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The Mediating Role of Innovation Orientation in the Impact of Digital Transformation on Logistics Capabilities of Enterprises

Abstract

Research background and purpose: In an era of digital transformation, logistics companies must adapt to technological advancements to maintain competitiveness. This study examines the impact of digital transformation on logistics capabilities, with a specific focus on the mediating role of innovation orientation. While prior research has explored the direct effects of digital transformation, studies investigating the mechanisms behind this relationship remain limited. Addressing this gap, the study aims to provide empirical insights for academia and industry.

Design/methodology/approach: The research employs a quantitative methodology based on Industry 4.0 principles. Data were collected from 401 participants using a judgmental sampling method from businesses affiliated with the Istanbul Chamber of Commerce (Türkiye) transportation and logistics services committee. The analysis was conducted using SPSS 23.0 and SPSS PROCESS Macro 4.3 (Model 4) with the bootstrap technique to examine mediation effects.

Findings: The results indicate that digital transformation significantly enhances logistics capabilities. It positively influences sub-dimensions such as logistics service differentiation and logistics innovation. Moreover, innovation orientation partially mediates this relationship, suggesting that companies with a stronger innovation focus benefit more from digitalization.

Value added and limitations: This study contributes to the literature by offering theoretical and methodological insights into the interplay between digital transformation, logistics capabilities, and innovation orientation. The findings provide practical recommendations for logistics companies in formulating digital transformation strategies. However, the study is limited to data from Istanbul Chamber of Commerce-affiliated businesses, which may affect generalizability. Future research could expand these findings by including a broader range of sectors and employing alternative research methodologies.

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1. Introduction

The digital transformation process necessitates the development of unique logistics competencies for businesses to gain a competitive advantage. These competencies emerge as a fundamental requirement for creating differentiation in logistics services. Looking at the conducted studies, the concept of capability holds a significant place in the research conducted in the logistics domain [Dang et al., 2021, p. 81; Yang, 2012, p. 53; Qiao, Zhao, 2008, p. 2858; Bag, Gupta, Luo, 2020, p. 607]. For businesses, logistic capabilities need to ensure cost-effectiveness and service differentiation in logistics to provide a competitive advantage and return on investment. Logistic capabilities provide added value both at the enterprise level and for the national economy. The more innovative a business is and the more it increases its factors in this regard, the higher the likelihood of success and competitiveness. While the pursuit of innovation by businesses is a notable factor, it can also have an impact on digital transformation and logistic capabilities.

This study aims to elucidate the role of innovation orientation in the relationship between digital transformation and logistic capabilities. In other words, it aims to determine whether innovation orientation acts as a mediating variable in the impact of digital transformation on logistic capabilities. No previous study has been found in the literature that examines the mediating role of innovation orientation in the impact of digital transformation on logistic capabilities. The fact that such a study has not been conducted before highlights the significance of this research. This study may provide insights into the technological digitalization of businesses in the logistics sector and lay the groundwork for further research. Specifically, this study on the mediating role of innovation orientation may inspire more in-depth investigations into similar topics in the future.

This research addresses two fundamental questions: firstly, does digital transformation enhance logistic capabilities? Secondly, is there a mediating role of innovation orientation in the relationship between digital transformation and logistic capabilities? In seeking answers to these questions, the concepts of digital transformation, logistics capabilities, and innovation orientation are first detailed within the literature review. Subsequently, the research methodology section includes a discussion of the research method and hypotheses, sampling, data collection, and evaluation techniques. The research results section encompasses reliability analysis, normality analysis, and analyses related to the hypotheses. The study concludes with the discussion and conclusion sections.

2. Literature Review

This section examines the concepts of digital transformation, logistics capabilities, and the sub-dimensions of logistics capability, namely logistics innovation and logistics service differentiation. It focuses on the impact of innovation orientation on the relationship between digital transformation and logistics capabilities. While existing literature addresses the impact of digital transformation on logistics capabilities, empirical studies on the mechanisms through which this impact occurs are limited. This study aims to fill this gap in the literature by revealing the mediating role of innovation orientation in the effect of digital transformation on logistics capabilities. By thoroughly analyzing how the sub-dimensions of logistics capabilities, such as logistics innovation and logistics service differentiation, are shaped by digital transformation, the study provides actionable findings at the sectoral level. Additionally, statistical analyses based on an extensive data set demonstrate that innovation orientation plays a critical role in enhancing the contribution of digitalization to the competitive advantage of logistics businesses. The study not only offers theoretical and methodological contributions to the academic literature but also presents a guiding model for companies in the logistics sector to shape their digital transformation strategies.

2.1. Digital Transformation

Digital transformation fundamentally focuses on the business-driven integration of technologies such as the IoT, social media, analytics, mobile, and cloud computing, combining these with information technologies at both individual and organizational levels [Sebastian et al., 2017, p. 198]. Digital transformation has enabled the evolution of labor-intensive production processes into mechanized processes in light of technological advancements. Therefore, the mechanization of processes occurs based on information technologies, which not only facilitates the collection of data but also renders the interpretation and utilization of data valuable.

Digital transformation is a capability that serves as a guiding force in an enterprise's digitalization roadmap. It provides strategic direction for every step taken along the journey, emphasizing the adoption of digital technologies and diverse business models as core strategies. This process involves coordination across all areas, integrating customer-focused contributions into operational processes and the value chain (Ismail et al., 2017, p. 9).

The concept of digitalization, which is accepted and embraced by businesses and society, is currently undergoing a transformation process. In this context, various structures such as business models, operations management, customer services, and human resources are being impacted by digitalization. Businesses must integrate correct talent management, innovation utilization, and globalization while adapting not only

their internal operations but also the complex interactions among all stakeholders in the digital environment. To overcome such challenges, the adaptation of organizational culture to digitalization, the shaping of behaviors, the updating of recruitment criteria, and changes in leadership styles are driving the conditions for change (Morakanyane et al., 2020; Kane et al., 2016).

Technology, objects, and processes constitute the other components. From this perspective, the processing of data, its transformation into information, and the construction of a better future make transformation inevitable [Bozkurt et al., 2021, p. 40]. Digital transformation leads to significant changes in all aspects of life and across all segments of society, contributing to the transformation of various areas such as business, business models, societal structure, strategies, products, and services. It enables businesses to diversify their tasks and reach solutions in different aspects, up to customer satisfaction. Essentially, digital transformation brings about a profound change, not only in simple changes in operations and processes but also in supporting innovative ideas.

Digital transformation, with an innovation-focused approach, directs all of a business's resources toward innovation based on sustainability. It involves the development of knowledge and skills, increased coordination both internally and with the external environment, the use of integrated working principles in operational practices, and the fostering of creativity (Mayakova, 2019, p.138; Tabrizi et al., 2019, p. 6; Armengaud et al., 2017, p. 335). Innovation, in general, is structured around the use of an enterprise's capabilities, skills, and unique characteristics through an innovative perspective while operating in alignment with the principles of the Kaizen philosophy. In this regard, the enhancement of any ideas generated within the organization, whether through internal development or external resources, can increase the contributions made to the business.

