Eskişehir Osmangazi Üniversitesi
Sosyal Bilimler Dergisi
Kasım 2025 (3), 1280-1297

The Impact of Organizational Agility on Innovation Performance: The Key Role of Digital Transformation

Yusuf AKKOCA[1]

Örgütsel Çevikliğin İnovasyon Performansı Üzerindeki Etkisi: Dijital Dönüşümün Anahtar Rolü

Öz

Bu çalışma, günümüzün dinamik iş ortamında, örgütsel öğrenmenin örgütsel çeviklik ve inovasyon performansı arasındaki ilişkiye nasıl aracılık ettiğini ve dijital dönüşümün bu süreci nasıl düzenlediğini incelemektedir. Dinamik Yetenekler Teorisine dayandırılarak ve 500 özel sektör çalışanından elde edilen verilere dayanan bulgular, çevikliğin öğrenmeyi ve dolayısıyla inovasyonu geliştirdiğini göstermektedir. Dahası, dijital dönüşüm bu dolaylı etkiyi güçlendirmekte ve örgütsel öğrenme, daha yüksek dijital olgunluk seviyelerinde inovasyona daha fazla katkıda bulunmaktadır. Güçlü dijital yetenekler olmadan öğrenmenin etkisi sınırlı kalmaktadır. Sonuçlar, inovasyonu en üst düzeye çıkarmak için çevikliğin hem öğrenme odaklı bir kültür hem de dijital yatırımlarla desteklenmesi gerektiğini vurgulamaktadır. Çalışma, dijital olarak dönüşen kuruluşlarda dinamik yeteneklerin oluşturulmasına yönelik öngörüler sunmaktadır.

Anahtar Kelimeler: Örgütsel Çeviklik, Örgütsel Öğrenme, Dijital Dönüşüm, İnovasyon Performansı

The Impact of Organizational Agility on Innovation Performance: The Key Role of Digital Transformation

Abstract

In today's dynamic business environment, this study explores how organizational learning mediates the relationship between organizational agility and innovation performance, and how digital transformation moderates this process. Based on Dynamic Capabilities Theory and data from 500 private-sector employees, findings show that agility enhances learning, which in turn improves innovation. Moreover, digital transformation strengthens this indirect effect, with organizational learning contributing more to innovation at higher digital maturity levels. Without strong digital capabilities, learning's impact remains limited. The results emphasize that agility must be supported by both a learning-oriented culture and digital investments to maximize innovation. The study offers insights into building dynamic capabilities in digitally transforming organizations.

Keywords: Organizational Agility, Organizational Learning, Digital Transformation, Innovation Performance

Makale Türü: Araştırma Makalesi

Paper Type: Research Article

1. Introduction

Today's rapidly changing and uncertain environment forces organizations to change. It has become important for organizations to remain agile in order to sustain their competitive advantage. Organizational agility is defined as the ability of firms to swiftly adapt to changes in internal and external environments, seize opportunities, and generate innovative solutions (Doz & Kosonen, 2010; Lu & Ramamurthy, 2011; Sambamurthy et al., 2003; Teece et al., 2016; Lee & Xia, 2010). Organizational

[1] Dr. Öğr. Üyesi, *Department Faculty of Economics and Administrative Sciences, Department of Business Administration, Kirsehir Ahi Evran University, yakkoca38@gmail.com* ORCID ID: https://orcid.org/ 0000-0002-8772-6896

Makale Gönderim Tarihi: 29.07.2025
Makale Kabul Tarihi 18.11.2025

agility not only enables companies to respond quickly to change, but also contributes to their ability to proactively anticipate opportunities and make strategic decisions (Tallon et al., 2019; Overby et al., 2006). In this context, organizational agility has emerged as a critical factor that directly influences firms' innovation performance. Studies in the literature show that organizational agility positively contributes to companies' innovative performance and facilitating the separation of resources during the innovation process (Sherehiy & Karwowski, 2014; Tallon et al., 2019; Roberts & Grover, 2012; Sambamurthy et al., 2003).

However, when the effect of organizational agility on innovation performance is examined, it becomes clear that the relationship is more complicated. At this point, the concept of organizational learning becomes important. Organizational learning refers to the continuous development of the organization through the sharing and restructuring of individual and collective knowledge (Schon & Argyris, 1996; Crossan et al., 1999; Crossan, 1996; Easterby-Smith & Lyles, 2011). Organizations that adopt a learning culture to support their agile structures can respond more effectively to changes and generate more creative solutions in innovation processes (Senge, 2006; Fiol & Lyles, 1985; Vera & Crossan, 2004). Especially, dynamic knowledge management processes enhance the impact of organizational learning on innovation and reinforce competitive advantage (Nonaka & Von Krogh, 2009).

Because of changing digital environment, the effects of technological developments on organizational processes cannot be overlooked (Bresciani et al., 2022). Digital transformation supports innovation activities by reshaping how organizations operate, while also strengthening agility and learning processes (Vial, 2021; Bharadwaj et al., 2013; Kane et al., 2015b; Fitzgerald et al., 2014; Westerman et al., 2014). Digital technologies accelerate the flow of information, improve strategic decision-making processes, and enable the redesign of business models (Sebastian et al., 2020). In this regard, examining the moderating role of digital transformation in the relationship between organizational agility and innovation performance gives a significant area of research for literature.

The purpose of this study is to investigate the mediating effect of organizational learning in the relationship between organizational agility and innovation performance, as well as the moderating role of digital transformation in this relationship. While aiming to address the existing gaps in the literature, this study also seeks to provide guidance to firms in developing their innovation and agility strategies.

2. Literature Review

2.1. Organizational Agility, Organizational Learning, Innovation Performance

Organizational agility determines the ability of organizations to adapt to environmental changes quickly and manage innovation (Teece, 2007; Eisenhardt & Martin, 2017; Nguyen et al., 2024). This agility is directly affected by organizations' organizational learning processes. Organizational learning involves organizations' capacities to generate individual and collective knowledge, share this knowledge, and develop innovative solutions (Senge, 2006; Crossan, 1996). These processes constitute the core elements of organizational agility. Furthermore, organizational learning enhances decision-making processes and increases agility (Gürsev, 2023). Therefore, organizational learning plays a critical role in establishing an agile organizational culture.

Agile organizations create a culture of openness to learning and innovation. This culture enables them to adapt quickly to organizational changes and respond quickly to changing market conditions (Zahra et al., 2006; O'Reilly & Tushman, 2013). Furthermore, a learning-based climate allows organizations to leverage their existing knowledge and experience to develop new strategies and produce more effective solutions (Teece et al., 1997; O'Reilly & Tushman, 2013).

