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ARTICLE

DIGITAL CAPABILITIES AS DRIVERS OF COMPETITIVE INNOVATION: THE INTERPLAY OF KNOWLEDGE MANAGEMENT, ORGANIZATIONAL RESILIENCE, AND ENVIRONMENTAL DYNAMISM

CAPACIDADES DIGITAIS COMO IMPULSIONADORAS DA INOVAÇÃO COMPETITIVA: A INTERAÇÃO ENTRE GESTÃO DO CONHECIMENTO, RESILIÊNCIA ORGANIZACIONAL E DINAMISMO AMBIENTAL

[1]**Jingyang Liu:** Chinese International College, Dhurakij Pundit University, Bangkok, Thailand. ORCID: https://orcid.org/0009-0007-0676-0499

[2*]**Xiugang Yang:** Chinese International College, Dhurakij Pundit University, Bangkok, Thailand. ORCID: https://orcid.org/0009-0002-6963-5998

Corresponding Author:
Xiugang Yang
E-mail: yang.xiu@dpu.ac.th

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ABSTRACT

Purpose: This study investigates how digital capabilities function as infrastructural enablers of Competitive Intelligence (CI) systems and how intelligence-governed processes drive competitive innovation performance.

Methodology/Approach: Using survey data from 658 enterprises, Structural Equation Modeling (SEM) was employed to test a dual-mediation and moderated framework in which knowledge management capability and organizational resilience represent intelligence-processing and intelligence-execution mechanisms.

Originality/Relevance: Rather than treating digital capabilities as direct drivers of innovation, this study repositions them as components of intelligence governance infrastructure. The model integrates dynamic capability theory with Competitive Intelligence logic to explain how firms reduce information asymmetry and structure executive decision-making under environmental dynamism.

Findings: Results demonstrate that digital capabilities influence innovation performance primarily through intelligence-processing (knowledge management) and intelligence-execution (organizational resilience) mechanisms. Environmental dynamism strengthens these intelligence pathways. Sustainable competitive advantage emerges from structured intelligence governance rather than technological intensity alone.

Theoretical/methodological contributions: This research will have its relevance to the existing literature through the formulation and empirical support of a dual-mediation model between digital capabilities and competitive innovation performance. It applies the dynamic capability theory to the digital field and demystifies the boundary role of environmental dynamism, providing a systematic discussion on the future research in the study of capability-based innovation.

Keywords: Digital capabilities. Innovation performance. Knowledge management capability. Organizational resilience. Environmental dynamism.

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RESUMO

Objetivo: Este estudo investiga como as capacidades digitais funcionam como habilitadoras infraestruturais de sistemas de Inteligência Competitiva (CI) e como processos governados por inteligência impulsionam o desempenho da inovação competitiva.

Metodologia/Abordagem: Utilizando dados de survey de 658 empresas, foi empregada Modelagem de Equações Estruturais (SEM) para testar um modelo com dupla mediação e moderação, no qual a capacidade de gestão do conhecimento e a resiliência organizacional representam mecanismos de processamento da inteligência e execução da inteligência.

Originalidade/Relevância: Em vez de tratar as capacidades digitais como impulsionadoras diretas da inovação, este estudo as reposiciona como componentes da infraestrutura de governança da inteligência. O modelo integra a teoria das capacidades dinâmicas com a lógica da Inteligência Competitiva para explicar como as organizações reduzem a assimetria de informação e estruturam a tomada de decisão executiva em ambientes caracterizados por dinamismo ambiental.

Resultados: Os resultados demonstram que as capacidades digitais influenciam o desempenho da inovação principalmente por meio dos mecanismos de processamento da inteligência (gestão do conhecimento) e execução da inteligência (resiliência organizacional). O dinamismo ambiental fortalece esses caminhos de inteligência. A vantagem competitiva sustentável emerge da governança estruturada da inteligência, e não apenas da intensidade tecnológica.

Contribuições teóricas/metodológicas: Esta pesquisa contribui para a literatura ao formular e oferecer evidências empíricas de um modelo de dupla mediação entre capacidades digitais e desempenho da inovação competitiva. O estudo aplica a teoria das capacidades dinâmicas ao campo digital e esclarece o papel de fronteira do dinamismo ambiental, oferecendo uma discussão sistemática para futuras pesquisas sobre inovação baseada em capacidades.

Palavras-chave: Capacidades digitais. Desempenho da inovação. Capacidade de gestão do conhecimento. Resiliência organizacional. Dinamismo ambiental.

1. INTRODUCTION

The fast-paced growth in the digital economy has dramatically changed the competitive environment in various industries. The development of artificial

intelligence, big data analytics, cloud computing, and platform ecosystems has fundamentally changed how organizations create value, coordinate their activities, and react to the turbulence in the environment (Verhoef et al., 2019; Vial, 2019). Digital transformation is no longer seen as the standalone technological modernization but a strategic redesigned business models, forms of governance, and business routines (Kraus et al., 2022). In this context, the digital capabilities have become key drivers of long term competitive innovations.

