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Comparison of Agility Perception Between Industrial and Service Sectors¹

İsmail Özdemir / Asst. Prof. Dr. 

Istanbul Gedik University, Gedik Vocational School, Department of Human Resources Management
iozdemir@gedik.edu.tr

Ahmet Erkasap* / Asst. Prof. Dr. 

Istanbul Gedik University, Faculty of Economics, Administrative and Social Sciences, Department of Management Information Systems
ahmet.erkasap@gedik.edu.tr

*Corresponding Author

Abstract

In recent years, organizational agility has become one of the most crucial elements for success and sustainability in increasingly competitive global markets. Agility refers to businesses' ability to adapt to rapidly changing market conditions and is recognized as an important performance indicator in both industrial and service sectors. The significance of agility performance and capability as a competitive element has attracted interest from both business and academic worlds, becoming the subject of numerous studies. However, how the perception of agility differs between industrial and service sectors hasn't been adequately examined.

Agility is a capability that can significantly positively impact the competitive power that businesses need strategically. However, the agility phenomenon doesn't depend solely on a business's intentions and efforts. External factors affecting business can influence agility perception. One of these is the sector in which the business operates and this sector's characteristics and structure.

This research examines agility perceptions of businesses in industrial and service sectors and investigates differences stemming from sectoral characteristics. The study considered data collected through surveys from 341 upper and middle-level managers of companies operating in the Istanbul region, including 145 service and 196 industrial businesses. The collected data underwent reliability, frequency, descriptive, and t-test analyses.

The research found that agility perception differs based on the operational sector ($t=3.429$, $p=0.001 < 0.05$). Accordingly, service sector businesses (Mean=4.06) have a higher agility perception compared to industrial sector businesses (Mean=3.85). These results reveal that agility perception in the service sector is at a higher level than in the industrial sector.

Keywords: Agility, Competition, Competitive Power, Service Sector.

JEL Codes: L20, L80, L60

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1. Introduction

Agility is a concept associated with the ability of organizations and teams to respond to change. However, there are significant differences in how responses are formulated and their content across different sectors. These differences can primarily be attributed to varying priorities stemming from the nature of processes and value chains within each sector (Sharifi & Zhang, 1999).

The service sector has a dynamic structure focused on customer interactions and experiences. Here, agility is critical for accurately perceiving customer needs, responding quickly, developing original service solutions, and enhancing customer satisfaction. Businesses can improve service processes by adopting agile approaches and becoming more responsive to customer demands and expectations.

The industrial sector differs from the service sector due to its focus on physical production processes and technological infrastructure. In this context, agility in the industrial sector concentrates on innovative production models that optimally combine machinery and human resources in a flexible structure, as well as factors like efficiency, supply chain management, and cost control. Agile structures in the industrial sector must continuously strive for development and innovation to effectively use resources and increase production efficiency. For this reason, agility in the industrial sector isn't limited to production processes but also encompasses product development and marketing strategies.

Recent research by Pelletier et al. (2025) emphasizes that manufacturing small and medium-sized enterprises (SMEs) need to align at least one dynamic IT capability (sensing, learning, coordinating or integrating) and one operational IT capability (IT management, IT infrastructure or e-business) to achieve high levels of agility through their digital transformation (Pelletier, L'Écuyer, & Raymond, 2025). This finding highlights the critical role of digital capabilities in enhancing organizational agility, particularly in the manufacturing sector.

In the rapidly changing service sector, agility significantly contributes to innovation and increased customer satisfaction, while in more stable sectors, it can serve fundamental goals such as operational excellence and cost reduction (Tallon and Pinsonneault, 2011).

Furthermore, Alakaş (2024) demonstrates that digital transformational leadership and organizational agility have positive effects on digital transformation, with digital strategy mediating these relationships (Alakaş, 2024). This research underscores the interconnected nature of leadership, agility, and digital transformation across different organizational contexts.

In conclusion, there are distinct differences in the

implementation of agility—a critical element for businesses' future success—between service and industrial sectors, in line with their own dynamics and requirements (Buldum and Görener, 2022). How this concept takes shape in both sectors is of great importance for sustainable growth, adaptation, and gaining competitive advantage.

2. Concept of Agility and Organizational Agility

Agility is an important capability that allows businesses to respond quickly to dynamic and changing market conditions and customer demands and to successfully maintain their existence, and it is influenced by factors such as sector dynamics, organizational structure, employee motivation (Buldum and Görener, 2022; Akkaya and Tabak, 2018). Agility is the flexibility, speed, and adaptation ability that businesses demonstrate against change. Businesses' ability to gain competitive advantage by rapidly adapting to especially variable, uncertain market conditions and customer demands significantly depends on their agility (Sharifi & Zhang, 1999, p. 10).

Recent systematic literature review by Asghar et al. (2025) reconceptualizes organizational agility as a multidimensional construct comprising contextual factors, fundamental attributes, vital enablers, and dynamic capabilities, rather than a singular construct. This comprehensive framework distinguishes between macro-agility (strategic and partnering agility) and micro-agility (operational, innovation, and workforce agility), providing a more nuanced understanding of organizational agility (Asghar, Kanbach, & Kraus, 2025).