When digital transformation technologies are integrated with innovation strategies, a business's ability to acquire, comprehend, and process information can be developed and enhanced. Additionally, the entry of unnecessary information into the system can be prevented to avoid data pollution. The level of flexibility and rapid responsiveness an enterprise possesses enables it to provide feedback aligned with customer needs and channel its efforts toward service adaptation. In this context, digital transformation technologies, with an innovation-centered approach, allow businesses to accurately perceive customer demands and optimally manage the flow across the value chain. The ability to process information, along with customers' access to and utilization of that information, positively influences the orientation towards innovation (Hilbert, 2020, p. 190; Adro & Leitão, 2020, p. 53; Pavlou & Sawy, 2010; Carvalho et al., 2022, p. 219; Kroh et al., 2018, p. 725; Saldanha et al., 2017, p. 267).

Businesses strengthen their marketing strategies and integrate into e-commerce platforms through digital transformation, affecting every aspect of the enterprise.

Digitally transformed businesses tend to establish robust data security policies to cope with the increasing volume of data (Düzcan & Fidan, 2023, p. 359). Digital economies necessitate digitalization and drive traditional industries towards development and transformation. They prompt e-commerce businesses to adopt digital transformation in their marketing strategies and business models.

With ongoing technological advancements, both society itself and businesses are part of the transformation towards Industry 4.0. Enormous volumes of data are generated by individuals leaving traces on various networks through sensors, wearable devices, and cloud computing technologies. Apart from individuals in society, businesses continue their efforts to adapt their machinery and devices to digital transformation technologies and to align their organizational structures with change (Çark, 2019). Given that technology and technological advancements are inevitable prerequisites for competition, businesses strive not to fall behind in this race.

Digital transformation technologies encompass artificial intelligence, Internet of Things, autonomous vehicles, smart robots and automation, big data and analytics, cybersecurity, cyber-physical systems and RFID, cloud computing, augmented reality and virtual reality, blockchain, simulation, and additive manufacturing.

Digital transformation technologies and advancements in information and communication technologies have led to profound changes in commercial activities and moved business processes to digital platforms. Especially in international trade and logistics operations, digitalization offers significant contributions in terms of traceability, transparency, and efficiency. Digital transformation is not only a technical change but also a profound transformation process in thought structures, habits, and business models. Today, businesses adopt digital technologies in various areas, from managing customer relationships to analyzing big data, increasing transaction speeds, and optimizing decision-making processes. Digital transformation provides businesses with a competitive advantage while increasing process efficiency and creating new opportunities. Restructuring existing capabilities and business processes enables businesses to transform traditional methods of operation and make the most of technological opportunities. Businesses adapting to the digitalization process leverage data analytics for quick access to information, simplify operational processes, and enhance service quality. Through business models based on digital technologies, customer experiences can be personalized, innovative approaches developed, and companies can achieve their sustainable growth goals. At the same time, managers need to raise awareness about digital transformation and personal development while strengthening their digital leadership and management skills. Establishing the necessary infrastructure to embed a digital culture within organizations and to enhance adaptability and agility in response to changing conditions is of critical importance. Lastly, creativity and intellectual capacity are fundamental elements in enabling startups to successfully

navigate their transformation processes (Altuntaş, 2018; Tutkunca, 2020; Ilcus, 2018; Pakdemirli, 2019; Ghi, et al., 2022).

Digital transformation has been examined in various ways by different researchers (Mutlu, et al., 2022; Sundarakani et al., 2024, p. 843; Richnak, 2022). In this study, the digital maturity levels of businesses are considered and included in the research (Azhari et al., 2014, p. 38).

2.2. Logistics Capabilities

Logistics capabilities serve the purpose of enabling logistics enterprise responsible for executing, planning, controlling, and implementing logistics operations to ensure customer satisfaction by facilitating appropriate resource flows and adapting these resources to the right areas. This approach enhances service performance within the value-creation process (Lai et al., 2004, p. 201). The size of logistics capabilities is directly related to the success of businesses in their logistics activities and their ability to differentiate from competitors.

Through logistics capabilities, activities across the supply chain are efficiently performed. Furthermore, within the scope of these capabilities, logistics skills increase, and the managerial skills of the chain are positively changed. When integration of logistics capabilities with other skills is achieved, superior performance systems that add value to end consumers emerge (Lorentz et al., 2013, p. 360).

Logistics capabilities have been examined by various researchers in different ways. Morash et al., (1996) focused on an alternative logistics capability framework, proposing a value-creating-oriented logistics capability framework. Daugherty and Pitmann (1995) contributed to the logistics capabilities literature by offering speed and time-based strategies. Eckert and Fawcett (1996, as cited in Cho, Ozment, & Sink, 2008) established criteria for logistics capabilities in terms of quality, people, and time. Clinton and Closs (1997) conducted a detailed examination of five factors to contribute to the conceptual development of logistics capabilities. Mandal et al. (2017) identified the impact of defined logistics capabilities on the supply chain in their study and concluded that these capabilities also influence the resilience of the chain. Similarly, Yang et al. (2009), in their research on maritime transport enterprises within the container shipping sector, focused on logistics resources and capabilities alongside the performance variable. They found that logistics resources positively influence logistics capabilities and innovation capability but do not have a direct impact on firm performance. Gligor and Holcomb (2014) conducted a study on supply chain agility, determining that logistics capabilities significantly affect agility. Sandberg and Abrahamsson (2011) and Wen (2012) are also notable contributors to research on logistics capabilities. Additionally, Yorulmaz and Birgün (2016) conducted a literature review to define logistics capabilities specifically for the maritime transport sector.

Logistics service differentiation; the concept of service differentiation can be explained as all distinctive activities carried out to meet the demands and expectations of customers, acknowledging that each customer is unique and special (Das & Joshi, 2007, p. 647). Logistics service differentiation, as a subset within the scope of logistics capabilities, has been approached by Langley et al. (1992, p. 24), who evaluated logistics activities and the outcomes of competitors to draw conclusions.

In terms of sustainable competitive advantage, the creation and readiness of resources aimed at delivering value to customers throughout all stages of logistics can be referred to as logistics capabilities. Providing unique solutions that enhance service performance to ensure customer satisfaction, offering quick responses, timely, rapid, and flexible service delivery, adopting solution-oriented approaches, and presenting information appropriately stored are all important for logistics service differentiation (Zawawi et al., 2017, p. 328).

Logistics innovation; logistics innovation capability, a part of logistics capabilities, refers to the skills that emerge parallel to the activities carried out in the logistics field within an organization, resulting from innovative ideas, inventions, and thoughts (Kallio et al., 2012). These ideas can be implemented in various ways. Introducing a new product, differentiating existing products, or revising a product or service to make it more usable and beneficial increases efficiency and fosters development in solving unresolved problems and addressing needs (Yeşil et al., 2012, p. 614). Through logistics innovation capability, the creation of a distinctive and difficult-to-imitate capability compared to rival businesses becomes possible, leading to sustainable competitive advantage (Yang et al., 2009). Businesses are encouraged to develop this capability and conduct research in this area (Shan et al., 2009, p. 458).

2.3. Innovation Orientation

At all levels of an organization, the continuous generation of new ideas, along with the encouragement of change and improvement, should be approached within the framework of innovation orientation. This approach also emphasizes the importance of knowledge and learning, fostering a culture of innovative thinking within the organization. In this way, innovation orientation serves as a strategically significant roadmap for companies to maintain their competitive advantage and prepare for the future (Siguaw et al., 2006, p. 558].