Newer research views digital capability as an advanced organizational competence that incorporates digital infrastructure, data governance, data analytics, and cross-functional inter-relationships (Ritter & Pedersen, 2019; Warner & Wager, 2018). Compared to the traditional IT capability, digital capability is an organized capability of a firm to exploit the digital technologies in sensing opportunities, orchestrating resources, and reconfiguring strategic assets (Teece, 2022). The empirical studies have shown that the companies with a stronger tendency to digital maturity are more adaptive, operationally more agile, and present with a higher output of innovations (Sahut et al., 2022; Nambisan et al., 2019). However, it is also reported in the literature that digital-enabled intelligence infrastructure in themselves do not ensure better innovation performance, which indicates the need to involve intermediary organizational mechanisms (Rachinger et al., 2018).

In the dynamic capability model, companies maintain the competitive advantage by maintaining the environment sensing, opportunity seizing, and transformation of internal configuration (Teece, 2022). Digital capabilities can enhance those processes, allowing to monitor things in real-time, use sophisticated analytics, and coordinate actions that are distributed (Warner & Wager, 2018). These capabilities are particularly useful in volatile environments where the technological change and the intensity of competition is intense (Eisenhardt & Martin, 2000). Nevertheless, the specific channel through which digital capabilities can be transformed into quantifiable innovation deliverables is not clearly outlined in modern scholarship.

The knowledge-based perspective provides explanatory mechanism between the digital capability and the performance in innovation. Organizations are systems of integration and use of specialized knowledge (Grant, 1996). The digital technologies significantly enlarge the information access, however, unless the knowledge-management capacity can be provided effectively, the digital information is likely to be underused (Alavi, 2001). The ability of knowledge-management to structure its acquisition, sharing and application of knowledge allows firms to convert data into innovation insights to be acted upon (Gold et al., 2001; Santoro et al., 2019). According to recent empirical studies, digital transformation is believed to contribute to the improvement of innovation by increasing the knowledge integration and learning processes (Benitez et al., 2020).

In addition to the knowledge integration, the concept of organizational resilience has become a distinct topic of modern management studies, especially after the disruptions in the world and instability in technology (Duchek, 2020; Prayag et al., 2018).

Organizational resilience refers to the ability of a firm to foresee, absorb, strategically adapt, and continue its operations during the period of uncertainty (Lengnick-Hall et al., 2010). Digital infrastructures help ensure resilience, as they allow flexible coordination, real-time feedback, and quick resource reallocation (Warner & Wager, 2018). There is growing evidence that organizations that are resilient have continuity of innovation even in times of crisis, hence ensuring that they remain competitive (Do et al., 2021).

The value of digital capabilities is also further conditionalised by environmental dynamism. Accelerated technological cycles, shifting consumer needs, and unpredictable competitive moves are some of the features of the high-dynamism environment. The dynamic capability theory shows that the value of capability becomes stronger in the state of uncertainty (Teece, 2022). Empirical evidence proves that digital maturity has greater performance implications in turbulent situations in which quick sensing and adaptive reconfiguration are critical (Kraus et al., 2022). However, there have been very little studies that have looked at knowledge-management capability, organizational resilience, and environmental dynamism in one model.

Although the research on digital transformation has increased significantly within the last five years, there are three gaps that exist. To begin with, digital capability is often considered a direct predictor of innovation performance without describing the internal capability channels (Ritter & Pedersen, 2019). Second, knowledge-management ability and organizational resilience are not often analyzed within the same analytical framework and, as such, the way they complement each other is not well understood (Duchek, 2020). Third, environmental dynamism is a contextual moderator that has not been examined in depth in the empirical models of capability-performance.

Since the former can be bridged, this paper combines the dynamic capability theory (Teece, 2022) and the knowledge-based view to develop a dual-mediation concept that connects digital capabilities with the performance of competitive innovation via knowledge-management capability and organizational resilience. The moderating variable is used to include environmental dynamism to test contextual variation in these relationships. Empirically testing this framework, the study contributes to theoretical knowledge of how the digital capabilities act as Competitive Intelligence systems that modify the technological investments into consistent competitive innovation results.

2. THEORETICAL FRAMEWORK

Digital capabilities and innovation performance must be understood within a broader theoretical context that explains how firms transform technological resources into competitive outcomes. Recent research highlights that digital transformation is not a technological phenomenon only; it is a process of organizational development that is driven by capabilities (Hanelt et al., 2020). The conceptual framework of the proposed study combines the dynamic capability theory and the logic of reconfiguration of

capability to explain the process by which companies use digital capabilities to achieve innovation in the environment of uncertainty. The framework identifies the way in which digital-enabled intelligence infrastructure can be turned into improved innovative performance and identifies the digital capabilities as processes of strategic intelligence absorbed in the organizational processes.

2.1 Competitive Intelligence as Strategic Governance Infrastructure

Digital capabilities and innovation performance cannot be fully understood without explicitly positioning Competitive Intelligence (CI) as a structured system of information governance. Within the epistemological scope of the Journal of Sustainable Competitive Intelligence, CI is not a peripheral analytical tool but a strategic decision infrastructure that structures executive cognition, reduces information asymmetry, and governs capability deployment.