Organizational learning has a direct impact on innovation performance. When an organization effectively manages its learning processes, it can increase its capacity to develop innovative solutions. Organizational learning supports innovation, particularly by creating environments that encourage knowledge sharing, collaboration, and innovative thinking (Crossan, 1996). In this context, as organizations optimize their learning processes, they are more successful in developing new products and services, improving existing processes, and implementing technological innovations (Damanpour, 1991; Liu et al., 2024). Furthermore, organizational learning encourages the flexibility and risk-taking necessary for testing and implementing innovative ideas (Argyris & Schön, 1997). This directly affects the innovation performance of organizations (Damanpour, 1991). Research suggests that organizational learning mediates the relationship between organizational agility and innovation performance. Indeed, Bahrami et al. (2016) emphasize that organizational learning plays a mediating role in the context between organizational intelligence and agility, and strengthens learning capacity contributes positively to innovation processes by increasing the agility of organizations.

However, it should not be forgotten that innovation is a term sustained by organizational learning processes. Innovation emerges not only from the acquisition of new knowledge and skills, but also from the effective application of this knowledge in organizational processes (Argyris & Schön, 1997; Crossan, 1996). Organizational learning helps organizations' knowledge-based decision-making processes and increases their ability to develop innovative solutions (Garcia-Morales et al., 2007). Organizational innovation has a positive relationship with organizational learning (Şeker, Örücü, & Önbıçak, 2024).

The impact of organizational agility on innovation performance is closely related to the ability of agile organizations to adapt to continuous change. Agile organizations can respond to changes in the external environment quickly and develop innovative thinking skills in the process (Teece, 2007; Eisenhardt & Martin, 2017). Agility also quickens internal processes within organizations, thus enabling the faster implementation of innovative ideas (Teece et al., 1997; O'Reilly & Tushman, 2013). Therefore, organizational agility enhances organizations' innovation capacity, ensuring long-term success (Zahra et al., 2006; O'Reilly & Tushman, 2013).

The role of organizational agility in innovation performance emerges when organizations respond to changing market demands and redesign their business processes (Zahra et al., 2006; O'Reilly & Tushman, 2013). Furthermore, agile organizations more quickly identify and adapt to opportunities in the external environment, which fasters the innovation process (Teece, 2007; Eisenhardt & Martin, 2017). In this context, organizational agility emerges as a key factor in the success of innovation performance (Teece et al., 1997).

The relationship between organizational agility, organizational learning, and innovation performance determines organizations' success in adapting to environmental changes (Çeçe & Bayraktar, 2023) and increasing their innovation capacity. By increasing agility, organizational learning accelerates knowledge processes for developing innovative solutions and enhances agility. Similarly, organizational agility accelerates organizations' innovation processes, enabling them to quickly adapt to new opportunities (Teece, 2007; Eisenhardt & Martin, 2017). The interaction between these three factors is one of the key components that will enable organizations to achieve sustainable competitive advantage (O'Reilly & Tushman, 2013).

2.2. Digital Transformation

Today, digital transformation refers to the strategic use of information technologies by businesses as part of their efforts to gain competitive advantage and ensure sustainability (Westerman, Bonnet, & McAfee, 2014). The future success of organizations depends on their use of these technologies

(Klein, 2020). Digital transformation is not just about technological innovations but it also fundamentally impacts organizations' structural processes, cultures, and business models (Stark, 2020; Reuschl et al., 2022). In this context, organizational learning plays a critical role in increasing businesses' adaptability to change and innovation capacity (Argyris & Schön, 1997; Senge, 2006). The relationship between digital transformation and organizational learning enhances businesses' innovation capacity and adaptability, while also enabling them to achieve competitive advantage.

The level of digital transformation defines the extent to which an organization has integrated digital technologies and how it utilizes these technologies in its business processes (Nalbantoglu, 2021; Bharadwaj et al., 2013). Digital transformation encompasses areas such as data analytics, artificial intelligence, the Internet of Things (IoT), and cloud computing (Brynjolfsson & McAfee, 2014). This transformation allows businesses to rapidly adapt to market conditions by improving their information-based decision-making processes (Kane et al., 2015b).

Organizational learning, on the other hand, refers to the transfer of knowledge acquired by individuals and groups to organizational memory and the effective use of this knowledge in strategic decision-making processes (Senge, 2006). This process is not merely the sum of individual learning but also a collective process that emerges through knowledge sharing, collaboration, and the implementation of innovative ideas within the organization (Argyris & Schön, 1997). Organizational learning enables organizations to adapt more quickly to digital transformation processes and encourages the effective use of digital tools (Za et al., 2014).

The relationship between digital transformation and organizational learning is bidirectional. Digital transformation accelerates organizations' learning processes and contributes to organizational learning in the following ways:

1. Facilitating Access to Information: Digital tools accelerate learning processes by providing organizations with rapid access to information (Chesbrough, 2006).

2. Data Analytics and Artificial Intelligence-Enabled Decision Making: Tools such as artificial intelligence and data analytics enable organizations to make smarter decisions, making learning processes more efficient (Bharadwaj et al., 2013).

3. Collaboration and Knowledge Sharing: Digital platforms encourage knowledge sharing among employees and strengthen a culture of collaboration, which accelerates organizational learning (Za et al., 2014).

Conversely, organizational learning supports digital transformation. Organizational learning processes develop the adaptation capabilities necessary for integrating digital technologies (Teece, 2018). Organizational learning includes the following elements that contribute to the successful implementation of digital transformation:

1. Adaptability and Innovation Culture: Organizational learning enables organizations to adapt more quickly to new technologies and plays a role in the implementation of innovative ideas (Teece, 2018).

2. Knowledge Management: Organizational learning processes increase the effectiveness of digital transformation by ensuring the effective use of data obtained from digital tools (Kane et al., 2015a).

The level of digital transformation refers to an organization's use of digital tools and technologies. This level acts as a moderator in organizational learning processes. In other words, an organization with a high level of digital transformation can make organizational learning processes more effective. Digital transformation and organizational learning are two critical processes that support and reinforce each other. The integration of digital tools accelerates organizational learning processes, while a

learning culture deepens digital transformation. The impact of digital transformation on organizational learning and the potential of organizational learning to support digital transformation enable businesses to improve their adaptability and innovation capacity. A deeper examination of the relationship between these two concepts will enable organizations to make their digital transformation processes more efficient in the future.