Homburg (2002), present a perspective on innovation orientation that evaluates how innovative a company is. This perspective measures the innovative features of the products and services offered by the company while also considering how these innovations are supported by marketing and communication strategies. In summary, the innovation orientation perspective is used as a criterion to present and develop a company's performance based on innovation in order to benefit its growth.

Generally, when businesses invent multiple products and differentiate them, it indicates that the company has adopted an innovative approach and is open to innovation. Innovation orientation is seen as an important tool for achieving strategic goals such as developing new products or entering new markets (Ionescu & Ionescu, 2015, p. 4).

It is acknowledged within the scope of innovation orientation that making efforts innovative enough to exceed customer expectations is vital. Innovative companies tend to invest significantly in marketing and promotion in addition to R&D activities. However, prioritizing new opportunities and product development is a key priority for an innovative company. An innovative company allocates more funding to R&D activities, adapts its employees to innovation, selects the right personnel for this purpose, continues training activities with a focus on learning, and creates an environment that supports creative thinking inspired by innovation. In this way, the company continuously develops new ideas and solutions, enhancing customer satisfaction and strengthening its competitive advantage. Innovation orientation not only strengthens the quality and image perception beyond what the company offers to its customers, but also solidifies its position in the industry and supports long-term success (Ritter & Gemünden, 2004, p. 561; Zhang et al., 2015, p. 45).

3. Research Methodology

3.1. Hypothesis Development and Research Model

The two main hypotheses, two sub-hypotheses, and the justifications for the hypotheses analyzed in the current study are as follows:

H1: Digital transformation has a significant impact on logistics capabilities.

When reviewing the literature related to H1 hypothesis studies, Bentalha et al. (2019) examined the practices of businesses in the service sector within the supply chain and investigated future trends of digitalization opportunities. This study serves as an appealing factor for research due to its perspective on digitalization. Deepu and Ravi (2021) contributed to the digitalization knowledge in supply chains by introducing a new method and approach. They classified it under three main dimensions: corporate, technological, and innovative, for effective management. This study, also based on digitalization, serves as an inspiration for researching the digitalization aspect in the logistics sector. Iman et al. (2022) conceptualized best practices to improve port connections that influence the development of maritime logistics capabilities in Indonesia. As a result of their study, they found that the perceived usefulness of services increased, which also increased the intention to use digitalization services at connection points. However, they also found that as the negative coefficient of user

trust increased, there was a sharp decline in customers' usage intentions. While the study in Indonesia investigated maritime logistics capabilities, this study focuses on logistics capabilities within the Turkish economy. Junge (2019), in his study, addressed similar topics and focused on the concepts of digital transformation, logistics, and supply chain.

H1a: Digital transformation has a significant impact on logistics service differentiation.
When reviewing the literature related to the H1a hypothesis, a study by Özşen (2019) was found. The study emphasized that the purpose of digital developments and the creation of applications suited to these developments is to satisfy customers. Since logistics companies are part of the service sector, the study highlighted that getting to know customers closely and being able to directly respond to their wants and needs is one of the primary goals. As seen from this study, digital transformation can influence logistics service differentiation. The findings of this study confirm the expectation that examining the impact of digital transformation on logistics service differentiation is related to an increase in customer satisfaction with the services offered.

H1b: Digital transformation has a significant impact on logistics innovation.
As a result of the literature review related to the H1b hypothesis, in a study by Sağlam and İnan (2021), it was found that digital business strategy has an impact on exploratory innovation. In the study by Haque et al. (2023), it was stated that "based on digital technologies, regardless of market or industry, human errors and manual processes lead to additional costs, time, and energy that limit a company's overall capacity, and these challenges are optimized through supply chain innovations." Gökırmak (2019), in his work related to logistics innovation, addressed digital transformation in the logistics sector and examined the public institution İstanbul Otobüs A.Ş.'s smart transportation systems as a sector example. These studies on digital transformation and innovation support the hypothesis of the study conducted.

H2: Innovation orientation plays a mediating role in the effect of digital transformation on logistics capabilities.
In the literature review conducted for the H2 hypothesis, Shen et al. (2021) developed a model examining how the adoption of digital technologies, digital capabilities, and innovation orientation affect a company's level of digital transformation success. In this model, they observed that the direct effect of adopting digital technologies on digital transformation is limited, but innovative approaches play a supporting role in this relationship. They also found that the transition to digital technologies significantly improved transformation performance. Kim (2023) defined the relationship between logistics companies' adoption of Logistics 4.0 technology, logistics innovation capability,

and logistics performance, analyzing the mediating effect of logistics innovation capability and the moderating effect of firm size through logistics innovation capability. Kim found that the adoption of Logistics 4.0 technology significantly impacted logistics innovation capability and logistics performance. It was revealed that logistics innovation capability significantly affects logistics performance. Additionally, it was found that logistics innovation capability has a significant mediating effect in the relationship between the adoption of Logistics 4.0 technology and logistics performance. The moderation effect based on firm size had a partial effect on logistics innovation capability and logistics performance, but the mediating moderation effect was not significant. Despite the presence of many studies involving the innovation orientation variable, no study was found that combines digital transformation, logistics capabilities, and innovation orientation in the logistics sector. Therefore, the establishment of the model and the determination of whether innovation orientation plays a mediating role is considered important.

In the current research, a causal research model has been used to investigate the effects between variables, based on the hypotheses developed from the literature.

Figure 1. **Research Model**

Source: own study

The study presents a theoretical framework for analyzing the impact of digital transformation on logistics skills and the mediating role of innovation orientation in this effect. Specifically, a research model is developed to clarify the interactions

between digital transformation technologies, which have gained prominence in the context of Industry 4.0, and logistics capabilities. In this context, the study evaluates whether innovation orientation in logistics processes enhances the impact of digital technologies and thoroughly examines the theoretical foundations of this relationship.

The model is based on the assumption that innovation orientation may act as a mediating variable in the relationship between digital transformation and logistics capabilities. Through the hypotheses developed within this framework, the study tests how digital transformation shapes innovative capacity in logistics processes and whether this contributes to the competitive advantage of businesses.

In addition to theoretical analyses, the study also includes a model development process that enables the testing of the proposed hypotheses. This comprehensive approach examines the role of digital transformation technologies in logistics management and the strategic importance of innovation orientation in this process. The research model designed to conduct these analyses is presented in Figure 1.

3.2. Sampling, Data Collection, and Evaluation Technique

In the study, a specifically designed questionnaire was prepared based on a literature review to collect data through the survey method. This survey form contains pre-determined questions that enable the conduct of the research. The survey consists of scales for digital transformation, logistic capabilities, and innovation orientation.

The population of the study consists of logistic companies within the boundaries of Istanbul province operating in the transportation and logistics services committee of the Istanbul Chamber of Commerce. According to the information available on the website, there are 10,982 member companies in the transportation and logistics services committee of the Istanbul Chamber of Commerce. A purposive sampling was conducted among the logistic companies in the transportation and logistics services committee of the Istanbul Chamber of Commerce, and those operating in the international market with a higher market volume were selected. The survey method was used as the data collection technique. Surveys were sent to companies via email, and they were asked to fill out online survey forms. The minimum sample size required to represent the population in the study was calculated as 385 and determined as 418. 17 surveys with incomplete responses were considered invalid, and 401 surveys were found suitable for analysis. In the study, simple and multiple linear regression analysis, reliability analysis, factor analysis, normality analysis, and mediation analysis were conducted.