Sharifi and Zhang (1999) emphasize that businesses should have characteristics such as flexibility, speed, competence, and responsiveness, which are critical for increasing their agility. The ability to rapidly restructure processes and structure to use business resources more effectively is expressed as flexibility. The capacity to offer products and services at a time that will provide superiority over competitors is expressed as speed. Competence is the ability of businesses to provide high-quality products and services. The ability of businesses to respond quickly to customer demands and market changes can be expressed as responsiveness.

Christopher (2000), Desalegn and colleagues (2024) have stated that agility is not only the capacity to respond quickly to customer demands and changes in the market, but also the sum of various strategies including proactive change management, the ability to evaluate opportunities, and development. Alkanadi & Helmi (2024) stated that agility requires advanced product and service design and production in order to gain flexibility against market fluctuations, and that competitive advantage can only be achieved

ved with such a strategy. Cristofaro et al. (2025) emphasized that organizational agility is a critical factor not only for short-term adaptation responses but also for adaptation to long-term changes.

Agile organizations need to have three fundamental elements: flexibility, speed, and customer focus. In this context, flexibility is the ability to adapt quickly to demand fluctuations and unexpected changes. Speed is the delivery of products and services to the market and customer in different ways in accordance with customer expectations. Customer Focus is structuring all processes by centering on customer wishes and expectations (Christopher, 2000, p. 39).

Agile organizations structured in this way stand out with demand orientation, short cycle times resulting from strategies based on predictable time planning, and flexible production structure. Moving away from the supply-oriented understanding in traditional organizations, demand orientation is adopted in agile structures. Short cycle times, which characterize agile organizational structures, enable the shortening and acceleration of supply, product development, and delivery times. Flexible Production is having the ability to rapidly restructure production processes as required by the market (Christopher, 2000, p. 41).

Agile organizational structures provide important advantages that will increase the strategic competitive power of businesses. To list these advantages (Christopher, 2000);

- **Competitive Advantage:** Agile organizations have an important sensitivity regarding focus on customer demands. Therefore, they can differentiate from their competitors by better perceiving customer wishes and demands and responding quickly.
- **Customer Satisfaction:** Agile organizations can better meet customer needs. This will enable the business to expand its customer base.
- **Risk Management:** Agile organizations are more sensitive to potential risks.
- **Evaluating Market Opportunities:** Agile organizations can quickly evaluate new market opportunities.
- **Use of Information Technologies:** The most important feature of agile formations is that they have effective information sharing and data processing systems. Current information technologies are utilized to the maximum extent to accelerate information sharing and increase its transparency. This strengthens organizational communication and flexibility.
- **Supplier Cooperation:** The stability of supply processes is extremely important. For this, it is necessary to cooperate with reliable suppliers. Flexible organizational structures have flexible, fast, and stable processes by working closely with suppliers.

- **Demand Forecasting:** It is important to meet customer demands uninterruptedly, quickly, and with the desired quality to ensure customer satisfaction and gain competitive advantage. Agile organizational structures use analytical methods to accurately predict customer demands and expectations.
- **Flexible Production Systems:** It is the adoption of the flexible production method for the rapid restructuring of production to adapt to the expectations of the market and the customer (Christopher, 2000).

Canpolat (2011) addressed the leadership behaviors of managers and defined the technical, human, and conceptual skills necessary for effective management. In this context, the role of managers in creating agile organizations and their leadership styles have an impact on employee motivation. The role of managers in an agile organizational structure, their adoption of a supportive leadership approach, is important in increasing organizational agility. In this context, agility requires managers at every level, from strategic to operational, to display a dynamic approach, focusing on innovation, efficiency in resource use, flexibility, and accurate decision-making. The manager's possession of these skills not only increases the business's ability to respond more quickly to market demands but also supports the formation of results such as continuous improvement, cooperation, creating value at the highest level, and increased productivity.

The role of digital transformational leadership has become increasingly critical in the modern business environment. Alakaş (2024) demonstrates that digital transformational leadership significantly influences organizational agility through digital transformation processes, with digital culture and digital strategy serving as key mediating factors (Alakaş, 2024). This finding emphasizes that contemporary leaders must not only possess traditional leadership skills but also digital competencies to effectively guide their organizations through digital transformation initiatives.

Ak (2018) emphasized the effects of increasing employee motivation and strengthening organizational identity on creating an agile structure and stated that the efforts of professional managers to create more flexible organizational structures resistant to competitive processes create a vital necessity in environments of uncertainty and change (Ak, 2018).

On the other hand, agility is not just a managerial approach, but also a cultural phenomenon. Therefore, the successful implementation of agility depends on the adoption of a mirroring understanding and organizational culture that will support agility by the business. Creating an organizational culture that will support agility is related to developing employee talents, empowering teams, and adopting new business models.