As a result, it is observed that organizational learning processes accelerate as the level of digital transformation increases, and that digital transformation is more successfully implemented as organizational learning strengthens. The synergistic relationship between these two concepts helps organizations achieve sustainable competitive advantages and increase their innovation capacity (Westerman, Bonnet & McAfee, 2014).

2.3. The Current Study

In today's business world, organizations place great importance on innovation and learning processes to adapt to rapidly changing environmental conditions and sustain their competitive advantage. In this context, the relationship between organizational agility, organizational learning, and innovation performance has become an important research topic in the literature in recent years. Organizational agility refers to the capacity of organizations to rapidly adapt to changing conditions and successfully implement innovations (Teece, 2007; Eisenhardt & Martin, 2017). Organizational learning, on the other hand, encompasses the processes by which organizations acquire knowledge, process it, and apply it (Argyris & Schön, 1997; Senge, 2006). Innovation performance, on the other hand, defines an organization's level of success in innovative activities and plays a critical role in achieving competitive advantage (Damanpour, 1991). This article aims to explore the relationships among organizational agility, organizational learning, and innovation performance, and to reveal how these three factors contribute to organizational success. Therefore, the following hypothesis was developed:

H1: Organizational learning mediates the relationship between organizational agility and innovation performance (see model in Figure 1).

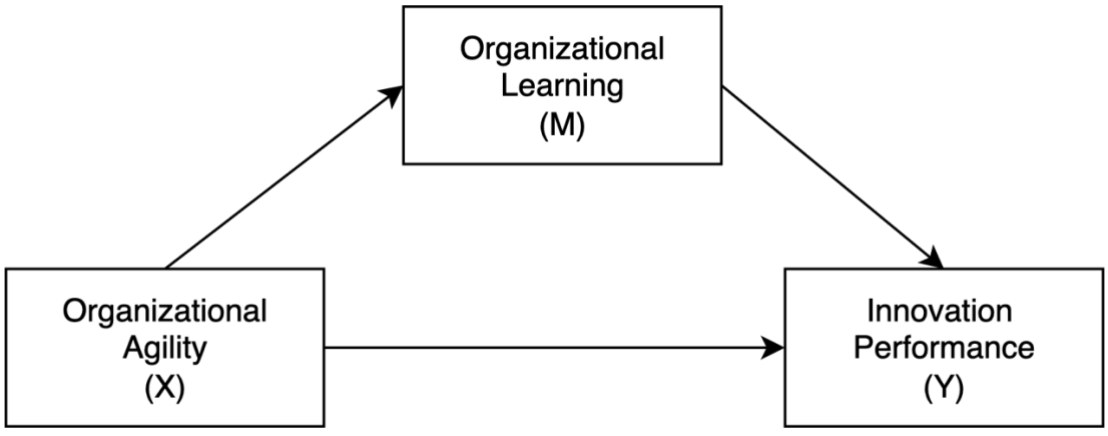

Figure 1: The simple mediation analysis using the PROCESS (Model 4) macro for SPSS.

Dynamic Capabilities Theory (Teece, Pisano & Shuen, 1997) emphasizes organizations' ability to restructure, integrate, and transform their existing resources to adapt to rapidly changing environmental conditions and sustain their competitive advantage. According to this theory, it is not

enough for organizations to simply utilize their existing knowledge and capabilities; their ability to learn new knowledge and integrate this knowledge into organizational processes is also critical.

Digital transformation acts as a driver that strengthens organizations' dynamic capabilities, accelerating and transforming organizational learning processes (Teece, 2018). The adoption of digital technologies enhances organizational learning capacity by optimizing the processes of knowledge acquisition, dissemination, and use (Vial, 2021). In this context, as organizations increase their level of digital transformation, they can respond more quickly to environmental changes and manage their learning processes more effectively.

According to Dynamic Capabilities Theory, digital transformation is not merely a technological advancement but also a strategic adaptation process that integrates organizations' knowledge and skills into their restructuring processes. In this context, organizations with a high level of digital transformation can respond more agilely to environmental changes and maintain their competitive advantage by managing their learning processes more effectively (Teece, 2018). Therefore, the following hypothesis has been developed:

H2: Organizational learning mediates the relationship between organizational agility and innovation performance when the indirect influence of organizational agility on innovation performance is moderated by digital transformation (see model in Figure 2).

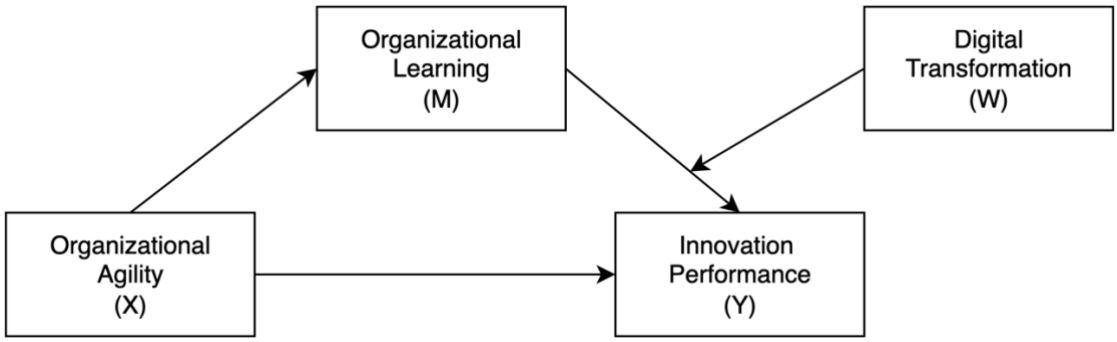

Figure 2: The moderated mediation analysis using the PROCESS (Model 14) macro for SPSS.

3. Methodology

3.1 The Sample

This study was conducted among employees working in the private sector in the province of Kırşehir, Türkiye. According to the 2023 Provincial-Level Basic Labor Force Indicators published by the Turkish Statistical Institute (TÜİK), the number of wage earners employed in the private sector in Kırşehir is approximately 5,000 (TÜİK, 2023). Based on this population size, and using a 95% confidence level with a 5% margin of error, the minimum required sample size was calculated to be 357 (Creswell & Creswell, 2017; Yamane, 1973). However, to enhance the reliability of the data and ensure more robust generalizations in the analysis, the sample size was increased to 500 participants. As a result, the findings of the study are expected to have sufficient representativeness and statistical significance.

Ethics committee approval was given by the Kırşehir Ahi Evran University Social and Human Sciences Research and Publication Ethics Committee with the decision number 2025/07/21 dated 09.04.2025.

