Explaining Lean Management Adoption in Iraqi SMEs: A Conceptual Framework Integrating Information Systems Capability, Organizational Learning, and Top Management Support

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ABSTRACT

Iraqi small and medium-sized enterprises (SMEs) face pressure to improve operational discipline while working with uneven digital resources, financing constraints, and limited organizational capabilities. This conceptual article develops a framework explaining how Information Systems Capability (ISC) may contribute to Lean Management Adoption (LMA), both directly and through Organizational Learning (OL), and how Top Management Support (TMS) may strengthen the conversion of learning into lean practice. Drawing on the Resource-Based View and Dynamic Capabilities Theory, the article uses a structured narrative review to synthesize lean-digital research, IT-learning studies, measurement literature, and peer-reviewed evidence from Iraqi SMEs. The synthesis distinguishes the proposed mechanism from existing studies of technology-practice complementarity, organizational learning and firm performance, and lean readiness. It produces six propositions covering the ISC-OL, OL-LMA, and ISC-LMA relationships, the mediating role of OL, the moderating role of TMS on the OL-LMA relationship, and the resulting conditional indirect effect. The framework suggests that management support may help explain differences in lean adoption among SMEs with comparable information and learning capabilities. Candidate measurement foundations are discussed alongside procedures for contextual adaptation, expert review, translation, pilot testing, and assessment of reliability and validity before empirical testing in Iraq. The article contributes a specified learning mechanism and management support condition to research on lean adoption in resource-constrained SME settings. Its practical implications emphasize the coordination of information capability, shared learning, and managerial support for sustained improvement routines. The propositions remain open to empirical evaluation, and future studies should examine their validity across sectors, regions, firm sizes, and levels of digital maturity.

Keywords: Information Systems Capability, Lean Management Adoption, Organizational Learning, Top Management Support, Iraqi SMEs.

INTRODUCTION

Small and medium-sized enterprises (SMEs) are important to employment, innovation, private-sector development, and economic diversification. Their role is particularly important in economies seeking to broaden activity beyond dominant sectors. In Iraq, SME development is closely connected with the wider objective of strengthening the private sector and expanding non-oil economic opportunities (Mohammadali & Abdulkhaliq, 2019; UNDP, 2023, 2024). However, Iraqi SMEs operate in an environment characterized by financing constraints, uneven infrastructure, regulatory frictions, informality, and capability gaps. UNDP's MSME evidence base covers multiple Iraqi governorates and identifies persistent challenges that require stronger enterprise capabilities and access to finance and digital channels; related UNDP evidence also reports a high level of private-sector informality (UNDP, 2021, 2023, 2024). Recent analysis of Iraq's

digital economy likewise points to outdated regulation and underdeveloped infrastructure as barriers to digital transformation (KAPITA, 2024).

Lean Management is a potentially valuable response because it emphasizes customer value, waste reduction, continuous improvement, process discipline, and employee involvement. Yet lean implementation in SMEs is not simply the adoption of operational tools. Research identifies leadership, organizational culture, skills, finance, and management commitment as important success conditions (Achanga et al., 2006; Sahoo & Yadav, 2018; Alkhoraif, 2024). At the same time, digital technologies increasingly support process visibility, coordination, and data-driven decision making, and research on Industry 4.0 and lean indicates that digital and lean practices can be complementary rather than competing approaches (Riezebos et al., 2009; Buer et al., 2018; Tortorella & Fettermann, 2018).

This paper focuses on Information Systems Capability (ISC) as the firm's ability to combine digital infrastructure, information resources, managerial expertise, and organizational processes in support of business objectives. ISC may enable lean adoption by improving information quality, process visibility, coordination, and knowledge sharing. However, technological capability alone is unlikely to generate sustained lean routines. Organizational Learning (OL) is therefore introduced as the mechanism through which information is interpreted, shared, retained, and converted into improved routines, while Top Management Support (TMS) is positioned as a managerial boundary condition that determines whether learned knowledge receives the resources, priority, and legitimacy needed for implementation.

