alone cannot improve relationship performance, and that smart technologies fully mediate this relationship [31]. Synthesizing these insights reveals that the performance effects of digital resources are transmitted through intermediate organizational capabilities, providing the empirical foundation for the sequential mediation model, KM and TI → Digital Maturity → Organizational Agility → Business Performance, developed in this study.

To overcome the static limitations of RBV, Dynamic Capabilities Theory (DCT) extends the resource perspective by demonstrating how organizations purposefully modify, reconfigure, and deploy their resource base to adapt to hyper-turbulent market conditions [38, 13].

Drawing on DCT, this study conceptualizes Digital Maturity and Organizational Agility as two sequentially ordered capabilities through which knowledge and technological resources are converted into BP. Digital Maturity (DM) is defined as a structural capability capturing the magnitude of digital strategy, digital skills, digitized processes, and digital infrastructure are rooted in the firm's core routines. As the substrate capability, DM forms the foundation on which subsequent absorptive capacity is built: Organizational Agility (OA), encompassing market sensing capability shifts and reconfigure operations in response. This sequencing follows the logic that a firm must first digitize its routines and infrastructure before it can sense, reconfigure, and adapt quickly; digital resources alone cannot generate adaptive responses without the mature digital substrate in place.

Integrating RBV and DCT establishes a coherent, sequential capability pipeline (KM + TI→ DM→ OA→ BP) [16, 28, 40]. Within this framework, KM and T serve as the foundational resource inputs grounded in RBV [6, 22; 40]. Achieving high DM subsequently grants the enterprise the dynamic operational flexibility required for dynamic reconfiguration under DCT, enabling OA to sense external market disruptions and

adjust internal processes without significant friction [30, 28, 40]. Ultimately, OA translates these dynamic adaptations into superior financial and non-financial Business Performance [42, 16, 40].

Knowledge Management (KM)

Knowledge Management (KM) is defined as a systematic organizational process that encompasses the architecture, tools, and routines dedicated to acquiring, storing, retrieving, and applying internal and external knowledge [43, 16, 36]. In modern organizations, knowledge serves as a core strategic resource underpinning competitive advantage [17, 16]. Effective KM practices foster organizational learning, enhance operational efficiency, and lower coordination costs by making data and information accessible across departments [16, 36]. In SME environments, KM functions as a strategic bridge between technological resources and firm-level objectives, enabling resource-constrained enterprises to leverage both experiential know-how and market insights [16; 40]. By establishing mechanisms for knowledge retention, documentation, and continuous updates, KM builds the internal competencies and intellectual capital necessary to achieve digital maturity [7, 36].

H1

Knowledge Management positively affects Digital Maturity

Technological Infrastructure (TI)

Technological Infrastructure (TI) refers to the reach, flexibility, and architectural quality of an organization's IT hardware, software, network systems, and technical staff skills [8, 29, 22]. TI represents a fundamental technical precondition for digital evolution, providing the physical and operational foundation required to connect IT systems across internal departments and external supply chain partners [22, 28, 40]. A flexible TI allows an enterprise to rapidly reconfigure digital platforms, integrate new digital tools with minimal disruption, and execute automated business routines [22, 28].

In the context of digital transformation, TI acts as a baseline resource that directly enables Digital Maturity by supporting digital strategies, digitized core processes, and employee digital skill execution [7, 22, 28].

H2

Technological Infrastructure positively affects Digital Maturity.

Digital Maturity (DM)

Digital Maturity represents the extent whereby an organization has integrated IT infrastructure, leadership intent, culture, and employee competencies into core routines to transform business models

and operational processes [7, 22, 28, 40]. DM reflects an ongoing maturation process rather than a static setup, wherein an enterprise aligns its people, strategy, and digitized routines to take advantage of technological opportunities [7, 28, 40].

DM firms exhibit clear digital strategies, strong executive leadership for digital initiatives, and integrated digital workflows, which directly enable OA [12, 7, 28]. High DM grants enterprises the operational visibility and technical readiness required to rapidly identify market trends, reconfigure internal processes, and adjust product/service portfolios in response to external changes [7, 28, 40].

H3

Digital Maturity positively affects Organizational Agility.