In the study, the Turkish adaptation of the Digital Transformation Scale, consisting of 12 statements and a 5-point Likert scale, was used (Sağlam, 2021). This scale was developed based on various studies (Gudergan & Mugge, 2017; Jafarzadeh et al., 2015;

Kane et al., 2016; Lansiti, Lakhani, 2014; Svahn et al., 2017), relying on the work of Nadeem et al. (2018).

The Logistics Innovation Scale (Anderson & West, 1998) and the Logistics Service Differentiation Scale (Song & Parry, 1997; Adaptation by Lynch et al., 2000) were used to measure logistic capabilities. Questions prepared with a 5-point Likert scale were used.

A total of 9 statements were used in the study to measure innovation orientation. The scale was derived from the studies of Sabuncu (2014) and Rejeb et al. (2008). While the first 5 statements in the scale were obtained from the study of Sabuncu (2014), the remaining 4 statements were taken from the study of Rejeb et al. (2008), translated into our language by experts, and applied (cited in Biçimveren, 2017, p. 53). The survey questions were organized using a 5-point Likert scale.

4. Research Results

4.1. Reliability Analysis

A survey form was prepared using three different scales for the conduct of the study and applied to employees in the logistics sector.

Table 1. **Reliability Analysis of Scales**

Scale	Cronbach's Alpha	Number of items (N)
Digital Transformation Scale	.971	12
Logistics Capability Scale	.957	9
Innovation Orientation Scale	.951	9

Source: own study

According to the results of the reliability analysis presented in Table 1, Cronbach's Alpha values for the digital transformation scale, logistics capability scale, and innovation orientation scale were calculated as 0.971, 0.957, and 0.951, respectively. It is accepted that the scale is reliable when the Cronbach's Alpha value is 0.70 or higher (Durmuş et al., 2022, p. 89). Therefore, it was determined that all scales used in the study are highly reliable.

4.2. Normality Analyses

In order to determine whether the digital transformation, logistics capabilities, and innovation orientation scales used in the study followed a normal distribution,

Kolmogorov-Smirnov and Shapiro-Wilk normality tests were applied. However, in the field of social sciences, it is more appropriate to examine skewness and kurtosis values related to variables rather than relying solely on normality tests to determine whether the data is normally distributed. Skewness and kurtosis values within the range of +1.5 to -1.5 are considered indicative of normal distribution (Tabachnick & Fidell, 2013).

Table 2. **Normality Analysis**

Scale	Skewness	Kurtosis
Digital Transformation Scale	-0.582	-0.188
Logistics Capability Scale	-0.476	-0.157
Innovation Orientation Scale	-0.263	-0.731

Source: own study

Based on the information available in the literature, when the skewness and kurtosis values of the variables included in the research were examined, it was concluded that the data for all three scales exhibited a normal distribution. The fulfillment of the normality assumption indicates that the data distribution is consistent with a normal distribution.

4.3. Analysis of Research Hypotheses

Hypothesis.
H1: Digital transformation has a significant impact on logistic capabilities, digital transformation is the independent variable, while logistic capabilities are the dependent variable. In this context, a simple linear regression analysis was conducted.

Table 3. **H1 Hypothesis Regression Analysis Results**

Model 1	R^2	Adjusted R^2	F	Std. Hata	Beta	T	P
Digital Transformation	,566	,565	520,962	,633	,753	22,825	0,000

Dependent Variable: Logistics capabilities, ($p<0,05$)

Source: own study

Digital transformation has a significant ($p<0.05$) and positive (R^2: 56%) effect on logistics capabilities. Hypothesis H1 is accepted. The explanatory power of the model is 0.565 and it is concluded that 56% of the digital transformation variable can be explained by the logistics capabilities variable and this effect is found to be moderate.

H1a: Digital transformation has a significant impact on logistics service differentiation.

Table 4. **H1a Hypothesis Regression Analysis Results**

Model 1	R²	Adjusted R²	F	Std. Hata	Beta	T	P
Digital Transformation	.538	.537	465.463	.706	.734	21.575	0.000

Dependent Variable: Logistics Service Differentiation, (*p<0,05)

Source: own study

Digital transformation has a significant ($p<0.05$) and positive (R2: 53%) effect on logistics service differences. Hypothesis H1a is accepted. The explanatory power of the model is 0.537 and it is concluded that 53% of the digital transformation variable can be explained by the logistics service differences variable, which is the sub-dimension of logistics capabilities, and this effect is found to be moderate.

H1b: Digital transformation has a significant impact on logistic innovation.

Table 5. **H1b Hypothesis Regression Analysis Results**

Model 1	R²	Adjusted R²	F	Std. Hata	Beta	T	P
Digital Transformation	.481	.479	369.421	.719	.693	19.220	0.000

Dependent Variable: Logistics innovation, (*p<0,05)

Source: own study

Digital transformation has a significant ($p<0.05$) and positive (R2: 47%) effect on logistics innovation. Hypothesis H1b is accepted. The explanatory power of the model is 0.479 and it is concluded that 47% of the digital transformation variable can be explained by the logistics innovation variable, which is the sub-dimension of logistics capabilities, and this effect is found to be moderate.

H2: Innovation orientation has a mediating role in the impact of digital transformation on logistics capabilities, hypothesis, digital transformation is the independent variable logistics capabilities are the dependent variable, and innovation orientation is included in the model as a mediating variable.

Table 6. **SPSS Process Hayes Mediation Analysis Results for Total and Direct Effects between Digital Transformation, Logistics Capabilities, Innovation Orientation Variables**

	Coefficient	SE	T	P	LLCI	ULCI
DT-> LC (c)	,744	,033	22,825	,000	,680	,809
DT-> LC (c′)	,580	,044	13,260	,000	,494	,666
DT->IO (a)	,748	,039	19,239	,000	,671	,824
IO-> LC (b)	,220	,041	5,408	,000	,140	,299
	Coefficient	BootSH			BootLLCI	BootULCI
DT-> LC (d)	,164	,037			,094	,241

DT: Digital transformation, LC: Logistics capabilities, IO: Innovation orientation
a: The direct impact of digital transformation on innovation orientation
b: The direct impact of innovation orientation on logistics capabilities
c: The total impact of digital transformation on logistics capabilities
c∕: The direct impact of digital transformation on logistics capabilities
d: Indirect impact of digital transformation on logistics capabilities