The framework's contribution becomes clearer when set against three adjacent lines of work. Lean-digital studies have mainly examined how digital technologies align with lean practices or relate to operational outcomes (Buer et al., 2018; Tortorella & Fettermann, 2018). Iraqi and KRI studies have assessed lean readiness, implementation, or adoption levels (Mohammad & Oduoza, 2020; Al-Baldawi et al., 2023, 2024), while IT-learning research has connected IT competency and organizational learning to firm performance (Tippins & Sohi, 2003). Iraqi SME research has also considered accounting information systems, knowledge-management capabilities, and performance (Kareem et al., 2021). The present model brings these strands together around a different outcome and process: ISC is proposed as an antecedent of LMA, OL explains how information-related capability may be converted into lean routines, and TMS may alter that conversion at the OL-to-LMA stage. The resulting conditional indirect effect is a proposition for testing in Iraq, rather than an established local finding.

LITERATURE REVIEW

Information Systems Capability

Here, Information Systems Capability (ISC) means the firm's coordinated ability to use digital infrastructure, information resources, specialist knowledge, managerial expertise, and organizational routines in support of business objectives (Bharadwaj, 2000). The emphasis is on how a firm combines and applies these resources, not simply on whether it owns particular technologies. Research on SMEs similarly indicates that IT contributes most when it fits business processes and is supported by complementary organizational capabilities (Cragg et al., 2010; Chae et al., 2014).

Two bodies of research motivate a possible connection between ISC and lean practice. Earlier work considered whether information technology and lean production can be combined in manufacturing systems (Riezebos et al., 2009); later studies examined how Industry 4.0 applications can align with lean production (Buer et al., 2018; Tortorella & Fettermann, 2018). Separate IT-competency research identifies organizational learning as a pathway to firm outcomes (Tippins & Sohi, 2003), while SME studies link digitalization with knowledge integration and capability development (Queiroz et al., 2022; Asadullah & Faik, 2026). Taken together, these findings make an ISC-to-learning-to-lean pathway plausible, but they do not establish that pathway for Iraqi SMEs.

Despite this evidence, the mechanism through which ISC becomes embedded in lean routines remains

under-specified, especially in developing-economy SMEs. This paper therefore treats ISC as a strategic resource that can influence Lean Management Adoption both directly and indirectly through Organizational Learning.

Lean Management Adoption

This paper treats Lean Management Adoption (LMA) as the extent to which an SME incorporates lean principles into its operating routines. Relevant practices include attention to customer value, waste reduction, process stability, continuous improvement, problem solving, and employee involvement. In keeping with Shah and Ward (2007), lean is considered a configuration of related practices rather than the use of one tool in isolation.

For SMEs, adopting lean practices can support productivity, quality, shorter lead times, responsiveness, and more consistent operations. Progress may nevertheless be limited by shortages of resources and skills or by competing management priorities. SME research therefore emphasizes leadership and management commitment, and cautions against reducing lean to a checklist of tools (Achanga et al., 2006; Sahoo & Yadav, 2018; Alkhoraif, 2024). Implementation conditions can also shift over time: Knol et al. (2018) found that learning and improvement training matter in earlier stages, while management support becomes more important as implementation advances. Digital systems may assist with visibility and coordination (Queiroz et al., 2022), but this paper expects adoption to depend on how technological capability is used within learning routines.

Organizational Learning

Organizational Learning (OL) is treated as a set of processes through which knowledge enters a firm, circulates among its members, gains shared meaning, and is retained for later use. Huber (1991) distinguishes knowledge acquisition, information distribution and interpretation, and organizational memory as key parts of this process. In the present framework, learning also has a dynamic-capability role: it can help a firm revise routines as operating conditions and experience change.

These processes fit the demands of lean improvement. Employees need ways to surface process problems, exchange practical knowledge, test changes, and preserve improvements that prove useful. Jerez-Gómez et al. (2005) represent organizational learning capability through management commitment, a systems perspective, openness to experimentation, and knowledge transfer and integration. In Iraqi SMEs, Kareem et al. (2021) report that knowledge-management capabilities mediate between accounting information systems and organizational performance. That finding is relevant to the proposed mechanism, although knowledge management and the broader OL construct used here are not identical. Information systems may support learning by making information easier to access and share (Cragg et al., 2010; Asadullah & Faik, 2026).