Organizational Agility (OA)

Organizational Agility (OA) is conceptualized as a dynamic capability that combines market-capitalizing agility (sensing and seizing emerging trends and opportunities faster than competitors) and operational adjustment agility (rapidly reconfiguring internal processes, staff, and tech budgets during unexpected disruptions) [30, 28]. In volatile, complex business environments, OA functions as a foundational antecedent of performance superiority [28, 40].

Grounded in DCT, OA enables firms to transform organizational flexibility into tangible commercial value [16, 28]. Agile organizations execute operational shifts with minimal delay, adjust product offerings to evolving customer preferences, and maintain high situational awareness during market turbulence [28, 40]. Consequently, higher organizational agility directly enhances business performance by safeguarding revenue targets, increasing profit margins, and driving long-term enterprise growth [16, 40].

H4

Organizational Agility positively affects Business Performance.

Sequential Mediation Effects of Digital Maturity and Organizational Agility

Prior empirical research frequently models digital and knowledge resources as direct determinants of performance, with only recent studies beginning to trace the sequential capability building through which resource inputs are converted into adaptive outcomes [24, 23]. Emerging empirical evidence from the Saudi context corroborates this concern: in a survey of 460 respondents from 150 SMEs, the direct relationship between digital transformation initiatives and firm performance failed to reach statistical significance, with intelligent digital infrastructure acting as the transmitting mechanism along the path from strategic digital transition to firm performance [3]. Similar evidence from 280 Finnish SMEs shows that digital transformation alone cannot improve relationship performance, with smart technologies fully

mediating the relationship [31]. These findings indicate that resource-level digital inputs operate on performance through intermediate organizational capabilities rather than directly, providing the empirical foundation for the sequential mediation logic advanced in this study.

Grounded in the integrated RBV-DCT framework, resource inputs (KM and TI) first build firm-level DM, which subsequently fuels dynamic OA, ultimately driving superior Business Performance (BP) [16, 28, 40].

SMEs possessing high KM capabilities or robust TI cannot achieve sustained performance gains during market turbulence unless those foundational resources are organized to elevate the enterprise's overall Digital Maturity [7, 22, 28]. Once digital maturity is achieved, the enterprise gains the dynamic agility (OA) necessary to reconfigure routines and seize market opportunities, which directly translates into optimized financial and operational metrics [16, 28, 40]. Thus, DM and OA operate as sequential capability mediators in the resource-to-performance pipeline [16, 28, 40].

H5a

Digital Maturity and Organizational Agility sequentially mediate the relationship between Knowledge Management and Business Performance.

H5b

Digital Maturity and Organizational Agility sequentially mediate the relationship between Technological Infrastructure and Business Performance.

Methodology

Research Design

This research utilizes a quantitative research design relying on cross-sectional survey data, widely applied in SME digital-transformation studies [1, 3, 4, 25] and appropriate for assessing the hypothesized relationships among knowledge management, technological infrastructure, digital maturity, organizational agility, and a static snapshot of firm performance [2]. The individual respondent constitutes the primary unit of analysis, and each returned questionnaire establishes one observation in the dataset.

The research model guiding this study links knowledge management and technological infrastructure, as foundational resource inputs, to business performance through two sequentially ordered organizational capabilities: digital maturity followed by organizational agility. Specifically, the model proposes four direct relationships: knowledge management and technological infrastructure each influencing digital maturity, digital maturity influencing organizational agility, and organizational agility influencing business performance. In addition, the model proposes two sequential mediation relationships, wherein digital maturity and organizational agility collectively mediate the influence of knowledge management and of

technological infrastructure onto business performance. The complete model, including the hypothesized paths, (see Fig. 1).

Population and Sampling

The sampling frame targeted SMEs operating within the Saudi Arabian private sector. A non-probability convenience sampling approach was utilized, and the questionnaire was distributed electronically via email. To mitigate response distortion, respondent engagement was kept entirely discretionary and unidentifiable and encourage honest responses. the researcher distributed the questionnaire to the participants, and 121 responses were obtained. Before conducting inferential evaluations, the dataset underwent systematic inspection for omitted observations and straight-lining; the number of cases removed (5) leaving 116 respondents to carry out the analysis. The sample size was evaluated against established methodological thresholds for the selected analytical method, proving sufficient given the structural intricacies of the proposed model [20]. The demographic profile of the respondents is presented in Table 1.