As a strategy that responds to the rapidly changing dynamics of the business world, digital transformation is also closely related to agility. Investments in rapidly developing autonomous technologies and digital transformation come to the fore in organizations' increasing agility and making their processes more efficient ((Mrugalska & Ahmed, 2021). Digital transformation involves restructuring core processes with digital technologies and changing organizational culture. With digital transformation, the integration of innovations such as data analytics, cyber-physical systems, big data and analytical cloud computing, artificial intelligence, and the internet of things that reshape business processes is ensured, thereby strengthening the abilities to make quick decisions, understand customer expectations, and respond more flexibly to market demands ((Mrugalska & Ahmed, 2021). Additionally, the efficiency provided by digital tools helps reduce costs and shorten product development times.

Recent research by Pelletier et al. (2025) provides empirical evidence that manufacturing SMEs must strategically align their IT capabilities to achieve organizational agility. The study reveals that organizations need to combine at least one dynamic IT capability (such as sensing, learning, coordinating, or integrating) with one operational IT capability (IT management, IT infrastructure, or e-business) to be highly agile. This configurational approach to IT capabilities highlights the complexity of digital transformation processes and their impact on organizational agility (Pelletier, L'Écuyer, & Raymond, 2025).

Mrugalska & Ahmed, (2021) state that agile organizational structures are needed for Industry 4.0 technologies because with the adoption of Industry 4.0 technologies by companies, it becomes possible to deal more effectively with environmental changes affecting the business. Also, the adoption of Industry 4.0 technologies by organizations can significantly increase their agility capabilities (Mrugalska & Ahmed, 2021).

Industry 4.0 refers to the integration of digitalization and automation into organizational structures. Industry 4.0 technologies can increase the agility capability of organizations with the contribution created in the following areas (Mrugalska & Ahmed, 2021):

- Quick Decision Making: Big data analysis and artificial intelligence enable faster and more accurate decisions.
- Flexibility: IoT and robotic systems make it possible to rapidly restructure production systems.
- Customer Focus: Digital technologies make a strong contribution to better understanding customer needs and responding quickly to these needs.
- Innovation: Industry 4.0 offers comprehensive product development and improvement services.

Atienza-Barba et al. (2024) stated that artificial intelligence has become a critical tool for agile structures in the post-pandemic period. They stated that artificial intelligence verification makes it possible for businesses to respond more quickly to possible changes by accelerating data analytics and automatic decision-making processes.

Digital transformation offers important opportunities for the agility of industrial and service sector businesses. While using digital technologies with automation and robot technologies to optimize production processes, reduce error rates, and for effective inventory management in the industrial sector, it creates opportunities to offer more personalized services by improving customer experiences in the service sector (Teece et al., 1997, p.516).

The digital transformation process not only includes technological updates but also reevaluates ways of doing business with a flexible and collaborative understanding. Thus, when businesses realize digital transformation, they not only use their existing resources efficiently but also gain significant competitive power to open up to new markets.

Therefore, digital transformation means increasing flexibility in the development of agility in service and industrial sectors, optimizing production processes by supporting innovative processes, and customer-oriented solutions (Sambamurthy, Bharadwaj, and Grover, 2003). The adaptation abilities of businesses are directly related to the success of this transformation. A successful digital transformation strategy contributes to businesses meeting current demands and increasing their resilience in the face of future uncertainties.

In another study conducted by Çelikdin (2022), the performance indicators of industrial agile businesses were addressed. The study emphasized the role of agility in businesses gaining competitive advantage and ensuring sustainability (Çelikdin, 2022). In this context, it was concluded that the perception of agility is an important factor in businesses achieving their strategic goals.

Sustainability is another critical element in the strategies of agile organizations. Increasing environmental concerns and social responsibility awareness cause businesses to be sensitive to green practices. In this context, sustainability transformation strategies emerge as elements that support agility and create both customer loyalty and competitive advantage.

Global competition is another determining factor in agility strategies. Agility has an important role in businesses gaining competitive advantage and ensuring sustainability (Çelikdin, 2022). Nguyen and colleagues (2024) stated that in businesses with high levels of agility, financial performance, innovation, and competitive advantage increase. Agile businesses can have high competitive power by using their resources more effectively and maintain their leading positions against their competitors. Busi-

nesses need solutions that will continuously increase innovation and strengthen adaptation to survive in local and international markets. In this context, agility becomes critical in terms of rapidly adapting to changing market conditions, presenting innovative solutions, and increasing their ability to remain competitive.

Mrugalska & Ahmed, (2021) state that the integration of current digital technologies (IoT, artificial intelligence, robotics) into business processes increases agility and creates competitive advantage. In this way, businesses adapt to changing conditions flexibly and quickly, and their ability to take advantage of opportunities and eliminate threats that arise in the business environment increases. The ability to make faster decisions, respond more quickly to market changes, and evaluate customer feedback is provided by correct technology integration.

Cost management is also one of the important benefits provided by agility. Including agile methodologies (such as Scrum and Kanban) in business processes increases resource utilization efficiency, workforce performance, and reduces costs. Agile organizations have the capacity to develop innovative solutions. They can offer products and services more suitable for customer needs by continuously making innovations in business processes. This creates a competitive advantage for the business. Competitive advantage is businesses gaining a certain superiority in the market. Agile organizations have a competitive advantage over their competitors in the market (Dove, 2001; Yusuf et al., 1999). This effect of agility on creating competitive advantage is a noteworthy area of study, especially in the service and industrial sectors. Agility requires responding quickly to changing market conditions, providing timely appropriate solutions to customer demands, and adopting innovative approaches. This quality provides businesses with a flexible structure, making it possible for them to take less risk while competing. Especially in the high-tempo service sector, companies can accelerate their product development processes by responding instantly to customer feedback; in this context, efforts to ensure consumer satisfaction contribute to long-term profitability by creating a loyal customer base.