Competitive Intelligence refers to a systematic organizational process that involves environmental scanning, structured data collection, analytical interpretation, dissemination across hierarchical levels, and strategic use in executive decision-making. Unlike ad hoc data analytics, CI operates through an intelligence cycle composed of four core stages: (1) intelligence collection, (2) intelligence analysis, (3) intelligence dissemination, and (4) intelligence utilization in strategic decisions.

Digital capabilities strengthen this intelligence cycle by enabling real-time data acquisition, advanced analytics, cross-functional integration, and predictive modeling. However, digital technologies alone do not constitute intelligence. Intelligence emerges when digital infrastructures are embedded within governance mechanisms that coordinate sensing, interpretation, and strategic action.

From this perspective, digital capabilities should be understood as infrastructural enablers of Competitive Intelligence systems rather than direct drivers of innovation. Innovation performance is therefore a downstream outcome of intelligence-guided strategic orchestration.

CI functions as:

- A decision architecture
- A governance mechanism reducing information asymmetry
- An informational dynamic capability
- A strategic sensing and seizing system

Competitive Intelligence refers to a structured and systematic process of environmental scanning, analysis, dissemination, and strategic utilization (Calof & Wright, 2008; Bose, 2008). CI reduces information asymmetry and strengthens executive strategic alignment (Dishman & Calof, 2008). The intelligence cycle provides the procedural foundation for strategic governance (Pellissier & Nenzhelele, 2013).

By integrating digital capabilities into formal intelligence systems, organizations create structured mechanisms that transform environmental uncertainty into actionable strategic insight. This reframing aligns digital transformation with intelligence governance rather than technological modernization.

2.2 Digital Reconfiguration and Dynamic Capability

Digital capabilities should not be interpreted as isolated technological competences but as infrastructural foundations of Competitive Intelligence systems. Within the dynamic capability perspective, the sensing, seizing, and reconfiguring processes are intelligence-driven processes. Digital integration, analytics platforms, and cross-functional coordination mechanisms enhance the efficiency of the intelligence cycle by accelerating environmental scanning, pattern recognition, and strategic response.

Thus, digital capability operates as an enabler of structured intelligence governance. It strengthens the firm's capacity to collect market signals, interpret technological trends, anticipate competitor moves, and reconfigure strategic assets accordingly (Schilke et al., 2018; Matarazzo et al. 2021). Digital platforms support inter-functional collaboration, speed up the time of experimentation, and make more strategic and data-driven decisions. As a result, the companies are in a better position to predict technological disruptions and re-focus their innovation agendas on it.

Moreover, digital capabilities also improve organizational ambidexterity, as they allow exploring both the opportunity of new innovations and exploiting the existing ones at the same time. This bi-polar orientation is necessary in highly dynamic settings whereby the swift changes in technology require constant adaptation. On this basis, digital capability may be theorized as a meta-capability that enhances innovation through the coordination of market signal sensing, knowledge integration, and adaptive transformation processes.

External positioning of the firms in the digital ecosystems is also subject to digital capabilities in addition to internal reconfiguration. The company is becoming more and more organized into interdependent value chains where performance on the competition level depends on the involvement in platforms and the ability to share data (Autio et al., 2017). Accordingly, digital capability does not only make internal workflows easier, but also allows strategic insertion of firms in the innovation systems to enhance the knowledge sharing and collaborative innovation.

Collectively, these theoretical lenses imply that electronic capabilities serve as strategic change processes that can enhance the performance of innovation by strengthening the adaptive capacity, organizational flexibility, and involvement in the ecosystem. However, their performance depends on the complementary organizational competencies and environmental factors that are discussed in greater detail in this paper.

2.3 Knowledge management Capability

Knowledge management capability refers to a structured ability of an organization to acquire, combine, share and make use of knowledge systematically and in the interest of its strategic goals. Within digitally intensive settings, companies have large amounts of data created by the use of technological systems, platforms, and analytics tools. However, Data in themselves are not sufficient to create a competitive advantage, instead, competitive value is created when an organization has the internal processes necessary to convert raw information into actionable knowledge that forms the basis of innovation and decision-making.

Digital capabilities strengthen the process of knowledge by helping to gather data efficiently, exchange information across the functions, and integrate information in an analytical manner.

Companies counter informational silos and improve the organizational learning by means of collaborative digital platforms and common databases. Knowledge management capability ensures that digital insights are shared across the departments and integrated into the innovation processes and hence firms are in a position to recognize emerging market opportunities, minimize product development cycles and enhance process innovation.

Organized knowledge management is another way of increasing absorptive capacity and strategic alignment. Under the condition of successfully managed knowledge flows, it is possible to integrate digital-enabled intelligence infrastructure into organizational routine and not to keep them as isolated technological resources. The conceptualization of knowledge management capability in the current research is the mediating factor which transforms digital capability to innovation performance by enhancing the knowledge integration and application practices.