Table 1. Demographic Information of Sample

Gender	Frequency	Percent	Cumulative Percent
Women	214	42,8	42,8
Men	286	57,2	100,0
Age	Frequency	Percent	Cumulative Percent
18-24 Years	31	6,2	6,2
25-31 Years	83	16,6	22,8
32-38 Years	158	31,6	54,4
39-45 Years	122	24,4	78,8
46-54 Years	76	15,2	94,0
55 Years and Above	30	6,0	100,0
Marital Status	Frequency	Percent	Cumulative Percent
Married	340	68,0	68,0
Single	160	32,0	100,0
Education	Frequency	Percent	Cumulative Percent
Primary School	53	10,6	10,6
High School	110	22,0	32,6
College	263	52,6	85,2
Graduate School	74	14,8	100,0
Total Work Experience	Frequency	Percent	Cumulative Percent
0-5 Years	119	23,8	23,8
6-10 Years	95	19,0	42,8
11-15 Years	180	36,0	78,8
16 Years and Above	106	21,2	100,0
Years Worked in Current Organization	Frequency	Percent	Cumulative Percent
0-5 Years	47	9,4	9,4
6-10 Years	128	25,6	35,0
11-15 Years	184	36,8	71,8
16 Years and Above	141	28,2	100,0
Number of Employees in the Company	Frequency	Percent	Cumulative Percent
1-100	227	45,4	45,4
101-500	172	34,4	79,8
501-1000	47	9,4	89,2
1001-1500	33	6,6	95,8
1501-2000	9	1,8	97,6
2001 and above	12	2,4	100,0

Based on the demographic data (Table 1), the majority of respondents were men (57.2%) and most were aged between 32-38 years (31.6%), followed by those aged 39-45 (24.4%). A significant portion of the participants were married (68.0%) and held a college degree (52.6%), with 14.8% having completed graduate studies. In terms of professional experience, 36.0% had 11-15 years of total work experience, and 36.8% had worked in their current organization for 11-15 years. Most respondents (45.4%) were employed in companies with 1-100 employees, while only a small proportion (2.4%) worked in organizations with more than 2000 employees. These figures suggest a relatively experienced and well-educated sample, primarily employed in small to mid-sized firms.

3.2. Data Collection Tools

To measure organizational agility, the scale developed by Akkaya and Tabak (2018), consisting of 17 items and four sub-dimensions, was used. Responses on the scale were given on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree).

To measure organizational learning, the scale developed by Ayduğ and Ağaoğlu (2022), based on the individual-level learning, group-level learning, and organizational-level learning models by Marsick and Watkins (1999) and Bontis, Crossan, and Hulland (2002), was used. This scale consists of 39 items and 3 factors, with responses on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree).

To measure innovation performance, the scale developed by Edeş and Çalık (2020), consisting of 15 items and 3 factors, was used. Responses were given on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree).

To measure digital transformation, the 12-item digital transformation scale developed by Nadeem et al. (2018) and translated into Turkish by Sağlam (2021), whose validity and reliability tests were conducted, was used. Responses were given on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree).

3.3. Data Analysis

The mediation effect was examined using Hayes' PROCESS macro with data collected from 500 participants. This analytical approach enabled the testing of indirect effects through bootstrapping procedures, which provide robust estimates of mediation by generating confidence intervals without relying on normality assumptions. The sample size of 500 ensured adequate statistical power for detecting mediation and moderated mediation effects. All analyses were conducted using standard settings in PROCESS, including 5,000 bootstrap resamples to obtain bias-corrected confidence intervals, allowing for rigorous assessment of the significance and magnitude of the indirect pathways within the proposed model.

4. Results

The internal consistency of the measurement instruments used in this study was evaluated using Cronbach's Alpha coefficients (Table 2). The results indicate excellent reliability across all constructs. Specifically, the Organizational Agility scale demonstrated a high level of internal consistency with a Cronbach's Alpha of .958 (.959 based on standardized items) across 17 items. Similarly, the Organizational Learning scale yielded a Cronbach's Alpha of .902 (.903 standardized) over 39 items, reflecting strong reliability despite the relatively large number of items. The Innovation Performance scale showed an exceptionally high reliability coefficient of .976 (.977 standardized) with 15 items. Lastly, the Digital Transformation scale also demonstrated excellent internal consistency, with a Cronbach's Alpha of .960 (.961 standardized) across 12 items. These findings suggest that all measurement scales used in the study are highly reliable for further analysis.

Table 2. Results of Reliability Analysis of Scales

	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Değişken Sayısı
Organizational Agility	,958	,959	17
Organizational Learning	,902	,903	39
Innovation Performance	,976	,977	15
Digital Transformation	,960	,961	12

This report presents the results of a moderated mediation analysis conducted using Andrew F. Hayes' PROCESS macro (Model 14). The variables are defined as follows:

X (Independent Variable): OA_mean (Organizational Agility)

M (Mediator Variable): OL_mean (Organizational Learning)

Y (Dependent Variable): IP_mean (Innovation Performance)

W (Moderator Variable): DT_mean (Digital Transformation)

Table 3. Regression Analyses Results for the Mediator (OL_mean)

Variable	Coefficient (b)	SE	t	p	LLCI	ULCI
Constant	-1,5874	0,1264	-12,56	<,001	-1,8357	-1,3391
OA_mean	0,5291	0,0414	12,79	<,001	0,4478	0,6104

The coefficient for OA_mean predicting OL_mean is 0.5291 with a p-value less than .001, indicating a statistically significant positive effect (Table 3). For every one unit increase in organizational agility (OA_mean), organizational learning (OL_mean) increases by approximately 0.53 units. The 95% confidence interval [0.4478, 0.6104] does not include zero, confirming the effect's reliability. This finding implies that higher organizational agility enhances the organization's learning processes. Agile organizations are better equipped to adapt quickly, which fosters continuous learning and knowledge acquisition, a foundation for innovation and long-term success.

Table 4. Regression Results for the Dependent Variable (IP_mean)

Variable	Coefficient (b)	SE	t	p	LLCI	ULCI
Constant	2,6461	0,1200	22,06	<,001	2,4104	2,8818
OA_mean	0,1363	0,0394	3,46	,0006	0,0588	0,2138
OL_mean	0,6059	0,0370	16,39	<,001	0,5332	0,6785
DT_mean	0,1592	0,0325	4,90	<,001	0,0954	0,2230
OL_mean × DT_mean	0,2714	0,0544	4,99	<,001	0,1646	0,3783

Table 4 shows regression results that organizational agility (OA_mean) has a positive and significant effect on innovation performance (IP_mean) with a coefficient of 0.1363 ($p = .0006$). Organizational learning (OL_mean) shows a stronger positive effect ($b = 0.6059$, $p < .001$) (Indicating that H1 hypothesis is supported). Digital transformation (DT_mean) also positively affects innovation ($b = 0.1592$, $p < .001$). Importantly, the interaction between OL_mean and DT_mean is significant ($b = 0.2714$, $p < .001$). This suggests that innovation performance improves not only directly through agility and learning but also via the moderating effect of digital transformation on learning. In other words, digital transformation strengthens the positive influence of organizational learning on innovation outcomes, highlighting the critical role of digital technologies in maximizing learning benefits.