Accordingly, OL occupies a specific place in the model: it explains how information and connectivity associated with ISC may be interpreted collectively and carried into changed operating routines. It is therefore proposed as a mediator, rather than included as a second, unrelated predictor of lean adoption.

Top Management Support

In this study, Top Management Support (TMS) refers to senior managers' demonstrated commitment to implementation, reflected in the priorities they communicate, the resources they assign, their participation in key decisions, and their response to obstacles. Such actions are especially consequential in SMEs, where owners and senior managers often make direct decisions about investment, training, and operational priorities. Management commitment is repeatedly identified as a condition for lean implementation in smaller firms (Achanga et al., 2006; Sahoo & Yadav, 2018).

The model assigns TMS a moderating role on the OL-to-LMA path. ISC may provide information and connectivity, and OL may help employees develop and share useful knowledge; whether that knowledge is acted on depends in part on managerial authorization, resources, and follow-through. The model focuses on

this second-stage conversion because ISC is treated as an existing organizational capability, even though managers also influence technology investment. Thus, stronger TMS is expected to make it more likely that learning leads to training, process changes, and continuing improvement. This placement is consistent with evidence that the importance of management support can grow as lean implementation proceeds (Knol et al., 2018), and with work on support for information systems and organizational change (Young & Jordan, 2008).

Theoretical Foundation and Research Gap

The model combines the Resource-Based View (RBV) with Dynamic Capabilities Theory (DCT). RBV directs attention to the firm-specific resources and capabilities that can underpin advantage (Barney, 1991); in this study, ISC is the relevant resource bundle because it combines technology with information, expertise, and routines (Bharadwaj, 2000). DCT adds a process view, emphasizing how firms integrate and renew capabilities as conditions change (Teece et al., 1997). OL fits this process logic because it can turn information and accumulated experience into revised routines. Together, the theories explain why the model includes both an organizational resource and a mechanism for converting that resource into practice.

The gap is not simply that few studies mention technology, learning, lean, and leadership together. Rather, the existing streams answer different questions. Lean-digital research examines the fit between technologies and lean practices (Buer et al., 2018; Tortorella & Fettermann, 2018); IT-learning studies connect learning with firm performance (Tippins & Sohi, 2003); Iraqi SME work links accounting information systems and knowledge-management capability to performance (Kareem et al., 2021); and Iraqi/KRI lean studies assess adoption or implementation conditions (Mohammad & Oduoza, 2020; Al-Baldawi et al., 2023, 2024). None of these cited models tests the proposed sequence in which ISC relates to LMA through OL, with TMS moderating the OL-to-LMA link. This paper specifies that sequence as a focused, testable extension.

The Iraqi setting gives this question practical relevance, while the available evidence must be interpreted carefully. Peer-reviewed studies of Iraqi SMEs identify issues involving information-system resources, knowledge-management capabilities, and managerial commitment (Kareem et al., 2021, 2026). These findings help motivate the constructs but do not demonstrate the proposed causal paths. Reports on MSMEs, informality, finance, digital access, regulation, and infrastructure provide additional background on the business environment (UNDP, 2021, 2023, 2024; KAPITA, 2024); they serve as contextual evidence, not substitutes for peer-reviewed tests of the model.

Peer-Reviewed Evidence From Iraqi SMEs

Recent Iraqi studies provide direct but sectorally bounded evidence relevant to the proposed model. Al-Baldawi et al. (2023) assessed lean adoption in five Iraqi water and juice SMEs across management, employee, process, supplier, and customer dimensions and reported mid-level adoption. A later Iraqi assessment study proposed an integrated model for evaluating lean-philosophy adoption under uncertainty (Al-Baldawi et al., 2024). Mohammad and Oduoza (2020) developed a lean-excellence framework from cases in three manufacturing SMEs in the Kurdistan Region of Iraq. On the information-systems side, Kareem et al. (2021) examined AIS and knowledge-management capabilities among Iraqi SMEs, while Kareem et al. (2026) studied factors associated with AIS utilization, including IT readiness and owner/manager commitment. Together, these studies establish local relevance for lean, information capability, learning-related processes, and managerial support. Their constructs and outcomes are not identical to those proposed here, and their designs do not test the integrated ISC–OL–TMS–LMA framework; the present paper therefore uses them as contextual grounding rather than as direct validation.