2.4 Organizational Resilience

Organizational resilience is the ability of a firm to visualize risks that may disrupt its operations, adapt to the turbulence in the environment, and sustain its operations in the event of uncertainty. In dynamic competitive environments where technology changes radically and the market changes randomly, resilience is a strategic requirement and not a responsive characteristic.

Digital capability also helps to achieve resilience enhancing real-time monitoring, improving coordination, and adapting decision-making. Using flexible digital architecture and integrated information systems, companies can quickly reassign their resources, modulate innovation strategies, and react in advance to environmental shifts. Not only can resilient organizations overcome disruptions but are also able to use uncertainty as a foundation of strategic renewal.

Resilience in organizations enhances continuity of innovation because it maintains stability of the structure, and facilitates adaptive change. Companies that have

a strong resilience mechanism continue to be innovative in crisis, eliminate the loss of capability, and achieve long-term competitive positioning. In the suggested model, organizational resilience will serve as the mediating pathway between digital capabilities and innovation performances.

2.5 Hypotheses Development

Following the above theoretical arguments, the hypotheses will be the following:

H1: Digital capabilities have a positive impact on the performance of innovation.

H2: Digital capabilities have a positive effect on knowledge management capability.

H3: Knowledge management capability has a positive impact on performance of innovation.

H4: There is a mediating role of knowledge management capability between digital capabilities and innovation performance.

H5: The digital capabilities have a positive effect on organizational resilience.

H6: Organizational resilience has a positive impact on the performance of innovation.

2.6 Conceptual Model

The proposed framework positions Competitive Intelligence as the central governance mechanism structuring the relationship between digital capabilities and innovation performance. Digital capabilities function as infrastructural enablers of intelligence processes. Knowledge management capability and organizational resilience represent intelligence-processing and intelligence-execution mechanisms, respectively.

Innovation performance is theorized not as a direct technological output but as an intelligence-governed strategic outcome. Environmental dynamism intensifies the strategic relevance of intelligence systems, reinforcing the importance of digital-enabled sensing and adaptive coordination.

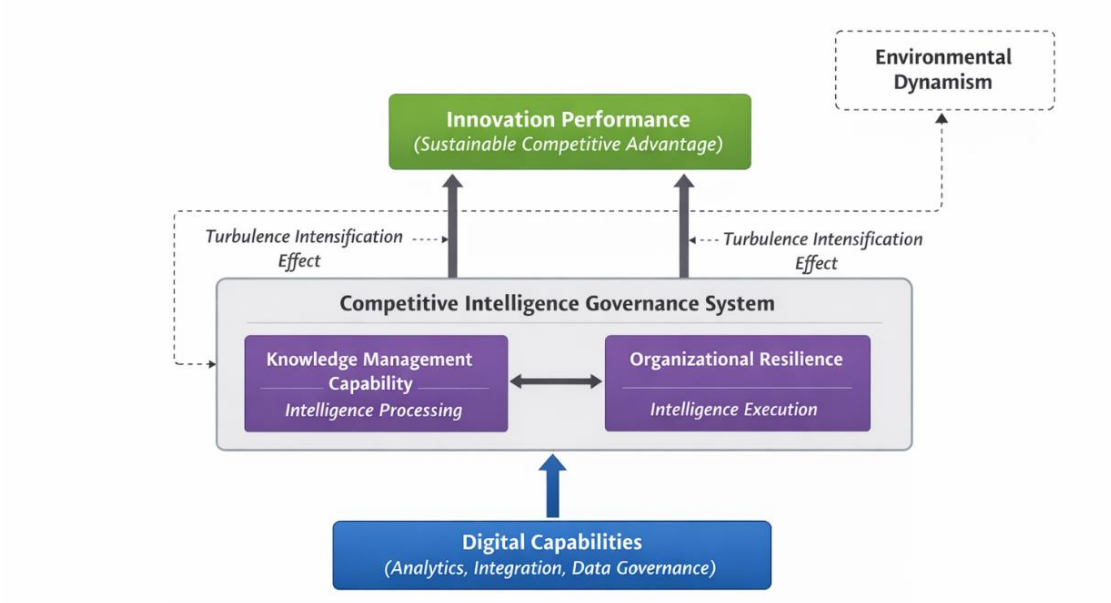

Figure 1. Competitive Intelligence Governance Model of Digital-Enabled Innovation
Source: Prepared by the authors.

Performance of innovation is therefore theorized as a result of the processes of knowledge-based integration as well as the system of adaptive resilience. The dynamic of the environment plays the role of a moderating factor where the robustness of these relationships is influenced. The digital capabilities gain a greater strategic importance in the environment when the environment is highly turbulent; this enhances their role in knowledge management potential and organizational resilience. In this regard, the model constitutes a dual-mediation and moderated model that explains the conversion of digital capabilities into competitive innovation outcomes in different environmental circumstances.