3. Agility in the Service Sector

In service sector businesses, agility capability is obtained through customer focus, entrepreneurship, and flexible organizational structures. In this context, agility plays a critical role in customer relations and market strategies (Buldum and Görener, 2022). Service sector businesses must continuously restructure their service processes with a customer-focused agility understanding (Ciampi et al., 2022).

Teece and colleagues (1997) revealed the business

dynamics that affect agility for service sector businesses. The first of these is Perceiving Customer Needs. Service businesses should be able to quickly perceive customers' needs and offer services suitable for these needs. The second is the restructuring of service processes in line with agile organization principles when necessary. Service businesses can adapt to market conditions by rapidly restructuring their processes. The third is the development of innovative service models. Service businesses can gain competitive advantage by developing innovative service models (Teece et al., 1997, p. 520).

Agility in service sector businesses requires having the ability to respond quickly and effectively to the competitive pressure created by constantly changing market conditions and customer demands. Agile service sector businesses that offer customer-focused and personalized service should establish a feedback mechanism to develop innovative approaches and flexible service models (Sharifi and Zhang, 1999, p.15) and strategies that will restructure business processes, and should continuously analyze the feedback obtained.

Technology use is one of the most important driving forces of agility in service sector businesses. Verma and Boyer (2000) associated agility in the service sector with customer focus, speed, and digital transformation. An agility approach in this sense requires having the ability to respond quickly to customer demands and increase flexibility in service processes. Technologies such as cloud computing, data analytics, and artificial intelligence offer flexibility, speed, and opportunities for sector businesses to provide personalized services that meet customer expectations. Especially with automation technologies, repetitive tasks can be performed, allowing employees to focus on more creative work. Besides, digital platforms can create opportunities for customer interaction and reaching large audiences.

Industry 4.0 approaches in the service sector increase agility by supporting customer focus and digital transformation processes. Industry 4.0 technologies in the service sector have a significant area of influence on customer focus and digital transformation. In services; artificial intelligence, IoT, and big data analytics can be used to better understand customer needs and to provide services suitable for these needs and create a positive customer experience. Besides, digital technologies allow services to be restructured very quickly (Mrugalska & Ahmed, 2021).

The effective use of data analytics and communication technologies in service sector businesses increases the ability to predict customer demands, provide personalized services, and respond quickly to customer demands (Akkaya and Tabak, 2018). This situation, especially in the service sector, not only meets customer demands quickly and increases ser-

vice quality but also strengthens the reputation of the brand, loyalty to the brand, and is critical in terms of increasing customer satisfaction.

Due to the nature of the service sector, it needs rapid change and adaptation abilities the most. Besides, it is important to have flexibility, innovative, and quick accurate decision-making abilities because the products offered are not tangible and customer interactions are one-to-one and generally face-to-face. Because, factors that affect customer satisfaction in the service sector are related not only to the quality of the service provided but also to the flexibility of the service and its timely, rapid delivery (Sambamurthy et al., 2003, p. 245).

Digitalization and the changing technology environment are causing a complete reinterpretation of service sector dynamics. Elements such as the spread of e-services, the development of mobile applications, and data analytics are transforming service delivery and radically redefining customer interactions (Sambamurthy et al., 2003, p. 245). The integration of these new technologies into the sector deeply affects not only the internal functioning of businesses but also external customer relations, thus becoming the key to agility in the sector.

The impact of agility differs in various parts of the service sector. While agility stands out as a strategic necessity in dynamic and competitive sectors (such as software or technology sector), the advantages of agility may remain more limited in more stable sectors (such as traditional manufacturing) (Nadkarni and Narayanan, 2007). Although the strategic importance of agility varies in different segments of the service sector, practices that will ensure that customer needs are met and the speed of meeting them is better than competitors in each different sector segment are critical in terms of obtaining agility and competitive advantage.

4. Agility in the Industry Sector

In the industrial sector, agility plays a critical role in increasing the efficiency of the supply chain and the effectiveness of production processes. Companies that adopt an agile production system have the ability to rapidly restructure their production processes according to variable market conditions. Agility not only offers an operational advantage but also strengthens the market perception of the brand. As a result, the competitive advantage provided by agility is not limited to the optimization of internal processes but also forms the key to long-term success by leading to transformation in the general strategies of companies.