Source: own study

Based on the data in Table 6, it has been observed that digital transformation has a direct effect on innovation orientation (R^2 = 48%, p = 0.000). Since the condition p < 0.05 is met, it is concluded that the path from digital transformation to innovation orientation (path a) is significant. When digital transformation and innovation orientation variables are considered together, they are found to have an effect on logistic capabilities (R^2 = 59%, p = 0.000). Initially, it is found that the impact of innovation orientation on logistic capabilities is significant. Subsequently, since digital transformation is found to have a direct effect on logistic capabilities (p = 0.000), it is determined that innovation orientation has a partial mediating effect. The significance of the mediating effect is demonstrated by the Bootstrap confidence interval statistic. According to the Bootstrap results, there must not be zero between the lower limit and upper limit. According to the analysis results, it is seen that there is no zero between the LLCI and ULCI values. These results indicate that innovation orientation has a partial mediating effect on the positive impact of the digital transformation variable on logistic capabilities. Additionally, the fact that the effect of digital transformation on logistic capabilities (0.744) decreases with the inclusion of the mediator variable in the analysis (0.580) is another factor indicating mediation. Accordingly, hypothesis H2 is accepted.
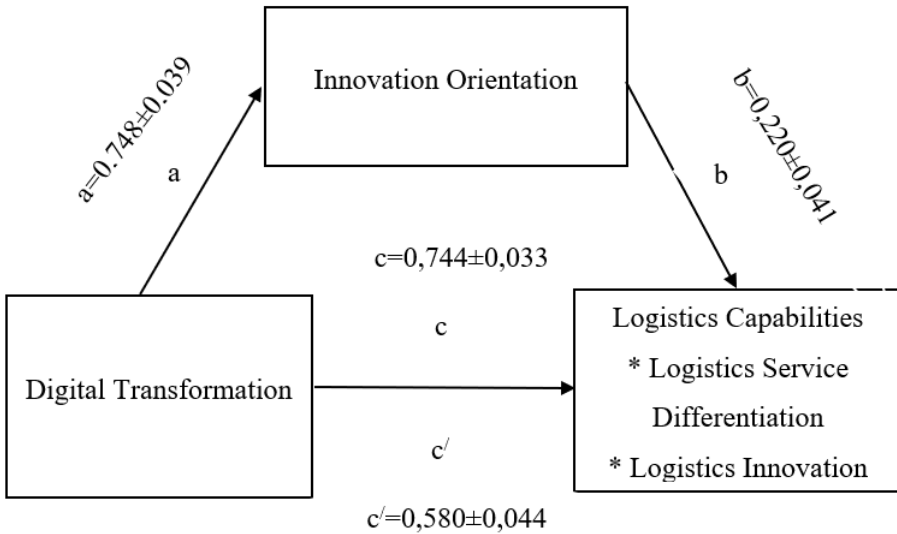
Figure 2. **Regression Results**

Source: own study

indirect impact + direct impact= total impact
a.b   c   a.b+c
b=0,164   b=0,580   b=0,744
β=0,166   β=0,587   β=0,753

   As stated above, while identifying the mediating role of innovation orientation in the impact of digital transformation on logistic capabilities, the direct effect, indirect effect and total effect were calculated.

5. Conclusion and Discussion

In today's world, where competition is increasing day by day, businesses are seen to develop various strategies to stand out and differentiate themselves from their competitors. Especially with the impact of digitalization, it is expected that industries and the businesses within them will shape their steps for the future from a broader perspective. In this context, businesses need to analyze how successful their roadmaps for digital transformation have been. One prominent sector in this regard is logistics,

where studies related to digitalization are progressing both globally and in Turkey. Determining what businesses are currently doing in the context of digital transformation and observing where they stand in terms of adapting to developments has become an important topic. Additionally, differentiating the services provided to customers in the logistics field through an innovative framework is a strong factor for differentiating from competing businesses.

In the study conducted, the impact of digital transformation on logistics capabilities was examined, focusing on determining the mediating role of innovation orientation in this effect. This is because it is valuable to observe the impact of digitalization, which holds critical importance from the businesses' perspective, and make correct decisions through the related variables.

The research began with a literature review, and after the explanation of relevant concepts, the analyses of the research continued. A survey technique was used in the research, and 401 responses were collected through online participation. The study aimed to investigate the mediating role of innovation orientation in the impact of digital transformation on logistics capabilities. The analysis was carried out using 401 data collected from logistics companies within the transportation and logistics services committee of the Istanbul Chamber of Commerce, located within Istanbul province in Turkey. Reliability analysis was conducted for the scales of digital transformation, logistics capabilities, and innovation orientation used in the research, followed by normality tests to understand whether the data was normally distributed. In the continuation of the study, linear regression was used to test the relationships between variables, and SPSS 23.0 and SPSS 23.0 Process Macro 4.3 programs were used to test the predicted mediation effect.

In the hypothesis testing of "H1: Digital transformation has a significant impact on logistics capabilities," simple linear regression was used. The result showed that digital transformation has a significant ($p<0.05$) and positive (R^2: 56%) effect on logistics capabilities. H1 hypothesis was accepted.

In the sub-hypothesis H1a, the impact of digital transformation on logistics service differentiation was found to be significant ($p<0.05$) and positive (R^2: 53%). H1a hypothesis was accepted. In H1b, the impact of digital transformation on logistics innovation was significant ($p<0.05$) and positive (R^2: 47%). H1b hypothesis was accepted.

Finally, in the hypothesis "H2: Innovation orientation plays a mediating role in the impact of digital transformation on logistics capabilities," it was observed that digital transformation has a direct effect (R^2: 48%, p: .000) on innovation orientation. When digital transformation and innovation orientation variables were considered together, it was found that they affected logistics capabilities (R^2: 59%, p: .000). Therefore, H2 hypothesis was accepted. This result shows that innovation orientation has a partial mediating role in the impact of digital transformation on logistics capabilities.

The findings of the research suggest that although digital transformation alone contributes to the development of logistics capabilities, innovation orientation makes this process more effective and contributes to the faster and more efficient development of logistics capabilities. Innovation orientation optimizes the effects of digital transformation. In other words, the impact of digital transformation on the development of logistics capabilities becomes more pronounced when an innovative approach is adopted.

When the findings of the study are expanded, it is observed that digital transformation has an impact on logistics capabilities. Likewise, it was concluded that digital transformation affects logistics innovation and logistics service differentiation within logistics capabilities. In this context, it is possible to say that logistics companies, by adopting digital technologies, have become more competitive and have made significant improvements in their logistics processes. This finding reinforces the strategic importance of digital transformation in logistics. The result that digital transformation also affects logistics innovation and service differentiation shows that digital technologies not only improve existing logistics processes but also allow for the development of innovative solutions and differentiated services. Digital transformation encourages companies to offer more creative and innovative logistics services and helps them differentiate in the market. These findings demonstrate that digital transformation is an important tool for transforming innovation and differentiation strategies in the logistics sector. It also emphasizes that digitalization is a long-term strategic necessity for the logistics industry.

The study makes significant contributions to the literature by revealing the impact of digital transformation on logistics capabilities in the logistics sector and highlighting the partial mediating role of innovation orientation in this process. By presenting an example within the context of Turkey, it enriches the limited body of literature that examines the sectoral effects of digitalization, particularly in developing countries. By emphasizing the critical role of innovation orientation in the relationship between digital transformation and logistics capabilities, the study demonstrates how this concept can serve as a foundation for optimizing innovation strategies not only in the logistics sector but also in other industries. Furthermore, it provides actionable recommendations for logistics enterprises aiming to gain a competitive advantage and introduces new research opportunities by exploring the relationship of innovation orientation with other variables, such as customer orientation, organizational learning, and sustainability. The study highlights the importance of businesses developing roadmaps for digitalization. Initially, it is recommended that business managers understand the place of digital transformation in their businesses and define short, medium, and long-term strategies in this context. Identifying the skills of employees and emphasizing the importance of managing resources with proper talent management should be highlighted. As

businesses understand the importance of innovation orientation, they can invest more in research and development and innovative activities. This way, businesses can support the discovery, development, and implementation of new technologies, thereby increasing their competitive strength.