Table 5. Moderation Interaction and Model Fit

Statistic	Value
Outcome Model R^2	0,4957
Change in R^2 due to Moderation	0,0254
F-test for Moderation	24,90
p-value for Moderation	<,001

Table 5 shows moderation interaction. The overall model explains 49.57% of the variance in innovation performance ($R^2 = 0.4957$). The moderation effect of digital transformation adds a significant increase of 2.54% to explained variance ($R^2 = 0.0254$, $p < .001$). The strong model fit demonstrates that the variables included robustly explain innovation performance. The significant increase due to moderation confirms that digital transformation meaningfully enhances the effect of organizational learning on innovation, emphasizing its strategic importance.

Table 6. Conditional Indirect Effects (X → M → Y at values of DT_mean)

DT_mean Level	Indirect Effect	BootSE	LLCI	ULCI	Significant?
-0,6102	0,2329	0,0320	0,1711	0,2967	Yes
0,0000	0,3205	0,0317	0,2597	0,3843	Yes
+0,6102	0,4082	0,0399	0,3323	0,4890	Yes

The indirect effect of organizational agility on innovation through organizational learning varies by digital transformation levels (Table 6):

At low DT_mean (-0.6102), indirect effect = 0.2329 (95% CI [0.1711, 0.2967])

At mean DT_mean (0), indirect effect = 0.3205 (95% CI [0.2597, 0.3843])

At high DT_mean (+0.6102), indirect effect = 0.4082 (95% CI [0.3323, 0.4890])

All effects are significant as their confidence intervals exclude zero. This pattern indicates the indirect relationship strengthens as digital transformation increases. Organizations with higher digital maturity gain greater innovation benefits from agility via learning processes, highlighting the critical synergistic effect of digital transformation.

Table 7. Index of Moderated Mediation

Index	Value	BootSE	LLCI	ULCI
Moderated Mediation	0,1436	0,0286	0,0917	0,2030

The index of moderated mediation is 0.1436 with a 95% confidence interval [0.0917, 0.2030], not including zero, indicating significant moderated mediation (Table 7). This confirms that the mediation effect of organizational learning between agility and innovation performance is significantly moderated by digital transformation. Thus, digital transformation plays a pivotal role in amplifying how learning channels agility into innovation. Therefore, H2 hypothesis is supported.

Table 8. Comparisons of Indirect Effects

Effect 1	Effect 2	Difference	BootSE	LLCI	ULCI	Significant?
0,3205	0,2329	0,0876	0,0174	0,0559	0,1238	Yes
0,4082	0,2329	0,1753	0,0348	0,1118	0,2477	Yes
0,4082	0,3205	0,0876	0,0174	0,0559	0,1238	Yes

Pairwise contrasts between indirect effects at different DT_mean levels are significant (Table 8):

Contrast between mean and low DT_mean: 0.0876 (95% CI [0.0559, 0.1238])

Contrast between high and low DT_mean: 0.1753 (95% CI [0.1118, 0.2477])

Contrast between high and mean DT_mean: 0.0876 (95% CI [0.0559, 0.1238])

Significant contrasts confirm that the strength of the indirect effect varies notably across digital transformation levels. This reinforces the idea that digital transformation enhances the mediated relationship, underlining its importance for organizational innovation strategies.

The moderated mediation analysis demonstrates that organizational agility influences innovation performance both directly and indirectly through organizational learning. Organizational learning is a critical mediator explaining how agility translates into innovation outcomes.

Digital transformation emerges as a strong moderator that enhances the indirect effect. Specifically, higher levels of digital transformation amplify the positive impact of organizational learning on innovation performance. This suggests that digital technologies and processes support organizational learning mechanisms, thereby increasing innovation capability.

In conclusion, organizations, which aim to improve innovation performance should focus on increasing agility and fostering learning capabilities, while simultaneously advancing digital transformation initiatives. The synergy among these variables accelerates innovation processes and strengthens competitive advantage.

5. Conclusion and Discussion

The results of this research reveal that the impact of organizational agility on innovation performance occurs through both direct and indirect ways. The direct effect findings indicate that agile structures enable faster movement in innovative processes, while the indirect effect occurs through organizational learning. The mediating role of organizational learning demonstrates that the flexibility inherent in agile structures accelerates knowledge generation, sharing, and application processes, increasing innovation competence. This demonstrates that managing organizational agility and learning together is a strategic necessity.

Regarding organizational agility, Eisenhardt and Martin (2017) emphasize that agility provides a strategic advantage in the face of uncertainty. The findings of this study also confirm that agility directly enhances innovation performance. However, this effect appears to be further strengthened by learning. In this context, the research suggests that the agility-learning-innovation triangle should be considered as a whole. İmamoglu and colleagues (2024) conducted a study on 285 managers from companies operating in various sectors in Gebze. Their findings indicated that organizational agility was positively correlated with digital transformation. As a result of the research conducted by Kayacı and Kanten (2024) on 341 employees of a large-scale organization operating in the building products industry, they concluded that organizational learning positively affects all dimensions of organizational agility.

The findings regarding the moderating role of digital transformation are consistent with the findings of Za et al. (2014) that digital tools facilitate learning processes. This study empirically demonstrated that the effect of learning on innovation becomes stronger as the level of digital transformation increases. This demonstrates that digital transformation is not merely a technology investment but also a strategic learning and transformation tool. Furthermore, in line with dynamic capabilities theory (Teece, 2007), this study demonstrates that agility, learning, and digitalization together increase the transformation capacity of businesses. Unlike other studies in the literature, this research offers a unique contribution to the literature by examining three variables together.

In light of the research results, it is recommended that organizations primarily adopt agile management approaches to enhance their innovation performance. However, agility alone is not sufficient; this structure must be supported by learning. Therefore, establishing continuously learning organizational structures and encouraging individual employee learning processes is critical. According to the study which supported the findings of this study, conducted by Ulutürk (2024) using the semi-systematic method, she found that organizational learning has a positive effect on the innovation activities of organizations.

