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FROM IT SOPHISTICATION TO ORGANIZATIONAL ADAPTATION: A SYSTEMATIC LITERATURE REVIEW THROUGH THE DYNAMIC CAPABILITY LENS

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Abstract

This systematic literature review examines how Information Technology (IT) Sophistication has been conceptualized, measured, and connected with organizational adaptation through Dynamic Capability Theory (DCT). The review synthesizes foundational studies on IT Sophistication and IT capability with research on sensing, seizing, transforming, analytics capability, and digital transformation. The evidence indicates a conceptual movement from IT Sophistication as a multidimensional measurement construct toward broader capability-based explanations of how organizations deploy and renew technology-related resources. However, the reviewed literature does not yet provide a systematic reconstruction of the original IT Sophistication construct within the sensing-seizing-transforming architecture. The current mapping audit contains 111 entries, 98 records with titles, five duplicate titles, and 93 unique titled records. These are preliminary audit counts rather than final PRISMA 2020 results because formal screening and full-text eligibility logs remain pending. The review therefore identifies a clear conceptual gap and proposes an evidence-based pathway in which IT Sophistication can function as a resource and capability foundation whose adaptive value depends on organizational routines, learning, and reconfiguration.

Keywords: dynamic capability theory; IT capability; IT sophistication; organizational adaptation; systematic literature review

INTRODUCTION

Information technology has developed from an operational resource into an increasingly strategic component of organizational capability. Early research conceptualized IT Sophistication as a multidimensional construct describing the technological, informational, functional, and managerial characteristics of IT use and management. Later research increasingly shifted toward IT capability, IT-enabled intangible resources, analytics capability, and digital transformation. This conceptual movement is important because sophistication describes the extent or maturity of an organization's IT arrangements, whereas capability emphasizes the organization's ability to mobilize and deploy resources in pursuit of organizational objectives.

Raymond and Paré (1992) provide the foundational measurement perspective by operationalizing IT Sophistication across four dimensions: technological, informational, functional, and managerial. Mata, Fuerst, and Barney (1995) subsequently examine IT resources and skills from a resource-based perspective and distinguish resources that may support sustained advantage from technology assets that are more readily acquired by competitors. Bharadwaj (2000) further develops the capability perspective by examining IT capability in relation to firm performance and IT-enabled intangible resources. These studies establish the basis for understanding IT not merely as hardware or software, but as a combination of resources, skills, and organizational arrangements.

Resource-Based View (RBV), however, does not by itself fully explain how technology-related resources are renewed when environments change. Dynamic Capability Theory (DCT) addresses this issue by emphasizing processes through which organizations sense changes, seize opportunities, and transform or reconfigure resources. Teece, Pisano, and Shuen (1997) provide the foundational dynamic-capability argument, while Teece (2007) specifies sensing, seizing, and transforming as central dimensions of adaptive organizational processes. Subsequent research connects technology-enabled capabilities with dynamic processes and organizational outcomes. Agarwal

and Selen (2009) link collaboration and learning with higher-order capabilities and service innovation. Wamba et al. (2017) examine Big Data Analytics Capability and firm performance and show the relevance of dynamic or process capabilities in explaining the relationship. Vial (2019) identifies dynamic capabilities as an important theoretical avenue for digital transformation research. More recent studies extend this logic to digital leadership, digital culture, ESG performance, innovativeness, and resilience (Su et al., 2023; Held et al., 2025; Foroudi et al., 2025).

The problem addressed by this review is therefore not a complete absence of evidence connecting IT and dynamic capabilities. Rather, the evidence is fragmented across related but non-identical constructs. The original IT Sophistication concept has progressively been reframed as IT capability, IS competence, analytics capability, digital capability, and IT-enabled dynamic capability. The unresolved question is whether and how IT Sophistication itself can be systematically integrated with the sensing-seizing-transforming architecture of DCT.