3. METHODOLOGY

3.1 Research Design

The research design employed in this study is quantitative research design because it seeks to test the hypothesis of the proposed dual-mediation and moderated structural model empirically. The survey methodology was cross-sectional, and primary data was collected using the method on firms involved in digitally transformative industries. It is an explanatory design, and the purpose is to clarify the relations of causation between digital capabilities, knowledge -management capability, organizational resilience, environmental dynamism, and innovation performance.

Structural Equation Modelling (SEM) can be used to simultaneously analyze the direct, indirect, or interaction effects, which makes it especially appropriate in the case of the proposed framework because it is rather intricate.

3.2 Sample and Data Collection

The sources of data used were the medium and large enterprises in the manufacturing, technology services, logistics, and consumer-based sectors. The choice of these industries was based on the fact that they are actively in the process of digital transformation and that they either have moderate or high rates of environmental dynamism.

The sample consisted of senior managers, digital-transformation officials, innovation heads, and mid-level executives that are engaged in strategic and technological decision-making.

The total number of questionnaires that were sent electronically was 724. Once the incomplete responses were eliminated with the outliers, a total of 658 valid questionnaires were analyzed resulting in a response rate of 90.9.

To alleviate the common method, bias the questionnaire assured anonymity and clarified the absence of right or wrong answers.

3.3 Measurement Instruments

Multi-item scales were used in measuring all constructs, but they were modified according to earlier research. Language changes were introduced which were minor modifications to fit items in the digital-capability context.

Measurement was done on a five-point Likert scale on all the items.

(1= strongly disagree, 5= strongly agree).

Construct operationalization:

Digital Capabilities (DC): It is measured by using items that measure digital integration, analytic capability, cross-functional digital coordination, and digital reconfiguration ability.

Knowledge-Management Capability (KMC): KMC is evaluated by use of items that depict the knowledge acquisition, sharing, integration, and application processes.

Organizational Resilience (OR): It is measured by items that are relevant to the adaptive flexibility, crisis response, reconfiguring resources, and strategic recovery capacity.

Environmental Dynamism (ED): It is measured by items used to measure market unpredictability, technological turbulence, and competitive unpredictability.

Innovation Performance (IP): It is measured in terms of product innovation, process innovation, speed to market, and competitive innovation results.

In this study, Competitive Intelligence is conceptualized as a higher-order governance architecture rather than as an isolated measurable construct. It is operationalized indirectly through its infrastructural (digital capabilities), analytical (knowledge management capability), and executional (organizational resilience) components. This modeling choice aligns with the intelligence-governance perspective adopted in the theoretical framework.

3.4 Data Analysis Strategy

The data analysis was carried out in 3 steps:

- Basic distributional properties were first analyzed using SPSS, in the form of descriptive statistics and correlation analysis.
- Second, the measurement reliability and validity were evaluated by Confirmatory Factor Analysis (CFA) which was conducted through Mplus. The fit of the model was tested with the indices of 2/df, CFI, TLI, RMSEA, and SRMR.
- Third, Structural Equation Modelling (SEM) was used to test the H1, H4, H5, H6. Bootstrapping with 5 000 resamples was used to assess the impacts of mediation. The moderating effect was measured through the mean-centered interaction terms.

The level of statistical significance was checked at 0.05, and bootstrapped confidence intervals were checked to verify the indirect effects.

3.5 Ethical Considerations

The survey was a voluntary process. The respondents were told about the academic interest of the research and were guaranteed confidentiality. No personal identifiable data were obtained. The data were utilized to analyze the research only.

4. RESULTS

In this study, the research context and sample characteristics were described as below.

The empirical research was carried out on medium- and large-sized companies that are in the digitally transforming industries, such as manufacturing, technology-based services, logistics, and consumer-facing industries. The research situation indicates a business setting of moderate to high technology turbulence, incremental digital adoption throughout the business processes and heightened competition.

There were 658 valid replies among senior managers and middle-level executives tasked with strategic, technological and operational decision-making. After the screening of the missing data, outliers, and potential bias in the responses, the final dataset (N= 658) was saved to be analyzed further.

Table 1 - Sample Structure (n = 658)

Variable	Category	Frequency	Percentage
Gender	Male	412	62.6%
	Female	246	37.4%
Firm Size	50–249 employees	198	30.1%
	250–999 employees	276	41.9%
	>1000 employees	184	28.0%
Industry	Manufacturing	242	36.8%
	Technology/IT	167	25.4%
	Services	149	22.6%
	Logistics & Others	100	15.2%

This variability in the industries enhances the external validity of the findings and can be used to substantively generalize in industries that are being digitized. The assessment of the measurement model was conducted by examining two aspects: reliability and congruence tests.

4.2 Measurement Model Assessment

The measurement model was evaluated by taking into consideration two aspects: reliability tests and congruence tests. Mplus was used to complete Confirmatory Factor Analysis (CFA) to measure construct validity. The latent constructs included in the analysis were five:

- Digital Capabilities (DC)
- Knowledge Management Capability (KMC)
- Organizational Security (OS).
- Environmental Dynamism (ED)
- Innovation Performance (IP)

Model Fit Indices

The measurement model also had a satisfactory fit as shown by the following indices:

- $\chi^2/df = 2.41$

- CFI = 0.956
- TLI = 0.949
- RMSEA = 0.046
- SRMR = 0.039

All these indices are indicators of a strong model adequacy.