However, digital transformation investments must be approached from a strategic perspective. It is crucial that digital tools not only provide operational convenience but also be positioned to support learning and innovation processes. Data analytics, artificial intelligence, and collaborative digital platforms, in particular, accelerate learning processes and trigger innovation. Therefore, it is

recommended that businesses plan their digital transformation strategies not only with a focus on technology but also with a focus on learning.

Statement of Research and Publication Ethics

Ethics committee approval was given by the Kırşehir Ahi Evran University Social and Human Sciences Research and Publication Ethics Committee with the decision number 2025/07/21 dated 09.04.2025.

Authors' Contributions to the Article

Author 1's contribution to the article is 100%.

Support Statement

This study was not supported by any institution or organization.

Declaration of interest

The authors affirm that this manuscript is an original work and has not been submitted or published elsewhere. All sources used in the study have been properly cited, and proper ethical standards have been followed in the research and writing process. The authors have no conflicts of interest to declare. The research complies with the ethical principles of academic publishing, including transparency, accountability, and integrity.

References

Akkaya, B., & Tabak, A. (2018). Örgütsel çeviklik ölçeğinin Türkçeye uyarlanması: Geçerlik ve güvenirlik çalışması. *İş ve İnsan Dergisi, 5*(2), 185-206.

Argyris, C., & Schön, D. A. (1997). Organizational learning: A theory of action perspective. *Reis, (77/78*), 345-348.

Ayduğ, D., & Agaoglu, E. (2022). Yükseköğretim kurumlarına yönelik örgütsel öğrenme ölçeğinin geliştirilmesi: geçerlilik ve güvenilirlik çalışması. *Mersin Üniversitesi Eğitim Fakültesi Dergisi, 18*(1), 1-25.

Bahrami, M. A., Kiani, M. M., Montazeralfaraj, R., Zadeh, H. F., & Zadeh, M. M. (2016). The mediating role of organizational learning in the relationship of organizational intelligence and organizational agility. *Osong public health and research perspectives*, *7*(3), 190-196.

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. V. (2013). Digital business strategy: Toward a next generation of insights. *MIS Quarterly, 37*(2), 471–482.

Bontis, N., Crossan, M. M., & Hulland, J. (2002). Managing an organizational learning system by aligning stocks and flows. *Journal of Management Studies, 39*(4), 437-469.

Bresciani, S., Ferraris, A., Santoro, G., & Kotabe, M. (2022). Opening up the black box on digitalization and agility: Key drivers and main outcomes. *Technological Forecasting and Social Change*, *178*, 121567.

Brynjolfsson, E., & McAfee, A. (2014). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. New York: W. W. Norton & Company.

Chesbrough, H. W. (2006). The era of open innovation. *Managing innovation and change*, *127*(3), 34-41.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Crossan, M. M. (1996). *The knowledge-creating company: how Japanese companies create the dynamics of innovation*.

Crossan, M. M., Lane, H. W., & White, R. E. (1999). An organizational learning framework: From intuition to institution. Academy of Management Review, 24(3), 522–537.

Çeçe, F., & Bayraktar, O. (2023). Örgütsel Öğrenmenin İş Performansi Üzerindeki Etkisinde Örgütsel Desteğin Aracilik Rolü. *Trakya Üniversitesi Sosyal Bilimler Dergisi*, *25*(2), 495-522.

Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of Management Journal, 34*(3), 555-590.

Doz, Y. L., & Kosonen, M. (2010). Embedding strategic agility: A leadership agenda for accelerating business model renewal. *Long Range Planning, 43*(2–3), 370–382.

Easterby-Smith, M., & Lyles, M. A. (Eds.). (2011). *Handbook of organizational learning and knowledge management*. Wiley.

Edeş, U., & Çalık, E. (2020). İmalat İşletmelerinin Sürdürülebilir Süreç İnovasyon Performansının Ölçümü için Ölçek Geliştirme. *Journal of Entrepreneurship and Innovation Management, 9*(2), 1-24.

Eisenhardt, K. M., & Martin, J. A. (2017). Dynamic capabilities: what are they?. *The SMS Blackwell handbook of organizational capabilities*, 341-363.

Fiol, C. M., & Lyles, M. A. (1985). Organizational learning. *Academy of Management Review, 10*(4), 803–813.

Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2014). Embracing digital technology: A new strategic imperative. *MIT Sloan Management Review, 55*(2), 1–12.

García-Morales, V. J., Ruiz-Moreno, A., & Llorens-Montes, F. J. (2007). Effects of technology absorptive capacity and technology proactivity on organizational learning, innovation and performance: An empirical examination. *Technology Analysis & Strategic Management*, *19*(4), 527-558.

Gürsev, S. (2023). Learning Organization and Innovation Coaching Model Organizational Agility Approach: A Case Study. *Avrupa Bilim ve Teknoloji Dergisi, (51),* 125-134.

İmamoğlu, S. Z., İmamoğlu, S. E., Avsuz, A. A., Türkcan, H. (2024). Dönüşümsel Liderlik ve Örgütsel Çevikliğin Dijital Dönüşüm Üzerine Etkisi. *Manisa Celal Bayar Üniversitesi Sosyal Bilimler Dergisi, 22*(2), 311-328. https://doi.org/10.18026/cbayarsos.1466131.

Kane, G. C., Palmer, D., Phillips, A. N., & Kiron, D. (2015a). Is your business ready for a digital future? *MIT Sloan Management Review, 56*(4), 37-44.

Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015b). Strategy, not technology, drives digital transformation. *MIT Sloan management review*.

Kayacı, B., & Kanten, P. (2024). Örgütsel Çevikliğin Öncülleri: Proaktif Kişilik, Bilişsel Esneklik, Örgütsel Öğrenme. *TroyAcademy, 9*(2), 155-175. https://doi.org/10.31454/troyacademy.1480937

Klein, M. (2020). İşletmelerin dijital dönüşüm senaryolari-kavramsal bir model önerisi. *Elektronik Sosyal Bilimler Dergisi*, *19*(74), 997-1019.

Lee, G., & Xia, W. (2010). Toward agile: An integrated analysis of quantitative and qualitative field data on software development agility. *MIS Quarterly, 34*(1), 87–114.

Liu, G., Tsui, E., & Kianto, A. (2024). A meta-analytic study on the organisational learning–performance relationships via country cultural and economic contexts. *Knowledge Management Research & Practice*, *22*(1), 17-31.

Lu, Y., & Ramamurthy, K. (2011). Understanding the link between information technology capability and organizational agility: An empirical examination. *MIS Quarterly, 35*(4), 931–954.