Table 1
Demographics Statistics (N = 116)

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	75	64.7
	Female	41	35.3
Work experience	Less than 5 years	41	35.3
	5 to less than 10 years	31	26.7
	10 to less than 15 years	14	12.1
	15 years and more	30	25.9
Firm age	Less than 3 years	20	17.2
	3 to less than 6 years	32	27.6
	6 to less than 10 years	23	19.8
	10 years and more	41	35.3
Firm size (employees)	1–5	19	16.4
	6–49	46	39.7
	50–250	51	44.0

Research Framework and Measures

Five constructs were measured with items used from previously confirmed scales and designed to the Saudi SME context, as summarized in Table 2. All measurement items were operationalized using a five-

point Likert scale, ranging from 1 ('strongly disagree') to 5 ('strongly agree'). The English instrument was translated into Arabic and validated by four experts in the field, whose feedback resulted in minor rewording to improve clarity while preserving the semantic content of each scale.

Table 2
Measurement Constructs

Construct	Item Count	Derived from
Technological Infrastructure	4	[8, 29]
Knowledge Management	5	[18]
Digital Maturity	3	[9]
Organizational Agility	6	[30]
Business Performance	5	[42]

Data Collection and Analysis Procedure

Data were collected between August and September 2026 via the electronic survey to SMEs across Saudi Arabia, with follow-up reminders to improve the response rate. The data were examined through PLS-SEM using SmartPLS 4 [19], chosen due to its robust predictive-explanatory capabilities for predictive frameworks and small-to-medium samples. A two-step strategy was employed. First, scale reliability across all latent constructs was examined via standard internal consistency indicators (Cronbach's alpha and composite reliability ≥ 0.70), convergent validity ($AVE \geq 0.50$; loadings above 0.70), and discriminant validity employing the Fornell–Larcker criterion [15] Second, the structural model examined the hypotheses, including the sequential mediation chain $KM/TI \rightarrow DM \rightarrow OA \rightarrow BP$. Bootstrap resampling was performed following the recommended settings for the analytical approach [20], employing bias-corrected bootstrapping confidence intervals at a 95% certainty threshold ($\alpha = 0.05$) to evaluate all hypothesized direct and indirect structural trajectories. Finally, because the data came from self-reports, the potential for common method variance was procedurally constrained by maintaining total participant de-identification, incorporating concise item phrasing, and structural isolation of exogenous and criterion items [10, 33, 39].

Results

Measurement Model Results

Prior to hypothesis testing, the latent variables were appraised within the outer model to substantiate item reliability and factorial validity [19]. Three indicators (DM4, DM5, TI5) exhibited substantial cross-loadings with technological infrastructure during initial evaluation and were removed to sharpen the conceptual boundaries; the final model thus comprised 23 indicators [11]. Table 3 summarizes the measurement model diagnostics, demonstrated robust internal consistency, with composite reliability values spanning 0.924 to 0.964, Cronbach's alpha coefficients between 0.891 and 0.955, and *pa*

statistics ranging from 0.891 to 0.956 — all above the 0.70 benchmark [20]. The AVE of every construct exceeded the 0.50 criterion (0.749–0.822), and All construct indicators exhibited statistically significant outer loadings exceeding the recommended 0.70 threshold ($p < 0.001$),

(0.832–0.923), supporting convergent validity [11].

Table 3
Confirmatory Composite Analysis (N = 116)

Construct	CA	N	CR (rho_c)	AVE	R ²
KM	0.929	5	0.946	0.778	
TI	0.891	4	0.924	0.754	
DM	0.892	3	0.933	0.822	0.748
OA	0.955	6	0.964	0.817	0.577
BP	0.916	5	0.937	0.749	0.606

To establish discriminant validity, the Fornell–Larcker test was applied, verifying that the square root of each latent variable's AVE proved greater than its paired correlations with remaining model constructs [15]. As shown in Table 4, the criterion was satisfied for nine of the ten construct pairs; for example, the square root of the AVE for digital maturity (0.906) surpassed its highest correlation with any other latent variable. After item refinement, the technological infrastructure–digital maturity pair now satisfies the criterion ($0.833 < 0.868$). The sole remaining exception — technological infrastructure with organizational agility ($0.885 > 0.868$) — is discussed in the limitations section.