6. Limitations and Future Directions for Research

The main limitation of the study is that it was applied only to businesses that are members of the Istanbul Chamber of Commerce in Turkey, and it cannot be applied in other countries without further validation. Additionally, the results of the study are limited to the period in which it was conducted. Since the study was carried out with logistics companies that are members of the Istanbul Chamber of Commerce, it is suggested that similar models be tested with more companies from different sectors and geographical regions to increase the generalizability of the findings in future studies. Research on the mediating role of innovation orientation in different sectors can be conducted. Since the study is a quantitative research shaped by data obtained from businesses, qualitative studies are recommended to understand businesses' tendencies, current situations, and future predictions regarding digital transformation, as well as to explore the results in greater depth regarding the relationships between logistics capabilities and innovation orientation. In addition to these variables, a customer orientation variable can also be added to the model to observe the impact of positioning the customer from the businesses' perspective on the other variables.

Authors' contribution

N.D.: article conception, research methods applied, conducting the research, data collection, analysis and interpretation of results. **Y.F.:** theoretical content of the article, draft manuscript preparation

References

Adro, F. J., & Leitão, J. C. (2020). Leadership and organizational innovation in the third sector: A systematic literature review. *International Journal of Innovation Studies, 4*(2), 51-67. https://doi.org/10.1016/j.ijis.2020.04.001

Altuntaş, Y. E. (2018). Dijital dönüşüm uygulamalarının kurumların marka değeri üzerindeki etkisi [The impact of digital transformation practices on the brand value of institutions]. *Ege Üniversitesi İletişim Fakültesi Medya ve İletişim Araştırmaları Hakemli E-Dergisi, 2*, 1–18.

Anderson, N. R., & West, M. A. (1998). Measuring climate for work group innovation: development and validation of the team climate inventory. *Journal of Organizational Behavior, 19*(3), 235-258: https://doi.org/10.1002/(SICI)1099-1379(199805)19:3<235::AID-JOB837>3.0.CO;2-C

Armengaud, E., Sams, C., Falck, G. V., List, G., Kreiner, C., & Riel, A. (2017). Industry 4.0 as digitalization over the entire product lifecycle: Opportunities in the automotive domain. In *Systems, Software and Services Process Improvement - 24th European Conference, EuroSPI 2017, Proceedings* (Vol. 748, pp. 334-351). Springer Verlag. https://doi.org/10.1007/978-3-319-64218-5_28

Azhari, P., Faraby, N., Rossmann, A., Steimel, B., & Wichmann, K. S. (2014). *Digital transformation report.* Neuland GmbH & Co. KG.

Bag, S., Gupta, S., & Luo, Z. (2020, 10 August). Examining the role of logistics 4.0 enabled dynamic capabilities on firm performance. *International Journal of Logistics Management, 31*(3), 607-628. https://doi.org/10.1108/IJLM-11-2019-0311

Bentalha, B., Hmioui, A., & Alla, L. (2019). The digitalization of the supply chain management of service companies: a prospective approach. In M.B Ahmed (Ed.), *SCA '19: Proceedings of the 4th International Conference on Smart City Applications, 29* (pp. 1-8). Association for Computing Machiner https://doi.org/10.1145/3368756.3369005

Biçimveren, L. (2017). Pazar odaklılık, yenilik odaklılık, pazarlama inovasyonu ve uluslararası pazar performansı: Balıkesir ve Bursa illerinde dış ticaret yapan firmalara yönelik bir uygulama [Market orientation, innovation orientation, marketing innovation and international market performance: An application for foreign trade companies in Balıkesir and Bursa provinces]. [Doktora Tezi, Balıkesir Üniversitesi Sosyal Bilimler Enstitüsü, Balıkesir]. DSpace@Balıkesir. https://dspace.balikesir.edu.tr/xmlui/handle/20.500.12462/3171

Bozkurt, A., Hamutoğlu, N. B., Kaban, A. L., Taşçı, G., & Aykul, M. (2021). Dijital bilgi çağı: Dijital toplum, dijital dönüşüm, dijital eğitim ve dijital yeterlilikler [Digital information age: Digital society, digital transformation, digital education and digital competencies] *Açıköğretim Uygulamaları ve Araştırmaları Dergisi-AUAd 7*(2), 35-63. https://doi.org/10.51948/auad.911584

Carvalho, A., Alves, H., & Leitão, J. (2022). What research tells us about leadership styles, digital transformation and performance in state higher education? I*nternational Journal of Educational Management, 36*(2), 218-232. https://doi.org/10.1108/IJEM-11-2020-0514

Clinton, S. R., & Closs, D. J. (1997). Logistics strategy: does it exist? *Journal of Business logistics, 18*(1), 19.

Çark, Ö. (2019). *Enterprise resource planning (ERP) systems.* Ankara: Gazi Bookstore.

Dang, D. D., Tran, V. B., Nguyen, V. T., Nguyen, L. H., Dang, T. H., & Le, T. T. (2021). Factors affecting logistics capabilities for logistics service providers: A case study in Vietnam. *The Journal of Asian Finance, Economics and Business, 8*(5), 81-89. https://doi.org/ 10.13106/jafeb.2021.vol8.no5.0081

Das, S. R., & Joshi, M. P. (2007). Process innovativeness in technology services organizations: Roles of differentiation strategy, operational autonomy and risk-taking propensity. *Journal of Operations Management, 25*(3), 643-660. https://doi.org/10.1016/j.jom.2006.05.011

Daugherty, P. J., & Pittman, P. H. (1995). Utilization of time-based strategies: creating distribution flexibility/responsiveness. *International Journal of Operations & Production Management, 15*(2), 54-60. https://doi.org/10.1108/01443579510080418

Deepu, T. S., & Ravi, V. (2021). A conceptual framework for supply chain digitalization using integrated systems model approach and DIKW hierarchy. *Intelligent Systems with Applications*, 10-11, 200048. https://doi.org/10.1016/j.iswa.2021.200048

Düzcan, A., & Fidan, Y. (2023). İşletmelerden dijital olgunluk düzeyinin yenilik performası üzerindeki etkisinde büyük veri analitik yeteneğinin aracı ve veri odaklı kültürün düzenleyici rolü [The mediating role of big data analytical capability and the moderating role of data-oriented culture in the effect of digital maturity level on innovation performance in businesses]. *İstanbul Ticaret Üniversitesi Sosyal Bilimler Dergisi, 22*(46), 356-389. https://doi.org/10.46928/iticusbe.1294014

Durmuş, B., Yurtkoru, S., & Çinko, M. (2022). *Data analysis with SPSS in social sciences.* theBOOK.

Ghi, T. N., Per, N. Q., Huan, N. Q., & Trung, N. T. (2022). Human capital, digital transformation, and firm performance of startups in Vietnam. *Management, 1*(26), 1-18. https://doi.org/10.2478/manment-2019-0081

Gligor, D. M., & Holcomb, M. C. (2014). Antecedents and consequences of integrating logistics capabilities across the supply chain. *Transportation Journal, 53*(2), 211-234. https://doi.org/10.5325/transportationj.53.2.0211

Gökırmak, H. (2019). Lojistik sektöründe dijital dönüşüm ve İstanbul Otobüs A. Ş. Akıllı Ulaşım Sistemleri Uygulaması [Digital transformation in the logistics industry and Istanbul Bus Inc. smart transportation systems application]. *BEYDER Bilgi Ekonomisi ve Yönetimi Dergisi, 14*(1), 73-87. https://dergipark.org.tr/tr/pub/beyder/issue/46315/547836.