In the industrial sector, agility is important for gaining competitive advantage by quickly adapting to changes in the market. Production processes of agile industrial businesses require the design of flexible and modular models (Kisperska-Moron and

Swierczek, 2009). Teece, Pisano, and Shuen (1997) emphasize that restructuring dynamic capabilities that include existing organizational resources can enable adaptation to changing conditions and gain competitive advantage. Additionally, the study states that industrial businesses should consider three basic processing dynamics in achieving organizational agility. The first of these is Restructuring Production Processes. Industrial businesses can adapt to customer demands by rapidly restructuring their production processes. Another is adopting technological innovations. Industrial businesses can gain competitive advantage by adopting new technologies and utilizing these new technologies. Finally, supply chain management. The design of an effective supply chain is an important factor that increases the profitability and competitive power of the business (Teece et al., 1997, p. 515).

Agile industrial businesses are built on basic principles such as flexible structuring, rapid reorganization, and continuous improvement that will enable increasing the adaptation ability of the workforce, adapting to customer demands by rapidly restructuring production processes, increasing diversity, and responding instantly to demand changes, and this is only possible by focusing on technological developments (Sharifi & Zhang, 1999, p. 10).

Structuring the supply chain is an important factor for increasing vitality in industry. Close cooperation with suppliers is an important factor that will ensure the rapid restructuring of the supply chain (Sharifi & Zhang, 1999, p. 10). Each stage of the supply chain covers interconnected processes to respond quickly and effectively to customer demands. Supply chain managers aim to optimize the value flow by using resources efficiently and flexibly, from production to distribution, from inventory management to recycling, to achieve corporate flexibility.

An important component of agility in the industrial sector is the ability to quickly adapt to new technologies (Li et al., 2023). On the other hand, supply chains should be digitalized structures based on flexible and dynamic strategies in increasing agility. Digitalization accelerates critical decision-making processes through real-time data flow and analysis methods in supply chains. In this way, effective management of resources and uninterrupted continuity of production processes are ensured.

Automation technologies are important components that strengthen agility in the industrial sector and form the backbone of the sector. Automation systems transform traditional systems, reducing human errors in the production process. Robot technologies and artificial intelligence applications increase the usage efficiency of workforce and resources and production performance (Ajiga et al., 2024).

One of the ways to increase the agility of production processes is the integration of lean production principles into business processes. The basic com-

ponents of Lean Six Sigma; waste reduction, process improvement, customer focus, data-driven decision making create opportunities for businesses in both industrial and service sectors to quickly adapt to customer demands and market conditions ((Rosa & Broday, 2018). This approach, by increasing the agility of the production process and the entire organization, accelerates response times, reduces costs, and significantly improves market reach speed and customer satisfaction. Additionally, the use of data analytics and digital technologies strengthens rapid decision-making mechanisms by increasing the traceability and controllability of production processes.

5. Methodology

5.1. Research Design and Ethics

This study employs a quantitative research approach using survey methodology to examine agility perceptions between industrial and service sectors. The research design follows a cross-sectional comparative study framework to investigate sectoral differences in agility perception among businesses operating in the Istanbul region.

Ethics Statement: This research was conducted in accordance with ethical research principles. Prior to data collection, ethical approval was obtained from the Ethics Committee of the İstanbul Gedik University. All participants were informed about the purpose of the study, and their voluntary participation was ensured. The confidentiality and anonymity of all responses were guaranteed, and participants were informed of their right to withdraw from the study at any time. The study complies with the Declaration of Helsinki and relevant ethical guidelines for research involving human subjects.

5.2. Sample and Data Collection

The study considered data collected through surveys from 341 upper and middle-level managers of companies operating in the Istanbul region. The sample consisted of 145 service sector businesses and 196 industrial sector businesses. The selection of Istanbul as the research location was based on its significance as Turkey's largest economic center, hosting a diverse range of both industrial and service sector companies.

The questionnaire used as a data collection tool consists of two main parts: Demographic Questions: Questions including demographic information of the participants such as education level and position of employee, type of enterprise, enterprise size, field of the enterprise. Agility Scale: The agility scale developed by Liu et al. (2018) and consisting of 8 questions was used (Liu, et al., 2018). The survey questions were designed to be answered using Likert-type scale (1=Strongly disagree, 5=Strongly

agree). During the data collection process, the questionnaire form was sent to the participants via e-mail using online platforms and in printed form. The data collection process took approximately three months and 341 valid responses were received during this period.

5.3. Data Analysis

The collected data underwent several analytical procedures:

Reliability Analysis: Cronbach's alpha coefficients were calculated to assess the internal consistency of the measurement scales.

Frequency Analysis: Descriptive statistics were computed to understand the distribution of responses and sample characteristics.

Descriptive Analysis: Mean scores, standard deviations, and other descriptive measures were calculated for both sectors.

Independent Samples t-test: This statistical test was employed to compare agility perceptions between industrial and service sectors, testing for significant differences between the two groups.

5.4. Hypothesis of Research

Many studies have been conducted to identify variables and parameters that affect agility in industrial and service sector businesses. The studies of Yusuf, Sarhadi, and Gunasekaran (1999) and Gunasekaran et al. (2018) emphasized that the main driving force of agility in industrial businesses is flexibility in production processes and integration of information technologies. Karakaya and Aydın (2014) and Özdemir and Aydın (2012) stated in their studies that agility in the service sector is associated with the ability to respond quickly to customer needs and customization. Şahin and Kılıç (2016) and Daghfous and Amara (2010) emphasized in their studies that agility in industrial businesses provides operational efficiency and cost advantage. Karakaya and Aydın (2014) stated in their studies that agility in the service sector increases customer satisfaction and service quality.