Table 4
Discriminant Validity Outcomes (N = 116)

BP	BP	DM	KM	OA	TI
	0.865				
DM	0.745	0.906			
KM	0.792	0.828	0.882		
OA	0.779	0.760	0.838	0.904	
TI	0.771	0.833	0.843	0.885	0.868

Structural Model and Hypothesis Testing

The structural model was then examined the hypothesized structural paths. As shown in Table 3, the proposed model yielded robust R² values, explaining substantial variance across all three endogenous variables: R² = 0.748 for digital maturity, 0.577 for organizational agility, and 0.606 for business performance (adjusted R² 0.744, 0.573, and 0.603, respectively). Knowledge management significantly

predicted digital maturity, supporting H1; technological infrastructure similarly exerted a positive impact on digital maturity, supporting H2; digital maturity strongly predicted organizational agility, supporting H3; and organizational agility significantly predicted business performance, supporting H4. Effect sizes (f^2) were medium for KM $\rightarrow$ DM (0.215) and TI $\rightarrow$ DM (0.251) and large for DM $\rightarrow$ OA (1.365) and OA $\rightarrow$ BP (1.540) [19].

The sequential mediated impact of knowledge management on business performance via digital maturity and organizational agility exerted a statistically significant positive influence ($\beta = 0.256$, $p < 0.001$; bias-corrected 95% CI [0.117, 0.407]), supporting H5a. The corresponding mediated impact of technological infrastructure yielded statistical significance ($\beta = 0.277$, $p < 0.001$; bias-corrected 95% CI [0.144, 0.448]), supporting H5b. Bootstrap confidence intervals are the recommended basis for inference about indirect effects in PLS-SEM [32], and both intervals excluded zero. Because the model contains no direct paths from knowledge management or technological infrastructure to business performance, these effects equal the total effects of the two antecedents (KM = 0.256; TI = 0.277). The path coefficients, standard deviations, and significance levels for all hypotheses are reported in Table 5.

Table 5
The Hypothesis Results (N = 116)

Path	path coefficient (β)	Standard deviation (STDEV)	P values	Significance
H1: KM $\rightarrow$ DM	0.433	0.113	< 0.001	***
H2: TI $\rightarrow$ DM	0.468	0.112	< 0.001	***
H3: DM $\rightarrow$ OA	0.760	0.057	< 0.001	***
H4: OA $\rightarrow$ BP	0.779	0.071	< 0.001	***
H5a: KM $\rightarrow$ DM $\rightarrow$ OA $\rightarrow$ BP	0.256	0.073	< 0.001	***
H5b: TI $\rightarrow$ DM $\rightarrow$ OA $\rightarrow$ BP	0.277	0.079	< 0.001	***
Note. *** $p < 0.001$				

Discussion

This study examined how knowledge management and technological infrastructure translate into business performance in Saudi SMEs by testing digital maturity and organizational agility as two sequentially ordered capability mediators. All six hypotheses were supported, providing consistent evidence for a sequential resource-to-performance pathway.

To answer research question (1), both knowledge management ($\beta = 0.433$) and technological infrastructure ($\beta = 0.468$) significantly influence digital maturity, with technological infrastructure the

stronger antecedent. This aligns with the theoretical premise that digital technologies constitute the foundational layer upon which maturity develops [3, 31], while knowledge management supplies the knowledge-process capabilities needed to engage, organize, and apply these digital resources [27]. To answer research question (2), digital maturity strongly predicted organizational agility ($\beta = 0.760$). The magnitude of this path supports conceptualizing digital maturity as the base capability: firms that have digitized routines, integrated systems, and embedded digital skills are structurally prepared to sense market shifts and reconfigure operations with minimal resistance [5]. To answer research question (3), organizational agility significantly predicted business performance ($\beta = 0.779$), confirming that agile organizations are better positioned to safeguard revenue, margins, and long-term growth [35, 37].