PROPOSED CONCEPTUAL FRAMEWORK AND PROPOSITIONS

The proposed framework positions ISC as the upstream strategic capability, OL as the mediating learning mechanism, LMA as the focal outcome, and TMS as a moderator of the OL-to-LMA relationship. Because the paper is conceptual, the relationships are stated as propositions rather than empirically confirmed hypotheses.

Information Systems Capability and Organizational Learning

The proposed ISC-to-OL relationship rests on the idea that usable, connected information can help employees acquire knowledge, compare interpretations, and share what they learn. These activities correspond to established accounts of organizational learning (Huber, 1991; Cragg et al., 2010). Tippins and Sohi (2003), studying managers in 271 manufacturing firms, found a mediating role for organizational learning between IT competency and firm performance. Iraqi SME work connects accounting information systems with knowledge-management capability (Kareem et al., 2021), while a later study identifies IT readiness and owner/manager commitment among factors associated with AIS use (Kareem et al., 2026). This evidence supports the relevance of an IS-learning link, but does not directly test ISC as defined here or lean adoption as its outcome. Research on digital platform resources and SMEs also points to learning and knowledge integration as capability-building processes (Asadullah & Faik, 2026).

Proposition 1 (P1): Information Systems Capability positively influences Organizational Learning in SMEs.

Organizational Learning and Lean Management Adoption

Lean improvement depends on more than finding a problem: firms must communicate what was learned, try a response, and embed useful changes in day-to-day work. OL provides processes for that transition, making a positive association with LMA theoretically plausible (Jerez-Gómez et al., 2005; Sahoo, 2022). The Iraqi lean studies show that adoption is a real but uneven practice among local SMEs and assess it across several organizational and supply-chain dimensions (Al-Baldawi et al., 2023, 2024). They offer contextual grounding for the outcome, but do not themselves test OL as its antecedent.

Proposition 2 (P2): Organizational Learning positively influences Lean Management Adoption in SMEs.

Information Systems Capability and Lean Management Adoption

ISC may also relate to LMA without passing through OL. Better information access and process connectivity can help managers see variation, coordinate work, and identify sources of waste. Research on IT and lean, including Industry 4.0 applications, describes conditions under which digital and lean practices can complement one another (Riezebos et al., 2009; Buer et al., 2018; Tortorella & Fettermann, 2018). Iraqi/KRI lean assessments identify relevant adoption dimensions but leave open whether differences in firms' information-systems capability help explain variation in those practices (Mohammad & Oduoza, 2020; Al-Baldawi et al., 2023, 2024).

Proposition 3 (P3): Information Systems Capability positively influences Lean Management Adoption in SMEs.

Mediating role of Organizational Learning

Information made available by an IS capability does not, by itself, establish that employees have interpreted it consistently or changed how work is performed. The proposed indirect path therefore depends on a learning process that gives information shared meaning and connects it to problem solving and improvement. OL is expected to carry part of ISC's influence to LMA, but the paper leaves the size and form of that indirect effect to empirical testing rather than assuming full or partial mediation in advance.

Proposition 4 (P4): Organizational Learning mediates the relationship between Information Systems Capability and Lean Management Adoption.

Moderating role of Top Management Support

For learning to result in lean practice, managers may need to make time for improvement, provide training and other resources, coordinate functions, and address barriers. These decisions matter in SMEs because a

small number of senior decision-makers often shape both priorities and implementation conditions. The model consequently predicts that the OL-LMA association will be stronger where TMS is high (Achanga et al., 2006; Young & Jordan, 2008).

Proposition 5 (P5): Top Management Support positively moderates the relationship between Organizational Learning and Lean Management Adoption, such that the relationship is stronger when Top Management Support is high.

Conditional indirect effect (moderated mediation)

The framework combines two proposed links: OL is expected to transmit part of ISC's relationship with LMA, and TMS is expected to strengthen the final OL-to-LMA step. If both propositions receive empirical support, the indirect ISC-to-LMA association through OL should differ across levels of TMS. This conditional indirect effect makes explicit how management support could help explain different lean outcomes among SMEs with comparable information and learning capabilities.