Accordingly, the review addresses four research questions:

RQ1. How has IT Sophistication been conceptualized and operationalized in prior research?
RQ2. What dimensions, antecedents, and consequences of IT Sophistication have been identified?
RQ3. How has the literature connected IT Sophistication/IT capability with Dynamic Capability Theory?
RQ4. How can DCT explain the evolution of IT Sophistication into adaptive capability?

LITERATURE REVIEW

IT Sophistication and IT Capability

IT Sophistication is best understood as a multidimensional construct rather than a single indicator of technology adoption. Raymond and Paré (1992) identify technological, informational, functional, and managerial dimensions, thereby emphasizing that technology sophistication includes both technical arrangements and the organizational use and management of information technology. This multidimensionality is important for an SLR because later studies often use the term IT capability without preserving the same measurement boundaries.

Mata et al. (1995) and Bharadwaj (2000) shift the emphasis toward capability and strategic value. From this perspective, the critical issue is not whether an organization owns sophisticated technologies, but whether it possesses resources and skills that can be combined and deployed in ways that support organizational objectives. Thus, IT Sophistication and IT capability are related but should not be treated as interchangeable constructs.

Dynamic Capability Theory

Teece et al. (1997) define dynamic capabilities in relation to the integration, building, and reconfiguration of internal and external competencies in changing environments. Teece (2007) further explains the microfoundations of dynamic capabilities through sensing, seizing, and transforming. This framework provides an explanation for organizational adaptation that complements RBV: RBV emphasizes the potential strategic value of resources, whereas DCT emphasizes how organizations renew and redeploy resources under environmental change.

Zahra and George (2002) provide a related capability mechanism through absorptive capacity, distinguishing potential and realized capacity and highlighting the organizational processes through which knowledge is acquired, assimilated, transformed, and exploited. Kump et al. (2019) contribute to DCT research by explicitly operationalizing sensing, seizing, and transforming capacities. These studies provide a theoretical and measurement basis for examining whether IT Sophistication can be linked to adaptive organizational processes.

Technology, Digital Transformation, and Organizational Adaptation

The technology-DCT relationship has expanded into analytics and digital-transformation research. Agarwal and Selen (2009) demonstrate how collaboration and learning can contribute to higher-order capability building and service innovation. Wamba et al. (2017) place Big Data Analytics Capability in a technology-to-capability-to-performance pathway, while Vial (2019) positions dynamic capabilities as a promising theoretical lens for understanding digital transformation. Recent studies provide adjacent evidence rather than direct measures of the original IT Sophistication construct. Su et al. (2023) examine dynamic capabilities as a mediator between digital transformation and ESG performance. Held et al. (2025) connect dynamic capabilities with digital leadership and digital culture in SMEs, while Foroudi et al. (2025) examine digital business capabilities, innovativeness, resilience, and ESG performance. These studies indicate the growing relevance of capability-based explanations of digital adaptation while also reinforcing the need to distinguish constructs carefully.

METHOD

This study adopts a Systematic Literature Review (SLR) approach and uses Dynamic Capability Theory as the principal theoretical lens. The review examines how IT Sophistication and related IT capability constructs are conceptualized, operationalized, theoretically positioned, and connected to organizational outcomes. Digital-transformation and ESG studies are included as contextual evidence when they help explain the evolution of technology-enabled capability, but they are not treated as direct replacements for the original IT Sophistication construct.

The working evidence base was derived from an existing mapping file and a set of core studies whose bibliographic records and key claims were verified against publisher or institutional information. Evidence was organized around four analytical dimensions: conceptual evolution, theoretical evolution, mechanisms linking technology and capability, and measurement. The synthesis compares each study's focal construct, relationship, DCT mechanism, evidence type, and role in the review.

At the current stage, the corpus audit records 111 mapping entries. Ninety-eight entries contain titles, five duplicate titles were identified after title normalization, and 93 unique titled records remain in the current candidate pool. These counts describe the existing mapping audit only and are not final PRISMA 2020 results. Database-specific search strings and dates, record-level screening decisions, full-text eligibility assessments, and exclusion reasons remain to be formally documented.