Marsick, V. J., & Watkins, K. E. (1999). *Facilitating learning organizations: Making learning count*. Gower Publishing.

Nadeem, A., Abedin, B., Cerpa, N. & Chew, E. (2018). Editorial: Digital Transformation & Digital Business Strategy in Electronic Commerce-The Role of Organizational Capabilities. *Journal of Theoretical and Applied Electronic Commerce Research, 13*(2), 1-8.

Nalbantoğlu, C. B. (2021). Dijital dönüşümün örgüt kültürü üzerine yansımaları. *Karamanoğlu Mehmetbey Üniversitesi Sosyal ve Ekonomik Araştırmalar Dergisi*, *23*(40), 193-207.

Nguyen, T., Le, C. V., Nguyen, M., Nguyen, G., Lien, T. T. H., & Nguyen, O. (2024). The organisational impact of agility: a systematic literature review. *Management Review Quarterly*, 1-49.

Nonaka, I., & Von Krogh, G. (2009). Perspective—Tacit knowledge and knowledge conversion: Controversy and advancement in organizational knowledge creation theory. *Organization Science, 20(*3), 635–652.

O'Reilly, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. *Academy of Management Perspectives, 27*(4), 324-338.

Overby, E., Bharadwaj, A., & Sambamurthy, V. (2006). Enterprise agility and the enabling role of information technology. *European Journal of Information Systems, 15*(2), 120–131.

Reuschl, A. J., Deist, M. K., & Maalaoui, A. (2022). Digital transformation during a pandemic: Stretching the organizational elasticity. *Journal of Business Research*, *144*, 1320-1332.

Roberts, N., & Grover, V. (2012). Leveraging information technology infrastructure to facilitate a firm's customer agility and competitive activity: An empirical investigation. *Journal of Management Information Systems, 28*(4), 231–270.

Sağlam, M. (2021). İşletmelerde Geleceğin Vizyonu Olarak Dijital Dönüşümün Gerçekleştirilmesi ve Dijital Dönüşüm Ölçeğinin Türkçe Uyarlaması. *İstanbul Ticaret Üniversitesi Sosyal Bilimler Dergisi, 20*(40), 395-420.

Sambamurthy, V., Bharadwaj, A., & Grover, V. (2003). Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *MIS Quarterly, 27*(2), 237–263.

Schon, D., & Argyris, C. (1996). *Organizational learning II: Theory, method and practice*. *Reading: Addison Wesley*, *305*(2).

Sebastian, I. M., Ross, J. W., Beath, C., Mocker, M., Moloney, K. G., & Fonstad, N. O. (2020). How big old companies navigate digital transformation. In *Strategic information management* (pp. 133-150). Routledge.

Senge, P. M. (2006). *The fifth discipline: The art and practice of the learning organization*. New York, NY: Doubleday/Currency.

Sherehiy, B., & Karwowski, W. (2014). The relationship between work organization and workforce agility in small manufacturing enterprises. *International Journal of Industrial Ergonomics, 44*(3), 466–473.

Stark, J. (2020). *Digital transformation of industry* (p. 17). Geneva: Springer International Publishing.

Şeker, C., Örücü, E., & Önbıçak, A. E. (2024). Örgütlerde inovasyon, örgütsel öğrenme ilişkisinde yapay zekâ kaygısının rolü. *İşletme Araştırmaları Dergisi*, *16*(1), 328-345.

Tallon, P. P., Queiroz, M., Coltman, T., & Sharma, R. (2019). Information technology and the search for organizational agility: A systematic review with future research possibilities. *The Journal of Strategic Information Systems, 28*(2), 218–237.

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal, 28*(13), 1319-1350.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509-533.

Teece, D. J. (2018). Dynamic capabilities as (workable) management systems theory. *Journal of Management & Organization, 24*(3), 359-368.

Teece, D., Peteraf, M., & Leih, S. (2016). Dynamic capabilities and organizational agility: Risk, uncertainty, and strategy in the innovation economy. *California Management Review, 58*(4), 13–35.

Teece, D. J. (2018). Business models and dynamic capabilities. *Long Range Planning, 51*(1), 40-49.

TÜİK (2023). İl Düzeyinde Temel İşgücü Göstergeleri. https://tuik.gov.tr

Ulutürk, F. (2025). Örgütsel Öğrenmenin, Çalışanların Öz Yeterlilik Ve İnovasyon Performansına Etkileri. *R&S - Research Studies Anatolia Journal, 8*(3), 311-339. https://doi.org/10.33723/rs.1670517.

Vera, D., & Crossan, M. (2004). Strategic leadership and organizational learning. Academy of Management Review, *29*(2), 222–240.

Vial, G. (2021). Understanding digital transformation: A review and a research agenda. *Managing digital transformation*, 13-66.

Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital: Turning technology into business transformation*. Boston, MA: Harvard Business Review Press.

Yamane, T. (1973). *Statistics: An introductory analysis*.

Jo, Y., & Hong, A. J. (2022). Impact of agile learning on innovative behavior: A moderated mediation model of employee engagement and perceived organizational support. *Frontiers in Psychology*, *13*, 900830.

Za, S., Spagnoletti, P., & North-Samardzic, A. (2014). Organisational learning as an emerging process: The generative role of digital tools in informal learning practices. *British Journal of Educational Technology*, *45*(6), 1023-1035.

Zahra, S. A., Sapienza, H. J., & Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: A review, model and research agenda. *Journal of Management studies*, *43*(4), 917-955.

Extended Summary

The Impact of Organizational Agility on Innovation Performance: The Key Role of Digital Transformation

In today's rapidly changing and highly competitive business environment, the ability of organizations to respond quickly and strategically to internal and external changes has become essential for maintaining innovation performance. This study explores how organizational agility enhances innovation performance both directly and indirectly through organizational learning, and how digital transformation moderates this indirect effect. Rooted in the Dynamic Capabilities Theory, the research develops an integrated model that combines agility, learning, and digital maturity to explain how firms can build and sustain innovation capabilities in complex and turbulent environments.

Organizational agility refers to the capacity of a firm to adapt rapidly to change, reconfigure resources efficiently, and respond proactively to emerging opportunities. It encompasses the speed and flexibility with which organizations adjust their strategies, structures, and processes in response to dynamic market conditions. While prior research has established a direct link between agility and innovation, this study emphasizes that this relationship is not linear or standalone. Instead, the ability of an organization to translate agility into tangible innovation outcomes is significantly influenced by its internal learning mechanisms. Organizational learning, in this context, represents the collective processes through which knowledge is acquired, shared, and applied within the organization. It enhances an organization's adaptive potential and contributes to innovation by fostering creativity, collaboration, and strategic decision-making based on accumulated knowledge and shared experiences.