Proposition 6 (P6): The indirect effect of Information Systems Capability on Lean Management Adoption through Organizational Learning is stronger when Top Management Support is high.

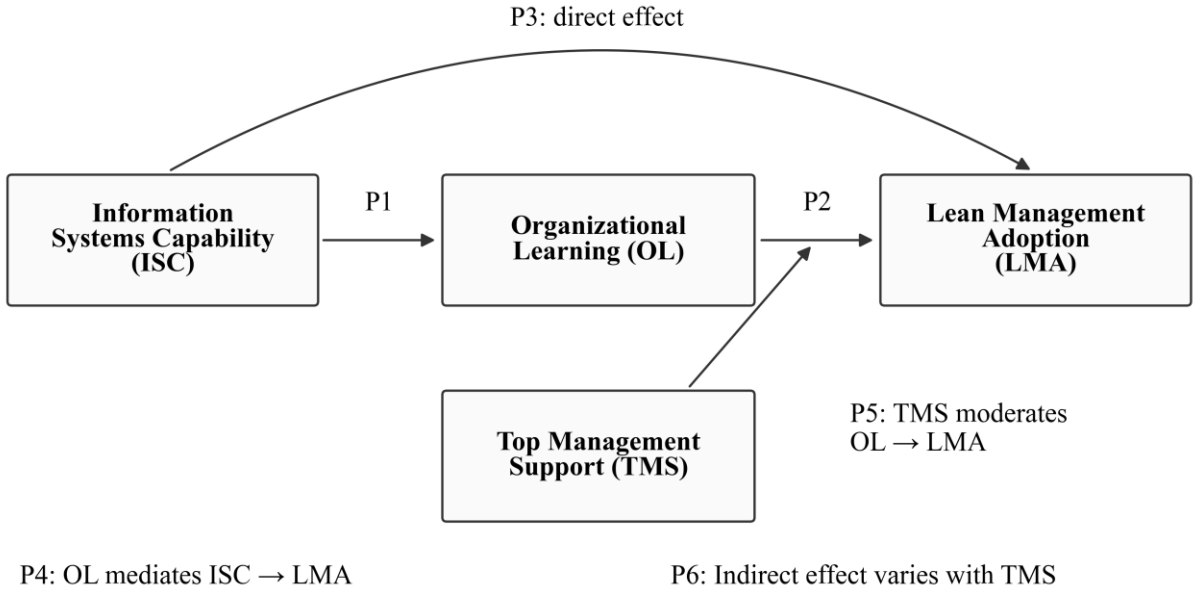


Figure 1. Proposed Conceptual Framework

Table 1. Summary of Proposed Relationships

Code	Relationship	Predictor	Outcome / Path	Type
P1	ISC → OL	Information Systems Capability	Organizational Learning	Direct
P2	OL → LMA	Organizational Learning	Lean Management Adoption	Direct
P3	ISC → LMA	Information Systems Capability	Lean Management Adoption	Direct
P4	ISC → OL → LMA	Information Systems Capability	OL as mediator	Mediation
P5	TMS × OL → LMA	Top Management Support	OL → LMA path	Moderation
P6	ISC → OL → LMA conditional on TMS	Information Systems Capability	Indirect effect via OL	Moderated mediation

METHODOLOGY: STRUCTURED NARRATIVE REVIEW

This conceptual paper uses a structured narrative review and critical synthesis rather than a systematic review or meta-analysis. The primary search window emphasized publications from January 2018 to September 2026 so that the framework reflected recent work on digitalization, lean management, organizational learning, and SMEs. Seminal publications published before 2018 were retained when necessary to establish theoretical foundations, define constructs, or identify validated measurement approaches. Peer-reviewed Iraq-specific studies were added where they directly informed lean adoption, information-systems capability, knowledge management, or the SME context.

Searches were conducted using combinations of the following keywords: "Information Systems Capability", "IT capability", "lean management", "lean adoption", "lean implementation", "Industry 4.0 and lean", "organizational learning", "organizational learning capability", "top management support", "SMEs", "Iraq SMEs", "digital transformation Iraq", and "informality Iraq". The review drew on peer-reviewed literature indexed through major scholarly databases and publisher platforms, with Scopus and Web of Science used as the principal bibliographic sources, complemented by authoritative institutional evidence for the Iraqi context.