Audit item	n	Status
Mapping entries	111	Existing mapping entries
Entries with titles	98	Available for title-level screening
Duplicate titles	5	After title normalization
Unique titled records	93	Current candidate pool
Formal PRISMA screening	Pending	Requires actual search/screening log

Table 1. Preliminary corpus audit

Because formal screening is still pending, the present manuscript should be interpreted as a structured preliminary synthesis rather than a completed PRISMA 2020 review. The final SLR should add database-specific search protocols, title/abstract screening records, full-text eligibility decisions, and reasons for exclusion before definitive inclusion counts are reported.

RESULTS AND DISCUSSION

1. Conceptual Evolution of IT Sophistication

The first finding is a conceptual shift from measuring the sophistication of IT arrangements toward examining the organizational capability to deploy and combine IT resources. Raymond and Paré (1992) establish IT Sophistication as a multidimensional measurement construct. Mata et al. (1995) and Bharadwaj (2000) then emphasize resources, skills, infrastructure, and IT-enabled intangibles as components of organizational capability. The literature therefore does not show a simple replacement of one construct by another; instead, it reveals overlapping research streams with different levels of analysis and different outcome assumptions.

2. Verified Evidence Base

The evidence table below prioritizes studies that directly inform the IT Sophistication/IT capability–DCT storyline. The table preserves the distinctions in the source evidence: foundational measurement studies, capability studies, DCT foundations, empirical capability pathways, and adjacent digital-transformation evidence.

Study	Constructs / relationship	DCT / mechanism	Method / evidence	SLR role
Raymond & Paré (1992)	IT Sophistication; no causal IV–DV	Technological, informational, functional, managerial dimensions	Instrument development/validation; 101 small manufacturing organizations	Foundational measurement
Mata, Fuerst & Barney (1995)	IT resources / skills → sustained advantage	RBV bridge; managerial IT skills may be	Theory/review; resource-based analysis	IT–capability bridge

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Study	Constructs / relationship	DCT / mechanism	Method / evidence	SLR role
		strategically valuable		
Teece, Pisano & Shuen (1997)	Dynamic capabilities → strategic advantage	Coordinating and combining assets under technological change	Conceptual framework	DCT foundation
Bharadwaj (2000)	IT Capability → firm performance	Capability perspective rooted in RBV	Empirical matched-sample study; IT infrastructure, human IT resources, intangibles	Core capability evidence
Zahra & George (2002)	Absorptive capacity → competitive advantage	Potential vs. realized capacity	Conceptual reconceptualization / review	Capability mechanism
Teece (2007)	Dynamic capabilities → enterprise performance	Sensing, seizing, transforming; microfoundations	Conceptual/theoretical development	DCT foundation
Agarwal & Selen (2009)	Stakeholder collaboration → dynamic capabilities → service innovation	Higher-order capabilities through collaboration and learning	SEM; telecommunications context	Empirical DCT pathway
Wamba et al. (2017)	Big Data Analytics Capability → firm performance	Dynamic/process capabilities mediate capability–performance link	Online survey; n=297 Chinese IT managers/business analysts	Technology → capability → outcome
Kump et al. (2019)	Dynamic capability construct	Sensing, seizing, transforming; explicit operationalization	Scale development; purification n=269, confirmation n=307	DCT measurement
Vial (2019)	Digital transformation → strategic/organizational change	DCT identified as a key research avenue	Review of 282 works	Bridge to digital domain
Su, Wang & Li (2023)	Digital transformation → ESG performance	Dynamic capabilities as mediator	Empirical study	Adjacent context
Held, Heubeck & Meckl (2025)	Dynamic capabilities → digital leadership/culture	Capabilities as antecedents of digital-transformation enablers	Survey; n=98 German SMEs	Recent DCT–digital evidence
Foroudi et al. (2025)	Digital business capabilities → ESG	Innovativeness and resilience as mediators	Empirical UK healthcare study	Adjacent context