The study further integrates digital transformation into this framework, arguing that digital maturity amplifies the impact of learning on innovation. Digital transformation is not viewed merely as a technological upgrade but as a strategic enabler that restructures organizational processes, accelerates knowledge flows, and facilitates innovative behaviors. Technologies such as artificial intelligence, big data analytics, cloud computing, and collaborative platforms reshape how learning is conducted and leveraged across teams. In digitally mature organizations, learning becomes more dynamic, integrated, and impactful. Thus, the synergy among agility, learning, and digitalization is proposed as a key driver of innovation performance and long-term organizational competitiveness.

To empirically test these relationships, the study utilized a quantitative survey method. Data were collected from 500 employees working in the private sector in Kırşehir, Türkiye. The sample was demographically diverse, with a majority of participants holding college degrees and having significant work experience, particularly in small and mid-sized enterprises. Measurement tools included validated scales for organizational agility, organizational learning, innovation performance, and digital

transformation, each assessed using a five-point Likert scale. The analysis employed Hayes' PROCESS macro for SPSS, specifically Models 4 and 14, to test for simple mediation and moderated mediation effects. This methodological approach enabled the researcher to examine both direct and indirect effects and to determine how the indirect pathway varies across different levels of digital transformation.

The findings revealed several important insights. First, organizational agility significantly predicted organizational learning, indicating that agile organizations are more likely to foster environments conducive to continuous learning and adaptation. Second, both organizational agility and organizational learning had significant positive effects on innovation performance. This confirmed that while agility directly contributes to innovation, it also does so indirectly by enhancing learning processes. In essence, agile organizations tend to learn more effectively, and this improved learning and innovation outcomes. Thus, learning serves as a crucial conduit that links agility with innovation.

More importantly, the study found that digital transformation plays a critical moderating role. The interaction between organizational learning and digital transformation was statistically significant, showing that the positive impact of learning on innovation becomes stronger as digital maturity increases. Conditional indirect effects analyses demonstrated that the indirect influence of agility on innovation via learning varied substantially depending on the level of digital transformation. At low levels of digital transformation, the indirect effect was modest; however, at high levels of digital maturity, the indirect effect was significantly stronger. This pattern confirms that digital transformation enhances the value of organizational learning in driving innovation, suggesting that technology enables organizations to better capture, disseminate, and utilize knowledge in ways that fuel innovation.

The model as a whole accounted for nearly 50% of the variance in innovation performance, indicating strong explanatory power. The moderated mediation index was also statistically significant, further confirming that the mediating effect of learning is contingent on the level of digital transformation. Pairwise comparisons among different levels of digital maturity showed significant contrasts, highlighting that the indirect effect becomes progressively stronger as digital capabilities improve. This evidence positions digital transformation not just as a supporting function but as a strategic lever that magnifies the impact of agility-driven learning on innovation outcomes.

These results carry significant implications for both academic theory and managerial practice. From a theoretical standpoint, the study reinforces the central tenets of the Dynamic Capabilities Theory by demonstrating how firms must continuously reconfigure their internal processes and resources—through learning and technological integration—to remain competitive in dynamic environments. The research contributes to the literature by offering a nuanced understanding of how agility operates not in isolation but in concert with learning and digital transformation. It also introduces a novel moderated mediation model that empirically validates the conditional nature of this relationship, addressing existing gaps in the literature where these variables were often studied separately or only partially considered.

From a practical perspective, the findings underscore that fostering organizational agility is necessary but insufficient for innovation success. Organizations must complement agility with robust learning systems that enable knowledge sharing, collective sense-making, and capability development. This requires building a culture that encourages inquiry, experimentation, and feedback, as well as investing in the systems and processes that facilitate organizational memory and knowledge transfer. Learning must be institutionalized—not left to chance—if firms are to consistently convert agility into innovative outputs.

Moreover, digital transformation should be pursued strategically, not merely as a response to technological trends or as an isolated IT project. Investments in digital tools and platforms must be aligned with the organization's learning and innovation goals. For example, the adoption of analytics and AI should be aimed not only at efficiency but also at enhancing employees' decision-making capabilities and uncovering new insights that can drive product or process innovation. Similarly, collaborative platforms should be used to break down silos and encourage cross-functional learning and ideation. When digital transformation is integrated into the organization's strategic framework in this way, it accelerates learning processes and significantly increases their contribution to innovation.

The study also offers practical guidance for managers seeking to boost innovation performance. First, managers should assess their organization's current level of agility and learning maturity, and identify gaps where learning mechanisms may not be fully supporting strategic flexibility. Second, digital transformation initiatives should be evaluated not just for their operational impact but for their capacity to enhance learning and innovation. Finally, managers should consider how these three elements—agility, learning, and digitalization—interact in their specific organizational context and take an integrated approach to capability development.

In addition to these practical insights, the study emphasizes the importance of cross-functional collaboration and leadership commitment in implementing agile and learning-oriented practices. Leaders must not only support digital investments but also foster psychological safety and openness in the workplace—conditions that are necessary for continuous learning and experimentation. Building organizational routines that reflect these values can help embed innovation into the culture and make it a repeatable, scalable process rather than an ad-hoc outcome.

In conclusion, the research presents a compelling case for the joint role of organizational agility, organizational learning, and digital transformation in enhancing innovation performance. While agility enables quick adaptation, and learning facilitates knowledge acquisition and application, digital transformation acts as a multiplier that elevates the impact of learning on innovation. This triadic relationship forms the foundation of dynamic capabilities, equipping firms to respond to uncertainty with resilience, creativity, and strategic foresight.

The study stands out by integrating these three dimensions into a single empirical model, offering a richer, more holistic understanding of how innovation capabilities are developed and sustained. Future research could build on this model by exploring other potential moderators (e.g., leadership style, organizational structure, digital culture), applying the framework in different cultural or sectoral contexts, or employing longitudinal designs to assess the evolution of these relationships over time. Studies could also investigate how specific technologies (e.g., AI, blockchain, or digital twins) interact with organizational processes to shape innovation trajectories.

Ultimately, the findings affirm that in a world characterized by rapid technological advancement and constant disruption, innovation is no longer the product of isolated efforts. Instead, it is the result of interconnected processes—agility, learning, and digital transformation—working in harmony to enable firms to thrive in the face of complexity. Organizations that successfully integrate these processes will be better positioned to generate innovative solutions, respond to shifting market demands, and secure a sustainable competitive advantage in the digital era.