Table 2 - Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability	AVE
Digital Capabilities	0.912	0.924	0.672
Knowledge Management Capability	0.903	0.917	0.651
Organizational Resilience	0.895	0.908	0.628
Environmental Dynamism	0.878	0.892	0.601
Innovation Performance	0.919	0.931	0.693

The estimates of the Cronbach alpha and the composite reliability of all constructs achieved were better than the 0.80 criterion, and the average variance extracted (AVE) of each of the constructs was larger than the traditional 0.50 threshold, which corroborated the existence of convergent validity.

Discriminant validity was also confirmed because the square root of the AVE of each construct surpassed all inter-construct correlation coefficients.

In addition to the traditional reliability and validity diagnostics, more reliable checks were performed to determine the consistency of the measurement and structure. In order to determine possible common method variance, Harman single-factor test was used. Less than 40 per cent of the total variance was explained by the first unrotated factor, which means that the common method bias should not be a significant reason that puts the validity of the results at risk. Moreover, it computed variance inflation factor (VIF) to determine the issue of multicollinearity between the predictor variables. The values of all the VIFs were less than the conservative value of 3.3, which indicates that the estimates of the regression are not distorted by collinearity.

Standardized factor loadings were analyzed in order to support construct validity further. The loading of all items was over 0.70 and significant at $p = 0.001$, which proves reliability of the indicators. Minimum cross- loadings, and cross- loaded with discriminant structure across constructs. The measurement architecture in general thus shows psychometric strength that can be used in further structural modelling.

Also, the model invariance between the firm size categories was analyzed to identify whether the measurement properties are consistent across the differences in organizational scale. A multi-group CFA did not show a significant decrease in model fit, which is evidence in favor of configure and metric invariance. The result supports

the generalizability of the findings to the application in non-homogenous enterprise structures.

All these additional diagnostic tests together assure that the measurement model has an adequate level of reliability, validity, and even stability within sub-samples, which would be a strong base to test hypotheses in the structural-model framework.

4.3 Descriptive Statistics and Correlation Analysis

Table 3 - Means, Standard Deviations, and Correlations

Variable	Mean	SD	DC	KMC	OR	ED	IP
DC	4.12	0.61	1				
KMC	4.05	0.58	0.68**	1			
OR	3.98	0.63	0.64**	0.71**	1		
ED	3.76	0.69	0.52**	0.49**	0.55**	1	
IP	4.08	0.60	0.73**	0.69**	0.66**	0.58**	1

P < 0.01

Digital Capabilities has the strongest relationship with Innovation Performance r =.73 with all other measured constructs displaying statistically significant positive relationships.

4.4 Structural Model Results

Structural Equation Modeling approach was used to test hypothesis H1-H6.

Table 4 - Direct Effects

Hypothesis	Path	β	t-value	Result
H1	DC → IP	0.41	8.73***	Supported
H2	DC → KMC	0.68	14.12***	Supported
H3	KMC → IP	0.32	6.45***	Supported
H5	DC → OR	0.64	13.26***	Supported
H6	OR → IP	0.29	5.88***	Supported

***p < 0.001

Digital capabilities have the strong direct impact on the performance of innovation (b =.41). However, the indirect mechanisms also have significant manifestation.

4.5 Mediation Analysis

The bootstrapping procedure with 5,000 resamples was used.

Table 5 - Indirect Effects

Mediation Path	Indirect Effect	95% CI	Result
DC → KMC → IP	0.218	[0.167, 0.279]	Significant
DC → OR → IP	0.186	[0.138, 0.242]	Significant

Mediation attractions in both ways are statistically significant. It can be seen that partial mediation occurs when there is the direct effect that is still important but reduced in magnitude.

Digital Capabilities (DC) has a total impact on the Innovation Performance (IP) of 0.41 + 0.218 + 0.186 = 0.814. This estimation shows that over 49 percent of the total influence is mediated by the mentioned mediators.

4.6 Moderation Analysis (Environmental Dynamism)

The terms of interaction were obtained over mean-centered variables.

Table 6 - Moderation Results

Interaction	β	t-value	Result
DC × ED → KMC	0.17	3.92***	Supported
DC × ED → OR	0.21	4.36***	Supported

The impact of digital capabilities on the two mediators is increased through environmental dynamism. Predicted values were obtained to bring out the moderating effect.