To answer research question (4), the sequential indirect effects were significant for both knowledge management ($\beta = 0.256$; 95% CI [0.117, 0.407]) and technological infrastructure ($\beta = 0.277$; 95% CI [0.144, 0.448]), supporting H5a and H5b on the basis of bootstrap confidence intervals, the recommended inference criterion for indirect effects in PLS-SEM [32]. Because the model contains no direct paths from either antecedent to business performance, these chains carry the full total effects of the two resource inputs (KM = 0.256; TI = 0.277). This confirms the conversion problem motivating the study: knowledge and technological resources pay off only after being converted into maturity and then into agility, rather than directly [3, 31].

The findings refine the indirect-transmission logic in the digital-transformation literature. In Saudi SMEs, digital transformation failed to demonstrate a statistically significant direct impact in driving organizational performance, with the effect transmitted through smart technologies [3]; similarly, among Finnish SMEs, digital transformation improved performance only through fully mediating intermediate technologies [31]. The present research specifies the capability sequence through which these effects travel, extending single-mediator accounts that tested human capital [26] or organizational agility alone [35, 37] by showing that the two capabilities operate in concert rather than in isolation.

The results are also consistent with the knowledge management literature, in which KM infrastructural factors influence performance only through knowledge-process capabilities [27], and KM capabilities driving organizational performance via organizational agility [35]. Within the Saudi SME context, the study complements evidence on digital-transformation awareness in the Ha'il region [41], mobile-commerce adoption amidst the COVID-19 crisis [1], and SME digital orientation [14] by empirically demonstrating how Saudi SMEs convert knowledge and technological resources into performance outcomes, directly relevant to the digitalization objectives of Vision 2030.

Theoretical and Practical Implications

The conceptual foundation of this study rests on the integration of resource-based and dynamic-capabilities paradigms. Knowledge management and technological infrastructure represent valuable, rare, and hard-to-reproduce resource inputs whose performance potential is realized only after transformation into higher-order capabilities; digital maturity and organizational agility function as the

dynamic capabilities that allow organizations to reconfigure their underlying resource portfolio in turbulent conditions [5]. The significant sequential chain supports the argument that competitive advantage originates less from possessing resources than from the organizational capabilities that mobilize them, and the ordering of the effects indicates that digitization of routines and infrastructure is a prerequisite for adaptive capacity. By establishing this logic within Saudi SMEs, the present research expands upon the dynamic-capabilities argument to a context undergoing rapid digital transformation.

For SME managers, the findings indicate that investments in knowledge and technology must be deliberately directed toward raising overall digital maturity, automating core processes, integrating systems, and using data for decisions, before performance benefits materialize. Isolating technology adoption without maturity-building is unlikely to yield gains [3, 31]. For policymakers supporting Saudi Arabia's SME digitalization agenda, programs should therefore target capability development, such as maturity assessment, digital-skills building, and agility-enabling processes, rather than technology acquisition alone [1, 41].

Limitations and Future Research

Certain methodological constraints qualify the findings. First, static research design prevents establishing strict causality about the ordering of capabilities; longitudinal research is needed to trace how digital maturity and organizational agility develop over time. Second, reliance on subjective self-assessments drawn from a non-random convenience sample of 116 respondents restrict external validity, although procedural remedies, anonymity, clear item wording, and separation of predictor and criterion items, were implemented to minimize the risk of common method bias [10, 33]. Third, discriminant validity was substantially improved by removing three indicators (DM4, DM5, TI5) that cross-loaded with technological infrastructure, and the Fornell–Larcker criterion is now satisfied for nine of the ten construct pairs, including the previously problematic technology–maturity pair [15]. The remaining exception concerns technological infrastructure, whose correlation with organizational agility (0.885) still exceeds the square root of its AVE (0.868) [15], and HTMT values remained above the 0.90 reference level for TI–OA (0.958), TI–DM (0.933), TI–KM (0.927), and KM–DM (0.906) [21]. This empirical closeness is theoretically plausible, since digitally mature operations presume developed infrastructure and both constructs originate in IT-capability research; however, it signals that future research should refine the measures to sharpen the conceptual boundary between the two constructs [11].