The studies of Sambamurthy, Bharadwaj, and Grover (2003) and Overby et al. (2006) emphasized the relationship between the effect of information technologies on agility, customer experience management in service businesses, and supply chain integration in industrial businesses, showing that information technologies have different application areas in both sectors. Daghfous and Amara (2010) emphasized the relationship between agility in industrial businesses and lean production and automation applications, stating that agility in industrial businesses is supported by lean production and automation applications.

The studies of Karakaya and Aydın (2014) and Sambamurthy et al. (2003) investigated the relationship between agility and digital transformation processes in service businesses. The study of Gunasekaran et al. (2018) investigated the relationship between agility and supply chain flexibility in industrial businesses, showing that agility in industrial businesses is directly related to supply chain flexibility. The studies of Karakaya and Aydın (2014) and Özdemir and Aydın (2012) investigated the relationship between agility and innovative service delivery in service businesses, emphasizing that agility in the service sector is associated with innovative service delivery.

In the studies mentioned above, it is seen that many different aspects related to agility have been researched. This research was conducted to understand the differences in agility practices of industrial and service businesses and to provide a reference for developing agile organizational structures. For this purpose, the hypothesis of the research was developed by utilizing the findings in the literature and placed in a theoretical framework. The following hy-

pothesis was proposed for the research:

H1: Businesses' agility practices differ according to the industrial and service sectors.

6. Findings

6.1. Confirmatory Factor Analysis

Confirmatory Factor Analysis is used to analyze the structural validity of the scale used in the research and creates the opportunity to explore the compatibility of the data collected for the research with the original structure. In this context, Confirmatory Factor Analysis (CFA) was applied to ensure the validity of the Agility Scale, which consists of a single dimension and 8 items. In terms of data model fit, covariances were gradually created between items 6-7, 7-8, 4-5, and 1-2 that showed error similarity. As a result, the new model fit indices obtained were within the limits specified in the literature (Kline, 2015; Byrne, 2010). The analysis results are shown in Table 1. and the CFA diagram is shown in Figure 1.

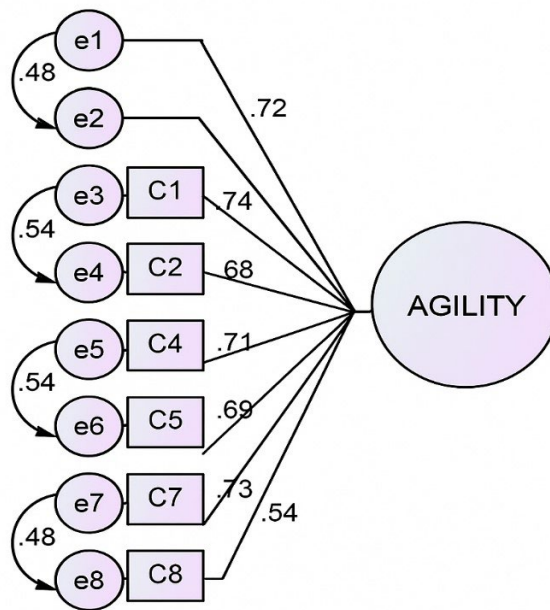


Figure 1. CFA Diagram of Agility Scale

Table 1. Agility Scale Model Fit Indexes

Fit Index	Category	Acceptable Fit	Perfect Fit	Obtained Value	Fit Status
χ^2/df	General Fit	$\leq 4-5$	≤ 3	2.96	Perfect
CFI	Comparative Fit	≥ 0.95	≥ 0.97	0.980	Perfect
NFI	Comparative Fit	0.90-0.94	≥ 0.95	0.970	Perfect
IFI	Comparative Fit	0.90-0.94	≥ 0.95	0.980	Perfect
RMSEA	Absolute Fit	0.06-0.08	≤ 0.05	0.067	Acceptable
GFI	Absolute Fit	0.85-0.89	≥ 0.90	0.973	Perfect

When Table 1 is examined, the general fit of the scale ($\chi^2/df = 2.96$) is at an acceptable level, falling within the recommended range of $\leq 4-5$ for acceptable fit (Hu & Bentler, 1999). Additionally, among the comparative fit indices, CFI (0.980), NFI (0.970), and IFI (0.980) show excellent fit according to Hu and Bentler's (1999) stringent criteria of ≥ 0.97 , ≥ 0.95 , and ≥ 0.95 , respectively. The RMSEA (0.067) shows acceptable fit, falling within Browne and Cudeck's (1993) reasonable fit range of < 0.08 . Finally, the absolute fit index GFI (0.973) demonstrates excellent fit, exceeding the ≥ 0.90 threshold recommended by Hu and Bentler (1999). Accordingly, the validity of the Agility Scale consisting of a single dimension and 8 statements has been confirmed.

Table 2. Reliability Analysis Results

Scale/Size	Number of items	α
Agility Scale	8	0,828

When Table 2. is analyzed; it is determined that the agility scale is highly reliable with an alpha coefficient of 0.828.