Table 2. Synthesis of verified core evidence

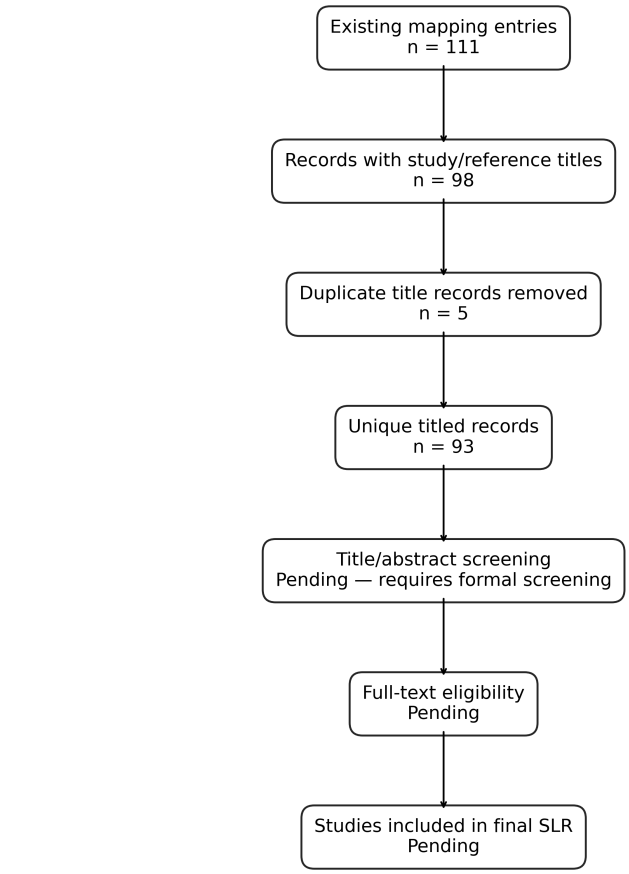

Figure 1. Preliminary evidence flow
The figure summarizes the existing mapping audit; it is not a final PRISMA 2020 flow because formal screening and eligibility records remain pending.

3. Evidence Timeline and Theoretical Development

The verified record suggests a progression from measuring IT Sophistication, to treating IT as an organizational capability, and then to explaining technology-enabled adaptation through dynamic capabilities. The progression begins with Raymond and Paré (1992), continues through RBV and IT capability research, and develops into DCT, analytics capability, and digital-transformation studies.