Studies were included when they (a) directly informed at least one proposed construct or relationship; (b) addressed lean implementation, digital/IT capability, organizational learning, top management support, SMEs, or the Iraqi business environment; and (c) provided theoretical, empirical, measurement, or contextual evidence relevant to the framework. Studies were excluded when only tangentially related, insufficiently relevant, or duplicative of stronger evidence. The final conceptual synthesis comprised 31 cited sources, including peer-reviewed studies and institutional reports. Sources were coded around five themes: ISC, OL, LMA, TMS, and Iraqi SME context, and integrated using RBV and DCT to derive the six propositions.

PROPOSED FRAMEWORK AND EXPECTED THEORETICAL CONTRIBUTION

The framework is offered as an explanation to be tested, not as a report of observed effects. It proposes that ISC may relate to LMA through two routes: a direct path and an indirect path through OL. TMS is expected to condition the latter path by influencing how readily learning is translated into lean practice. Together, these relationships define a conditional-process model for examining why similar digital capabilities may be associated with different levels of lean adoption across SMEs.

The contribution lies in the model's specified relationships. It uses RBV to frame ISC as a firm resource and DCT to explain why learning may convert that resource into updated operating routines. It then places LMA downstream of this process, which differs from lean-digital models centered on technology-practice complementarity and from IT/OL models centered on firm performance. In addition, Iraqi and KRI lean studies have assessed adoption dimensions and implementation pathways; the present framework adds a testable OL mediation path and locates TMS on the OL-to-LMA link. The resulting conditional indirect effect connects these pieces in one model. These distinctions define the proposed theoretical contribution; their value depends on subsequent empirical evaluation.

Suggested measurement for future empirical testing

Measurement choices should preserve each construct's meaning rather than transfer items mechanically across settings. For ISC, Bharadwaj (2000) provides a resource-based view of IT capability, while Tippins and Sohi (2003) operationalize IT competency through organizational IT resources and knowledge; only indicators that match the paper's definition of integrated technology, expertise, and routines should be retained.

For OL, Jerez-Gómez et al. (2005) offer a four-dimension, 16-item organizational-learning-capability scale developed and validated in Spanish chemical firms; its dimensions provide a theory-aligned starting point, but wording and factor structure need testing with Iraqi SMEs. For LMA, Shah and Ward (2007) provide a

multidimensional lean-practice measurement foundation, while Iraqi studies by Al-Baldawi et al. (2023, 2024) and Mohammad and Oduoza (2020) help identify locally relevant practices and implementation language. TMS should be measured specifically as visible support for lean implementation and for acting on organizational learning; lean success-factor evidence (Achanga et al., 2006; Knol et al., 2018) can guide item content, but should not be presented as a validated scale for this exact construct and context.

Any adaptation should be reviewed by Iraqi SME and measurement experts, translated and back-translated if Arabic questionnaires are used, cognitively checked, and pilot-tested. Researchers should then assess dimensionality, reliability, convergent and discriminant validity, and whether the selected measures are reflective or formative before testing structural paths.

The source measures were developed in different industries, countries, and research settings. The table distinguishes validated measurement foundations from contextual evidence: a local study that assesses lean adoption is not automatically a validated survey scale, and items developed for IT competency, general organizational learning, or project support should only be retained where their wording maps to the defined construct. This distinction reduces construct overlap and helps ensure that ISC, OL, LMA, and TMS remain empirically separable.

For an Iraqi SME survey, the research team should document every retained, revised, or newly written item and its source; obtain expert review for content coverage; conduct cognitive interviews with owners or managers; and pilot the Arabic or English instrument before the main survey. Back-translation is appropriate if the questionnaire is translated between English and Arabic. The final measurement model should be tested for reliability, convergent and discriminant validity, and construct dimensionality before any structural or mediation/moderation conclusions are drawn.