Conclusion

This study examined how knowledge management and technological infrastructure translate into business performance in Saudi SMEs. By integrating the resource-based and dynamic-capabilities paradigms, the research formulated and empirically evaluated a model in which digital maturity and organizational agility operate as two sequentially ordered capability mediators linking knowledge and technological resource inputs to business performance.

The results show that knowledge management ($\beta = 0.433$) and technological infrastructure ($\beta = 0.468$) significantly enhance digital maturity, which in turn strongly predicts organizational agility ($\beta = 0.760$). Organizational agility was found to significantly drive business performance ($\beta = 0.779$). In addition, the sequential indirect effects through digital maturity and organizational agility were significant for both knowledge management ($\beta = 0.256$) and technological infrastructure ($\beta = 0.277$), with bootstrap confidence intervals excluding zero. These outcomes underscore the necessity of sequential capability building in digital transformation: knowledge and technological resources generate performance benefits only after being converted into digitally mature operations and, subsequently, into organizational agility, empowering enterprises to detect and capitalize on market fluctuations.

Overall, this study advances digital-transformation research by emphasizing the pivotal role of sequential capability development in linking knowledge and technological resources with business performance. The conclusions offer valuable insights for SME directors and legislators pursuing to design effective capability-building programs — maturity assessment, digital-skills development, and agility-enabling processes — that convert resource investments into sustained performance, thereby supporting the digitalization objectives of Saudi Arabia's Vision 2030.

Declarations

Author Contribution

SA, The author designed the research study, performed the research, analyzed the data, wrote the manuscript, contributed to editorial changes in the manuscript, read and approved the final manuscript.

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Figures

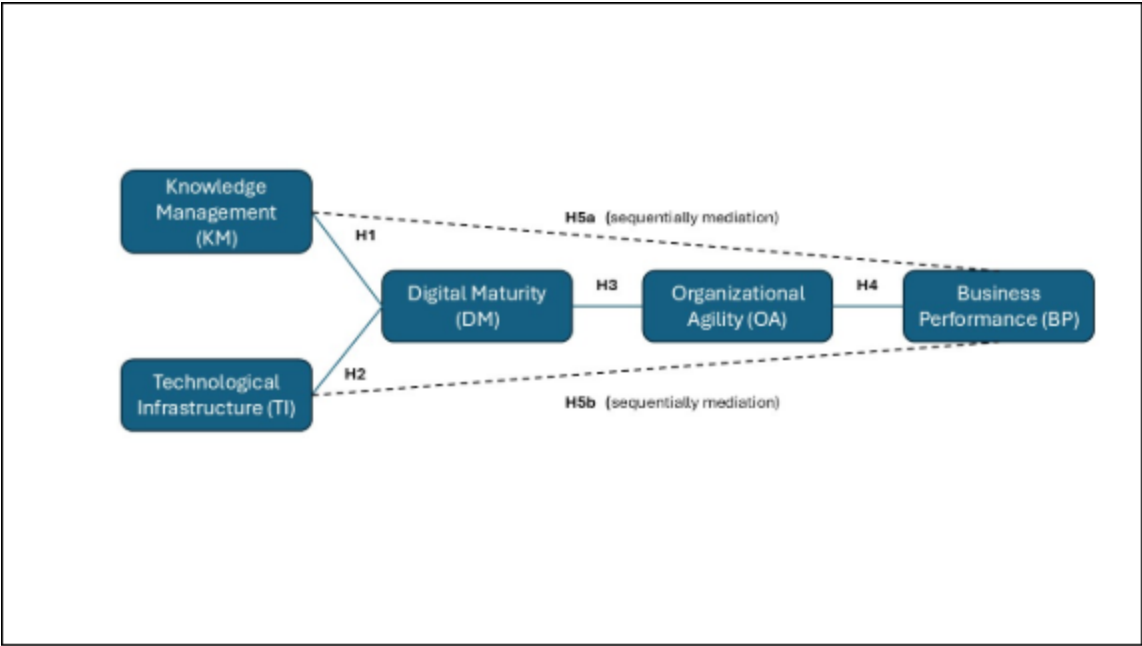


Figure 1

Research Model