Gudergan, G., & Mugge, P. (2017). *The gap between the practice and theory of digital transformation* [White paper]. 50th Hawaii International Conference on System Sciences.

Haque, A. K., Koohi, P., & Waqar, K. (2023). *The significance of digital transformation in the supply chain management for facilitating international businesses: Cases from emerging markets.* [Master's thesis, Linnaeus University]. DiVA Portal. https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1770830

Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach.* Guilford publications.

Hilbert, M. (2020). Digital technology and social change: the digital transformation of society from a historical perspective. *Dialogues in clinical neuroscience, 22*(2), 189-194. https://doi.org/10.31887/DCNS.2020.22.2/mhilbert

Homburg, C., Hoyer, W. D., & Fassnacht, M. (2002). Service orientation of a retailer's business strategy: Dimensions, antecendents and performance outcomes. *Journal of Marketing, 66*(4), 86-101. https://doi.org/10.1509/jmkg.66.4.86.18511

Ilcus, A. M. (2018). Impact of digitalization in business world. *Revista de Management Comparat Internaţional, 19*(4), 350-358. https://doi.org/10.24818/RMCI.2018.4.350

Iman, N., Amanda, M. T., & Angela, J. (2022). Digital transformation for maritime logistics capabilities improvement: cases in Indonesia. *Marine Economics and Management, 5(*2), 188-212 https://doi.org/10.1108/MAEM-01-2022-0002

Ionescu, A., & Ionescu, C. (2015). The relationship between the innovation orientation and organizations performance in Romania. R*omanian Journal of Economics*, 40, 299-312.

Ismail, M. H., Khater, M., & Zaki, M. (2017). Digital business transformation and strategy: What do we know so far. *Cambridge Service Alliance*(10), *Working Paper,* 1-35.

Jafarzadeh, H., Aurum, H., D'Ambra, J., Abedin, B., & Assemi, B. (2015). Search engine advertising adoption and utilization: An empirical investigation of inflectional factors. *Organizational Computing and Electronic Commerce, 25*(4), 402-427. https://doi.org/10.1080/10919392.2015.10 87704

Joong-Kun Cho, J., Ozment, J. and Sink, H. (2008). Logistics capability, logistics outsourcing and firm performance in an e-commerce market. *International Journal of Physical Distribution & Logistics Management, 38*(5), 336-359. https://doi.org/10.1108/09600030810882825

Junge, A. L. (2019, September). Digital transformation technologies as an enabler for sustainable logistics and supply chain processes – an exploratory framework. *Brazilian Journalof Operations & Production Management, 16*(3,), 462-472. https://doi.org/10.14488/BJOPM.2019.v16.n3.a9

Kallio, A., & Kujansivu, P. (2012). Locating the weak points of innovation capability before launching a development project. *Interdisciplinary Journal of Information Knowledge and Management, 7,* 012-038. https://doi.org/10.28945/1563

Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2016, July 26). *Aligning the organization for its digital future.* MIT Sloan Management Review. https://sloanreview.mit.edu/projects/aligning-for-digital-future/

Kim, Y.-M. (2023, October). Impact of logistics 4.0 technology adoption on logistics performance: The mediating effect of logistics innovation capability and the mediated moderation effect of firm size. *Journal of Korea Trade, 27*(5), 63-90. https://doi.org/10.35611/jkt.2023.27.5.63

Kroh, J., Luetjen, H., Globocnik, D., & Schultz, C. (2018). Use and Efficancy of Information Technology in Innovation Processes: The Specific Role of Servitization. *Journal of Product Innovation Management, 35*(5), 720-741. https://doi.org/10.1111/jpim.12445

Lai, K. H., Cheng, T. E., & Yeung, A. C. (2004). An empirical taxonomy for logistics. *Maritime Economics and Logistics, 6,* 199-219. https://doi.org/10.1057/palgrave.mel.9100109

Langley, C., John, J., & Mary, C. H. (1992). Creating logistics customer value. *Journal of Business Logistics, 13*(2), 1-27.

Lansiti, M., & Lakhani, K. (2014, November). Digital ubiquity-how connections, sensors and data are revolutionizing business. *Harvard Business Review*. https://hbr.org/2014/11/digital-ubiquity-how-connections-sensors-and-data-are-revolutionizing-business

Lorentz, H., Töyli, J., Solakivi, T., & Ojala, L. (2013). Priorities and determinants for supply chain management skills development in manufacturing firms. *Supply Chain Management: An International Journal, 18*(4), 358-375. https://doi.org/10.1108/SCM-03-2012-0111

Lynch, D. F., Keller, S. B., & Ozment, J. (2000). The effects of logistics capabilities and strategy on firm performance. *Journal of Business Logistics, 21*(2), 47-67.

Mandal, S., Bhattacharya, S., Korasiga, V. R., & Sarathy, R. (2017). The dominant influence of logistics capabilities on integration: Empirical evidence from supply chain resilience. *International Journal of Disaster Resilience in the Built Environment, 8*(4), 357-374. https://doi.org/10.1108/IJDRBE-05-2016-0019

Mayakova, A. (2019). Digital transformation of modern quality management. *Economic Annals-XXI, 180(11-12)*, 138-145. https://doi.org/10.21003/ea.V180-15

Morakanyane, R., O'Reilly, P., Mcavoy, J., & Grace, A. (2020). Determining Digital Transformation Success Factors. In Proceedings of the 53rd Hawaii International Conference on System Sciences (pp. 4356-4365). HICSS. https://doi.org/10.24251/HICSS.2020.532

Morash, E. A., Droge, C. L., & Vickery, S. K. (1996). Strategic logistics capabilities for competitive advantage and firm success. *Journal of Business Logistics, 17*(1), 1-22.

Mutlu, I., De Hartigh, E., & Ucler, C. (2022). *Digital technology and the stages of digital business transformation*. In Proceedings of the IEEE 28th International Conference on Engineering, Technology and Innovation & 31st International Association for Management of Technology (IAMOT) Joint Conference**.** IEEE. https://doi.org/10.1109/ICETI-IAMOT53082.2022.10033256

Nadeem, A., Abedin, B., Cerpa, N., & Chew, E. (2018). Editorial: Digital transformation and digital business strategy in electronic commerce-The role of organizational capabilities. *Journal of Theoretical and Applied Electronic Commerce Research, 13*(2), 1-8. https://doi.org/10.4067/S0718-18762018000200101

Pakdemirli, B. (2019). Dijital dönüşüm ve ekonomik büyüme [Digital transformation and economic growth]. *Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 32*, 665–694. https://doi.org/10.14520/adyusbd.571201

Pavlou, P. A., & Sawy, O. A. (2010). The "Third Hand": IT-Enabled Competitive Advantage in Turbulence Through Improvisational Capabilities. *Information Systems Research, 21*(3), 413-659. https://doi.org/10.1287/isre.1100.0280

Özşen, M. (2019). *Lojistik sektöründe dijital pazarlamanın yeri ve önemi: Sektöre yönelik vaka analizi* [The place and importance of digital marketing in the logistics industry: Case analysis for the sector]. Yüksek Lisans Tezi, Celal Bayar Üniversitesi Sosyal Bilimler Enstitüsü, Manisa.