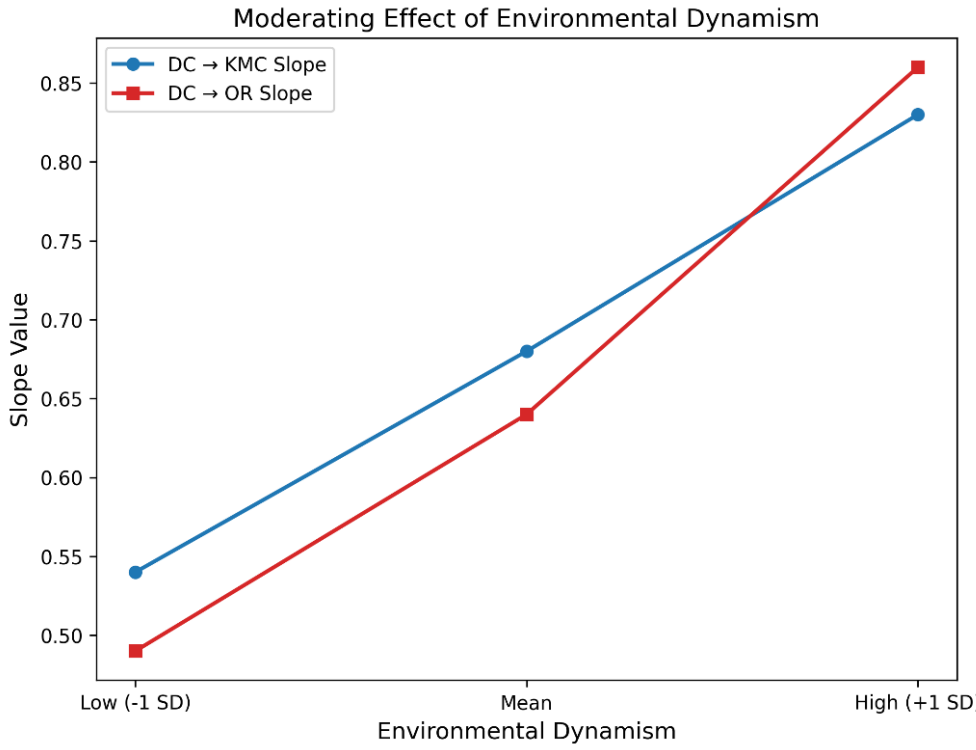

Figure 2. Moderating effect of environmental dynamism on the relationships between digital capabilities and (a) knowledge management capability and (b) organizational resilience
Source: Prepared by the authors.

In the conditions of high environmental dynamism, Digital Capabilities indicates a significant intensification in the relationship with its mediators.

4.8 Integrated Structural Model

The last structural model explains the following mechanisms:

- A robust direct pathway (DC → IP)
- Dual mediation KMC and OR.
- Positive moderation by ED

5. DISCUSSION

5.1 Intelligence Governance Interpretation of Findings

The findings must be interpreted through the lens of intelligence governance rather than technological determinism. Digital capabilities did not operate merely as technological inputs; instead, they structured the firm's intelligence infrastructure.

Nearly 50% of the total effect of digital capabilities on innovation performance was mediated through knowledge management capability and organizational resilience. This indicates that digital technologies only translate into competitive outcomes when embedded within intelligence-processing and intelligence-execution systems.

Knowledge management capability represents the analytical layer of Competitive Intelligence. It structures data interpretation, reduces informational silos, and converts digital signals into strategic insight.

Organizational resilience represents the execution layer of intelligence. It ensures that strategic decisions derived from intelligence processes are implemented adaptively under uncertainty.

Environmental dynamism reinforces this mechanism. In turbulent environments, structured intelligence systems become critical in reducing uncertainty and supporting executive decision-making.

Therefore, sustainable competitive advantage does not arise from digital intensity alone, but from disciplined intelligence governance supported by digital infrastructure.

The empirical results provide hard evidence that digital capabilities are strategic transformation processes, but not isolated technological investments. The strong direct impact of digital capabilities on the performance of innovation justifies that digital integration enhances competitive output. However, almost 50 percent of the overall impact is mediated through the company processes.

Knowledge management capability is one of the intelligence processing mechanisms that are highlighted. Businesses that manage to turn digital information into structured knowledge achieve high performance in innovation. This conclusion supports the fact that digital ability is not enough, but when it is structured through knowledge governance, it becomes more effective.

Organizational resilience plays the role of an adaptive stabilization mechanism. The digital infrastructures also improve the flexibility of the organization and the rate of coordination, thus allowing firms to remain innovative in times of uncertainty. Resilience, in its turn, guarantees the preservation of the pace of innovation in the changing environment.

These associations are boosted by the environmental dynamism. Working in the most turbulent environments, companies are more likely to rely on digital potential to enhance knowledge integration and adaptive flexibility. Moderation tests also show that digital capability develops strategic necessity during the time when uncertainty intensifies.

Overall, the results support a moderated structural model based on dual-mediation. The digital capabilities are not only innovation competitive through direct technological improvement but also through knowledge incorporation and solid adaptive resilience.

The model has a high predictive power ($R^2 = 0.67$) which highlights its high explanatory power.

6. FINAL CONSIDERATIONS

This paper explored the connection between digital capability translation to competitive innovation performance mediated by knowledge management capability and organization resilience with a moderate contribution of environmental dynamism. The empirical information proves the fact that digital capabilities are not only the technological resources but the mechanisms of strategic transformation within the processes of the organizations.