Table 2. Construct Measurement Sources and Contextual Adaptation

Construct	Measurement basis and context	Adaptation for Iraqi SMEs	Use and validation
Information Systems Capability (ISC)	Bharadwaj (2000), resource-based IT capability; Tippins and Sohi (2003), IT competency in manufacturing firms.	Select items for IT infrastructure, managerial/technical expertise, information integration, and alignment with business processes; do not equate system use alone with capability.	Adapt only construct-aligned items; expert review and pilot testing; assess dimensionality and distinguish ISC from AIS use.
Organizational Learning (OL)	Jerez-Gómez et al. (2005), four dimensions and 16 items, developed and validated in Spanish chemical firms.	Retain the theory-aligned dimensions of management commitment, systems perspective, openness/experimentation, and knowledge transfer/integration; revise wording only where local comprehension requires.	Test the factor structure in Iraqi SMEs; assess reliability, convergent validity, and discriminant validity from ISC and TMS.
Lean Management Adoption (LMA)	Shah and Ward (2007), multidimensional lean-practice measure; Al-Baldawi et al. (2023, 2024) and Mohammad and Oduoza (2020) provide Iraqi/KRI contextual evidence.	Select lean practices relevant to the sampled sector and firm size; use local evidence to check content coverage, not as proof that a local validated scale exists.	State whether the construct is reflective or formative; verify item coverage and measurement properties before structural analysis.

Top Management Support (TMS)	Young and Jordan (2008) on management support; Achanga et al. (2006) and Knol et al. (2018) on support and lean implementation conditions.	Define support as visible prioritization, resource allocation, communication, training, and removal of barriers for acting on learned knowledge through lean implementation.	Adapt or develop lean-specific items; expert content review, cognitive interviews, pilot testing, and construct-validity assessment are required.

DISCUSSION AND PRACTICAL IMPLICATIONS

For practice, the framework suggests that Iraqi SMEs should consider how information capability, employee learning, and lean implementation fit together. Digital systems can make operational information more available, but managers and employees still need routines for interpreting it and acting on it. Management support may then help turn improvement knowledge into agreed priorities, training, and process changes. Local lean assessments report variation across adoption dimensions, while Iraqi information-systems research highlights IT readiness and owner/manager commitment (Al-Baldawi et al., 2023, 2024; Kareem et al., 2021, 2026). Together, these studies point to questions that managers can examine locally, although they do not prove the full sequence proposed here. The location of TMS in the framework is also intended to guide empirical diagnosis. Senior managers can influence technology investment as well as operating priorities, but the model isolates their possible role at the point where organizational learning is translated into lean practice. Researchers can therefore test whether two SMEs with similar ISC and OL levels differ in LMA when the degree of managerial support differs.

LIMITATIONS AND FUTURE RESEARCH

Several limits define what can be concluded. As a conceptual study, this paper does not estimate causal effects or establish whether any proposition is supported. The narrative review documents its search and selection logic but remains selective; it should not be read as an exhaustive systematic review or meta-analysis. Iraqi SMEs also vary by sector, region, ownership, and digital maturity, so a relationship observed in one group may not hold uniformly across the population.

Future studies can test the propositions with SME owners and managers using measures whose fit has first been assessed in the Iraqi context. A PLS-SEM analysis could estimate direct paths, the ISC-to-OL-to-LMA indirect effect, the OL-by-TMS interaction, and the conditional indirect effect, with bootstrap confidence intervals for indirect paths (Hair et al., 2022). Researchers should report measurement quality before interpreting structural relationships. Comparisons across sectors, firm sizes, regions, and levels of digital maturity could identify contextual variation, while longitudinal data would help distinguish a developing capability sequence from relationships measured at one point in time.

CONCLUSION

This conceptual paper proposes that Information Systems Capability may support Lean Management Adoption in Iraqi SMEs directly and through Organizational Learning. It further positions Top Management Support as a condition that could strengthen the conversion of learning into lean routines. Linking RBV's resource perspective with DCT's emphasis on capability renewal, the model specifies six relationships for empirical testing, including an indirect effect that varies with management support. Its contribution is to make the proposed mechanism and boundary condition explicit in the Iraqi SME context. Evidence from future studies will be needed to determine whether these relationships hold and how strongly they operate.

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