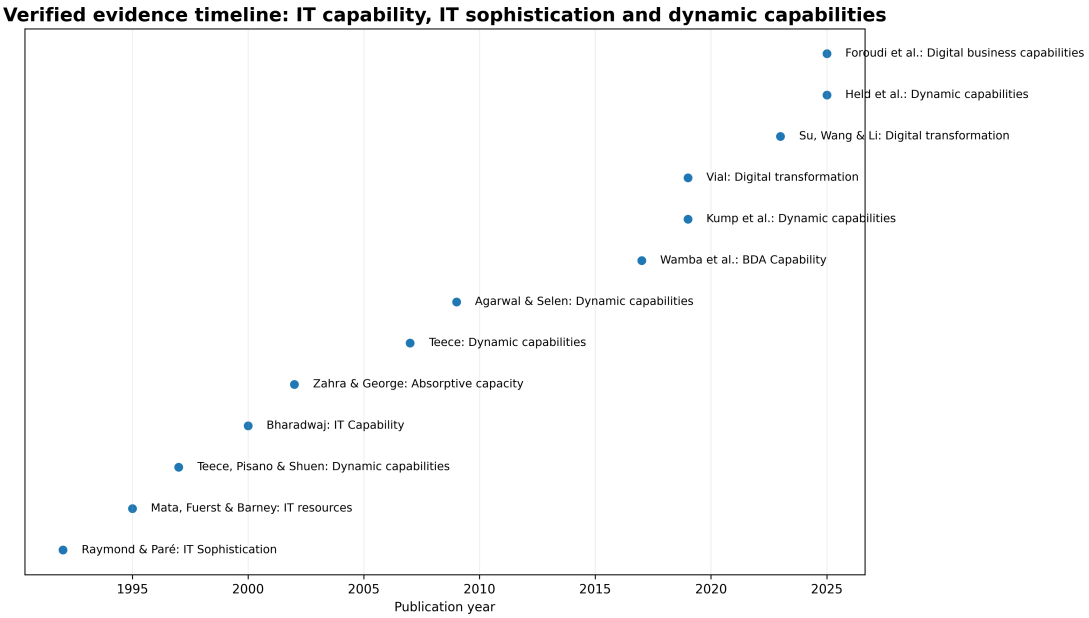

Figure 2. Verified evidence timeline

Selected verified studies illustrate the evolution of the research conversation; the timeline is not a complete bibliometric map.

4. Mechanisms: From Technology Resources to Adaptive Capability

The second major finding concerns mechanism. IT resources or sophistication do not automatically constitute dynamic capability. The reviewed evidence suggests that organizational processes are necessary to translate technology resources into adaptive outcomes. Agarwal and Selen (2009) emphasize collaboration and learning, while Wamba et al. (2017) demonstrate the relevance of dynamic/process capabilities in the relationship between analytics capability and performance. This supports an interpretation in which technology can provide the resource base, while organizational capabilities explain how that base is mobilized and renewed. Under this interpretation, sophisticated IT may support sensing by improving the availability and integration of information; seizing may involve the mobilization of technical and managerial resources around selected opportunities; and transforming may involve changes to processes, skills, structures, and routines. These links are theoretically plausible interpretations of the reviewed literature, not causal effects established by the present audit.

5. Dynamic Capability Dimensions

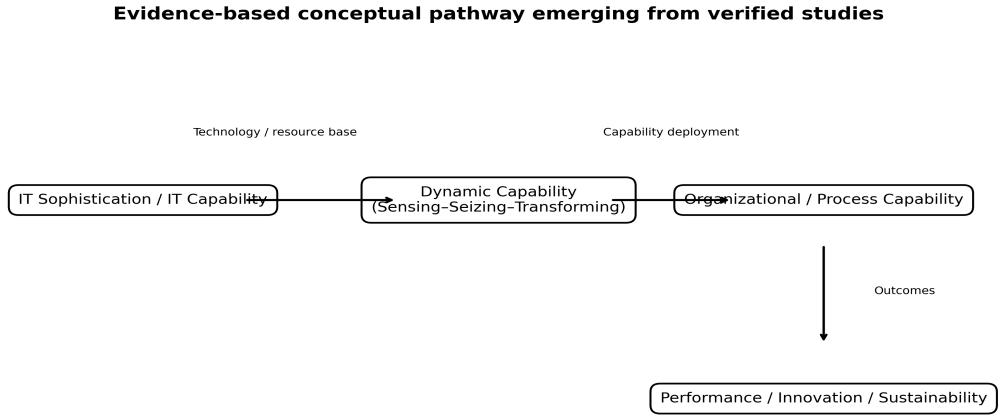

Figure 3. Dynamic Capability Theory dimensions

Sensing, seizing, and transforming are treated as interrelated organizational processes rather than as simple stages of IT investment.

Kump et al. (2019) provide an operationalization of sensing, seizing, and transforming capacities, while Teece (2007) provides the theoretical microfoundations. These frameworks address a different conceptual question from Raymond and Paré's measurement of IT Sophistication. Consequently, the constructs should not be collapsed into one scale without explicit theoretical justification and empirical validation.