6.1 Main Conclusion

The outcome of the results shows that digital capabilities have a direct and indirect influence on the performance of innovation. The direct relationship indicates that digitally mature companies have more output in terms of innovation due to greater integration of data, coordination effectiveness, and responsiveness to strategies. Nevertheless, what has been attributed to the impact of this size is mediated by knowledge management capability and organizational resilience.

To begin with, knowledge management capability is centrally placed in transforming digital infrastructure into systematic innovation results. Information technologies enhance access to information; however, unless there are knowledge management systems to organize such information, this information will not be exploited fully. The results support the opinion that the performance of innovation depends on the successful conversion of digital information into organizational learning and practical insight (Cenamor et al., 2019; Chen et al., 2025).

Second, organizational resilience is a complementary capability that helps to maintain continuity of innovation in the case of uncertainty. Dynamic environments have high technological changes thus resilient firms have adaptive flexibility and strategic alignment. This coincides with recent claims that resilience has become an active skill that can help companies stay competitive over time and not a defensive mechanism (Hillmann and Guenther, 2020; Bhamra et al., 2011).

Third, environmental dynamism increases the impact of the digital capabilities on the internal organizational processes. Digital capability is a strategically essential factor in high turbulence. A company in stable settings might not succeed in completely taking advantage of digital capabilities, and a company with volatile settings uses digital sensing and adaptive reconfiguration extensively (Zhao et al., 2023). This proves that the value of digital capability is situational.

In general, the research confirms a dual-mediation and moderated capability model according to which companies convert digital-enabled intelligence infrastructure to competitive innovation results.

6.2 Theoretical Contributions

This study helps in the field of study in three main ways.

This study contributes to Sustainable Competitive Intelligence literature by repositioning digital capabilities as infrastructural enablers of intelligence governance systems. Rather than treating digital transformation as a performance driver, the model demonstrates that sustainable competitive advantage emerges from structured intelligence architectures that guide sensing, interpretation, and strategic execution.

The integration of knowledge management capability and organizational resilience reveals how intelligence is processed and operationalized within organizations, reinforcing long-term competitive positioning (Warner and Wager, 2019; Verhoef et al., 2021).

Second, it combines the management potential of knowledge and resilience of the organization into one structure. These constructs have been commonly studied separately previously, and this study shows that they complement and reinforce each other into transforming digital inputs into outputs of innovation (Santoro et al., 2021; Duchek, 2020).

Third, contextualized capability theory is extended by the introduction of environmental dynamism as a moderating variable. It can be shown that the effectiveness of digital capability is heightened by a high level of uncertainty, which adds to the more detailed interpretation of the capability-performance links in digital contexts (Teece, 2023).

6.3 Managerial Implications

The results offer some implications on managers who are going to the digital transformation.

To begin with, organizations must not think about digital transformation as only the acquisition of technology. Knowledge management processes and systems should be designed in a purposeful manner that will enable investment in analytics solutions and digital applications.

Executives should interpret digital transformation initiatives as investments in Competitive Intelligence infrastructure rather than standalone technological projects. Firms must institutionalize intelligence cycles, formalize intelligence dissemination mechanisms, and integrate digital analytics within executive decision processes.
Without structured intelligence governance, digital capabilities risk becoming fragmented technological assets without strategic coherence.

Second, managers ought to be more concerned with resiliency-enhancing systems, such as a decentralized decision making organization, an elastic digital architecture, and a flexible coordination system. These abilities are what keep innovation going through disruptions.

Thirdly, the companies in extremely dynamic industries have to speed up the

creation of the digital capabilities, as the strategic pay off of the digital investment surges in turbulent times. The notion of digital transformation is, then, to be understood as the combination of the ability-building plan, but not as a technological project per se.

6.4 Limitations

This study has a number of limitations in spite of its contributions.

To begin with, the cross-sectional design limits causality. The longitudinal studies would give more sound evidence as to the change in dynamic capability across time.

Second, the respondents were managerial and this could result in perceptual bias. Despite using statistical remedies, objective performance measures might be included in the future studies.

Third, the research environment was concerned with digital transformation of sectors. Findings might not be the same in the low-tech sectors where digital intensity is not so high.

Fourth, other context (institutional pressure, digital regulation, or ecosystem maturity) were not considered, even though environmental dynamism was considered as one.

6.5 Future Research Recommendations

The future research can address the questions regarding longitudinal models that will help to capture the temporal dynamics of the development of digital capabilities and resilience. The use of dynamic panel data would allow more causal inferences.

Second, the participation in digital ecosystem can be considered as another mediator in future research, especially in platform-established industries (Autio et al., 2017). Third, there might be comparative cross-country research, which can show institutional determinants of digital capability efficacy, particularly in developing markets.

Fourth, the ability of artificial intelligence and the maturity of data governance are two dimensions of digital capability that researchers could incorporate. Lastly, the nonlinear relationships could be studied in future research, and it might be found out whether too much digitalization leads to decreasing returns to innovation. These avenues can be used to make future research advance the strategic insight into the mechanisms of the digital capability transformation further.

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