6.3. Demographic Findings

Frequency analysis was conducted to determine the

Table 3. Educational Status

	N	Percentage%	Cumulative Percentage (%)
Bachelor's and Associate's degree	159	46,6	46,6
Master's Degree	117	34,3	80,9
PhD	65	19,1	100,0
Total	341	100,0	

46.6% (159 people) of the participants are undergraduate and associate degree graduates, 34.3% (117 people) have master's degrees, and 19.1% (65 people) have doctoral degrees. Since the research was conducted on managers, it is expected that

Table 4. Position of the Employee

	N	Percentage%	Cumulative Percentage (%)
Senior Manager	227	66,6	66,6
Mid-Level Manager	114	33,4	100,0
Total	341	100,0	

When Table 4.6. is analyzed, 33.4% of the participants, 114 of them are middle level managers and 66.6%, 227 of them are senior managers. This reveals

6.2. Reliability Analysis

Reliability refers to the ability of measurement tools in a research to produce consistent results when reused. Therefore, reliability analysis is a critical factor in determining the validity and accuracy of data in experimental and field studies.

The Cronbach Alpha (α) technique is widely used to determine the reliability level in research. Accordingly, the α value takes a value between 0 and 1, and values of minimum 0.7 and above are considered to have high internal consistency and reliability indicators (Nunnally and Bernstein, 1994: 275-280). In this context, the Cronbach Alpha value was calculated to determine the reliability of the agility scales. The obtained result is shown in Table 2.

educational status of the participants. The findings obtained as a result of the analysis are given below.

6.4. Education Status

The educational status of the participants is shown in Table 3.

their educational levels are high. Additionally, the fact that a group with high educational status and in managerial positions constitutes the research sample significantly supports the quality of the research findings.

the suitability of the sample for strategic level information to be obtained about the business.

Table 5. Type of Enterprise

	N	Percentage%	Cumulative Percentage (%)
Business Operating on an International Scale	162	47,5	47,5
Large Scale Enterprise	72	21,1	68,6
Small and Medium Enterprises - SMEs	79	23,2	91,8
Micro Scale Firm or Sole Proprietorship	28	8,2	100
Total	341	100,0	

When Table 5. is examined, 47.5% of the enterprises operating on an international scale are 162 enterprises, while 21.1% are large-scale, 72 enterprises. Of the international enterprises, 31 are not considered

large-scale enterprises. Small and medium-sized enterprises are 23.2%, 79 enterprises, micro-sized and sole proprietorships are 8.2%, 28 enterprises. Of the enterprises within the scope of the research, 40.5%,

Table 6. Enterprise Size

	N	Percentage%	Cumulative Percentage (%)
Small and Medium Enterprises	138	40,5	40,5
Large Scale Enterprise	203	59,5	100,0
Total	341	100,0	

138 enterprises are small and medium-sized enterprises and 59.5%, 203 enterprises are large-scale enterprises.

Table 7. Field of Activity of the Enterprise

	N	Percentage%	Cumulative Percentage (%)
Service Sector	145	42,5	42,5
Industry Sector	196	57,5	100,0
Total	341	100,0	

Of the enterprises within the scope of the research, 42.5%, 138 service enterprises and 57.5%, 196 industrial enterprises.

on of a data set deviates from the central tendency and the general shape of that distribution. Skewness refers to the symmetry of the data distribution and kurtosis refers to whether the top of the data distribution is high or flat. The fact that the skewness and kurtosis coefficients are between ± 1.0 values indicates that the distribution is normal (George and Mallery, 2018:114-115).

6.5. Normality Statistics

Skewness and kurtosis are two important measures used to evaluate the distribution of data. These measures describe the extent to which the distribution

Table 8. Skewness and Kurtosis Values of Agility Data

Scale/Size	Skewness		Kurtosis	
	Statistics	Standard Error	Statistics	Standard Error
Service Sector	-0,250	0,201	0,310	0,400
Industry Sector	-0,154	0,174	0,515	0,346

The skewness and kurtosis values of the agility scales shown in Table 8 indicate a normal distribution.

ne whether Agility differs in terms of Activity Sector Variable. The results of the analysis are shown in Table 10 and descriptive statistics values according to sectors are shown in Table 9.

6.6. Comparison of Agility in terms of Activity Sector Variables

Independent Sample T test was applied to determi-

Comparison of Agility Perception Between Industrial and Service Sectors

Table 9. Descriptive Statistics for Sectors

In which sector does your company operate?	N	Average		Average	Standard Deviation	Standard Error
		Max	Min			
Agility	Service	145	5	2,75	4,0586	,51519
	Industrial	196	5	2,50	3,8501	,60495

The lowest average of the agility scale for the Service Sector is 2.75; the highest average is 5.0; the general average is 4.0586 and the standard deviation is 0.515. This indicates that the agility perceptions of the service sector are at a high level.

In the industrial sector, the lowest average of the agility scale is 2.50; the highest average is 5.0; the

general average is 3.85 and the standard deviation is 0.60495. This indicates that agility in the industrial sector is at a high level.