Qiao, H., & Zhao, Q. (2008). Research on third party logistics service capability maturity model. In *2008 IEEE International Conference on Service Operations and Logistics, and Informatics* (Vol. 2, pp. 2858-2861). IEEE.

Rejeb, H. B., Guimaraes, L. M., & Boly, V. (2008). Measuring innovation best practices: Improvement of an innovation index integrating threshold and synergy effects. *Technovation, 28*(12), 838-854. https://doi.org/10.1016/j.technovation.2008.08.005

Richnak, P. (2022). Current trend of industry 4.0 in logistics and transformation of logistics processes using digital technologies: An empirical study in the Slovak Republic. *Logistics Basel, 6*(4), 79. https://doi.org/10.3390/logistics6040079

Ritter, T., & Gemünden, H. (2004). The impact of A company's business strategy on its technological competence, network competence and innovation success. *Journal of Business Research*, 57(5), 548-556. https://doi.org/10.1016/S0148-2963(02)00320-X

Sabuncu, B. (2014). KOBİ'lerde yenilik ve engellerin tespitine yönelik bir araştırma: Denizli örneği [A Study on the Innovation in SMEs and the Identification of the Obstacles: The Case of Denizli]. *İşletme Araştırmaları Dergisi, 6*(1), 103-123. https://isarder.org/index.php/isarder/article/view/159

Sağlam, M. (2021). Realization of digital transformation as a vision of the future in businesses and Turkish adaptation of the digital transformation scale. *Istanbul Commerce University Journal of Social Sciences, 20*(40), 395-420. https://doi.org/10.46928/iticusbe.764373

Sağlam, M., & İnan, M. B. (2021). Sürdürülebilir rekabet avantajı kazanılmasında inovasyon, pazarlama stratejileri ve dijitalleşme arasındaki ilişkinin incelenmesi [Examining the relationship between innovation, marketing strategies and digitalization in gaining sustainable competitive advantage]. *Business, Economics and Management Research Journal, BEMAREJ, 4*(2), 118-137.

Saldanha, T. J., Mithas, S., & Krishnan, M. S. (2017). Leveraging customer involvement for fueling innovation. *MIS quarterly, 41*(1), 267-286. https://doi.org/ 10.25300/MISQ/2017/41.1.14

Sandberg, E., & Abrahamsson, M. (2011). Logistics capabilities for sustainable competitive advantage. *International Journal of Logistics Research and Applications, 14*(1), 61-75. https://doi.org/10.1080/13675567.2010.551110

Sebastian, I. M., Ross, J. W., Beath, C., Mocker, M., Moloney, K. G., & Fonstad, N. O. (2017). How big old companies navigate digital transformation. *MIS Quarterly Executive, 16*(3), 197-213. https://doi.org/ 10.4324/9780429286797-6

Shan, W., & Zhang, Q. (2009). Extension theory and its application in evaluation of independent innovation capability. *Kybernetes, 38*(3/4), 457-467. https://doi.org/10.1108/03684920910944164

Shen, L., Zhang, X., & Liu, H. (2021). Digital technology adoption, digital dynamic capability, and digital transformation performance of textile industry: Moderating role of digital innovation orientation. *Managerial and Decision Economics, 43*(6), 2038-2054. https://doi.org/10.1002/mde.3507

Siguaw, J., Simpson, P., & Enz, C. (2006). Conceptualizing innovation orientation: A framework for study and integration of innovation research. *Journal of Product Innovation Management, 23*(6), 556-574. https://doi.org/10.1111/j.1540-5885.2006.00224.x

Song, X. M., & Parry, M. E. (1997). A cross-national comparative study of new product development processes: Japan and the United States. *Journal of Marketing, 61*(2), 1-18. https://doi.org/10.1177/002224299706100201

Sundarakani, B., Manikas, I., & Gunasekaran, A. (2024). The role of digital transformation in achieving sustainable supply chain management in Industry 4.0: An editorial review perspective. *International Journal of Logistics Research and Applications, 27*(6), 843-851. https://doi.org/10.1080/13675567.2024.2332123

Svahn, F., Mathiassen, L., & Lindgren, R. (2017). Embracing digital innovation in incumbent firms: How Volvo cars managed competing concerns. *MIS Quarterly, 41*(1), 239-253. https://doi.org/10.25300/MISQ/2017/41.1.12

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6. b.). Pearson.

Tabrizi, B., Lam, E., Girard, K., & Irvin, V. (2019, March 13). Digital transformation is not about technology. *Harvard Business Review*. https://hbr.org/2019/03/digital-transformation-is-not-about-technology

Tutkunca, T. (2020). İşletmelerde dijital dönüşüm ve ilgili bileşenlerinin analiz edilmesi üzerine kavramsal bir araştırma. [Conceptual Research on Analyzing Digital Transformation and Its Related Components in Businesses]. *Çağ Üniversitesi Sosyal Bilimler Dergisi, 17*(1), 65-75. https://dergipark.org.tr/tr/pub/cagsbd/issue/55510/760135

Wen, Y. H. (2012). Impact of collaborative transport management on logistics capability and competitive advantage for the carrier. *Transportation Journal*, *51*(4), 452-473. https://doi.org/10.5325/transportationj.51.4.0452

Yang, C. C., Marlow, P. B., & Lu, C. S. (2009). Assessing resources, logistics service capabilities, innovation capabilities and the performance of container shipping services in Taiwan. *International Journal of Production Economics, 122(1)*, 4-20. https://doi.org/10.1016/j.ijpe.2009.03.016

Yang, C.-C. (2012, 12 July). Assessing the moderating effect of innovation capability on the relationship between logistics service capability and firm performance for ocean freight

forwarders. *International Journal of Logistics Research and Applications, 15*(1), 53-69. https://doi.org/10.1080/13675567.2012.669469

Yeşil, S., Şekkeli, H., & Doğan, Ö. (2012, November). An investigation into the implications of Islamic Work Ethic (Iwe) in the workplace. *Journal Of Economics And Behavioral Studies, 4*(11), 612-624. https://doi.org/10.22610/jebs.v4i11.362

Yorulmaz, M., & Birgün, S. (2016). Lojistik yetenekler üzerine literatür araştırması ve deniz ulaştırma lojistiği hizmet yeteneklerinin belirlenmesi [Literature research on logistics capabilities and determination of maritime transportation logistics service capabilities]. *Akademik Sosyal Araştırmalar Dergisi ASOS Journal, 25*(4), 313-331. https://doi.org/10.16992/ASOS.1148

Zawawi, N. F., Wahab, S. A., Mamun, A. A., Ahmad, G. B., & Fazal, S. A. (2017). Logistics capability, information technology and innovation capability of logistics service providers: Empirical evidence from East Coast Malaysia. *International Review of Management and Marketing, 7*(1), 326-336.

Zhang, J., Jiang, Y., & Zhu, M. (2015). Perceived environmental turbulance, strategic orientations and new product success: A comparative study of SMEs and large manufacturing exporters. *Journal of Advances in Management Research*, 12(1) ,43-54. https://doi.org/10.1108/JAMR-05-2014-0026