6. Emerging Integrative Pathway

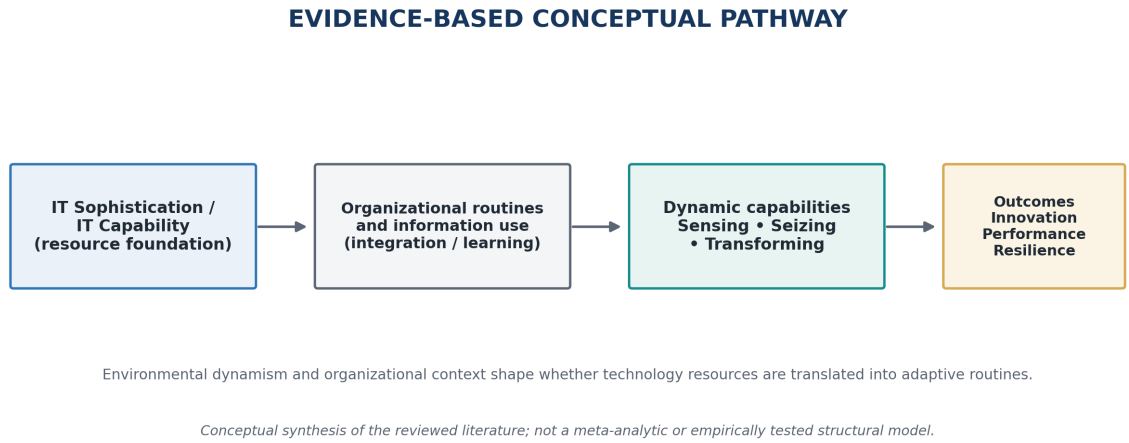

Figure 4. Emerging conceptual pathway

Evidence-based synthesis of the reviewed literature; not a meta-analytic or empirically tested structural model. The integrative interpretation emerging from the review positions IT Sophistication/IT capability as a potential resource and capability foundation. Organizational routines, learning, and information use provide the integration mechanism through which technology-related resources may contribute to dynamic capabilities. Dynamic capabilities then provide the organizational process through which resources are adapted and renewed, with innovation, performance, resilience, and other outcomes appearing as possible consequences.

7. Measurement Implications

Measurement is a central unresolved issue. Raymond and Paré (1992) operationalize IT Sophistication using technological, informational, functional, and managerial dimensions, whereas Kump et al. (2019) operationalize dynamic capabilities through sensing, seizing, and transforming. The dimensions are complementary in a theoretical discussion but are not interchangeable measurement indicators. Future studies should therefore specify the level of analysis and test whether the dimensions of IT Sophistication have distinct relationships with sensing, seizing, and transforming capacities.

8. Preliminary Research Gap

The central gap is the fragmented construct evolution between IT Sophistication and DCT. The literature contains evidence on IT capability, analytics capability, digital capability, and technology-enabled dynamic capability, but the original IT Sophistication construct has not yet been systematically reconstructed within the sensing–seizing–transforming architecture while preserving its measurement dimensions. This creates an opportunity for a focused SLR contribution: to determine whether the four dimensions of IT Sophistication can be theoretically and empirically connected to specific dynamic-capability mechanisms. The gap should remain classified as preliminary until the full candidate set is screened and coded. The final review should distinguish direct evidence about IT Sophistication from adjacent evidence about IT capability and digital transformation, rather than combining them as if they were the same construct.

CONCLUSION

This systematic literature review indicates that research has moved from a measurement-oriented understanding of IT Sophistication toward broader capability-based explanations of technology-enabled organizational adaptation. Raymond and Paré (1992) establish the multidimensional IT Sophistication construct; RBV studies explain the strategic relevance of IT resources and skills; and DCT explains how organizations sense

change, seize opportunities, and transform resource configurations. Research on analytics capability and digital transformation further extends this discussion to performance, innovation, leadership, resilience, and sustainability. The principal contribution is the identification of a conceptual gap between the original IT Sophistication construct and the sensing–seizing–transforming architecture of DCT. IT Sophistication is best treated as a possible enabling foundation rather than automatically equated with dynamic capability. At the same time, the corpus audit remains preliminary: 111 mapping entries, 98 title-bearing records, five duplicate titles, and 93 unique titled records are not final systematic-review inclusion counts. Formal screening, full-text eligibility assessment, and coding must therefore be completed before definitive claims about the final evidence base are made.

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