As a result, when examining the descriptive statistics of the industrial and service sectors, it is seen that the agility perception of the service sector is higher than in the industrial sector.

Table 10. Independent Sample T-test Analysis Results

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Agility	Equal variances assumed	4,083	,044	3,348	339	,001	,20849	,06228	,08599	,3309
	Equal variances not assumed			3,429	332,287	,001*	,20849	,06081	,08888	,3281

*P is valid P<0.05

When Table 10 is analyzed; it is determined that agility differs in terms of the sector of activity ($t=3,429$ $p=0,001<0,05$). Accordingly, the agility perception of the service sector (Mean=4.06) is higher than that of the industrial sector (Mean=3.85). These results indicate that agility is at a higher level in the service sector than in the industrial sector.

7. Discussion and Conclusion

7.1. Discussion

The findings of this study contribute to the growing body of literature on organizational agility by providing empirical evidence of sectoral differences in agility perception. The results align with theoretical expectations that service sector organizations, due to their inherent characteristics and operational requirements, tend to perceive themselves as more agile compared to their industrial counterparts.

The multidimensional nature of organizational agility, as conceptualized by Asghar et al. (2025), provides a theoretical framework for understanding these sectoral differences. The distinction between

macro-agility (strategic and partnering agility) and micro-agility (operational, innovation, and workforce agility) may explain why service sector organizations, with their emphasis on customer interaction and rapid service delivery, demonstrate higher agility perceptions (Asghar et al., 2025).

The dynamics of the industrial and service sectors each create a significant impact on the development of sectoral structures and business models. Understanding the differences between the two sectors plays a critical role in developing strategies that will increase success while developing agile approaches for businesses. The recognition of agility as a capability that shapes the future of the business world is important for the sustainability of ongoing competition in both service and industrial fields.

The differentiation of agility according to service and manufacturing sectors was done with data collected from managers in 341 companies in the manufacturing and service sectors. As a result of the analysis conducted with the collected data, it was determined that it differs between industrial and service sectors, and it was concluded that agility in the service sector is at a higher level compared to the industrial

al sector. In the service sector, quick response and flexibility to customer demands can change continuously and in shorter periods are at the forefront. According to the findings of the study, the service sector is stronger than the industrial sector, especially in responding quickly to customer demands. These findings show that agility in the service sector is significantly associated with practices that increase customer satisfaction (Vargo & Lusch, 2008).

The higher agility perception in the service sector can be attributed to several factors that are inherent to service operations. First, service organizations typically operate with direct customer interaction, necessitating rapid response capabilities to meet evolving customer expectations (Vargo & Lusch, 2008). This customer-centricity creates organizational structures that prioritize flexibility and adaptability as core competencies rather than secondary capabilities (Teece, 2018).

Brozovic (2016) argues that service organizations develop “dynamic service capabilities” that enable them to reconfigure their service delivery processes rapidly in response to changing market conditions. These capabilities are embedded in organizational routines that emphasize customer feedback loops and continuous service innovation. Our findings support this theoretical perspective, demonstrating that service sector managers perceive their organizations as more agile compared to their industrial counterparts.

The intangible nature of services also contributes to greater organizational agility. Unlike manufacturing processes that require significant capital investment in physical assets, service processes can often be reconfigured with minimal structural changes (Menor et al., 2002). This inherent flexibility allows service organizations to pivot more rapidly when market conditions change, supporting the higher agility perception observed in our study (Sherehiy et al., 2007). Digital transformation has further amplified the agility advantage in service organizations. As noted by Nambisan et al. (2019), digital technologies enable service firms to develop modular service architectures that can be rapidly reconfigured to meet changing customer needs. The integration of cloud computing, data analytics, and artificial intelligence has created what Huang et al. (2017) term “digital service agility” the ability to leverage digital technologies to sense and respond to market changes with unprecedented speed and precision.

The relatively lower agility perception in the industrial sector can be understood through the lens of structural inertia theory (Hannan & Freeman, 1984) and the concept of path dependency (David, 1985). Industrial organizations typically operate with capital-intensive production systems that create significant switching costs when changes are required. This structural rigidity can impede rapid adaptation

to changing market conditions, resulting in lower perceived agility (Bustelo et al., 2006).

Gunasekaran et al. (2018) identify several factors that constrain agility in manufacturing contexts, including complex supply chains, high capital investment requirements, and lengthy product development cycles. These factors create what Teece (2018) terms “complementary asset constraints” the need to align multiple interdependent systems when implementing changes. Our findings suggest that these constraints may contribute to the lower agility perception observed in industrial organizations.

However, it is important to note that industrial sector agility, while lower than service sector agility, still registered at a high level (Mean=3.85). This suggests that industrial organizations are actively developing agility capabilities despite structural constraints. Yusuf et al. (2014) argue that manufacturing organizations are increasingly adopting “leagile” approaches that combine lean efficiency with agile responsiveness. These hybrid approaches enable industrial organizations to develop context-specific agility capabilities that address their unique operational challenges (Narasimhan et al., 2006).

The emergence of Industry 4.0 technologies presents significant opportunities for enhancing agility in industrial contexts. As noted by Mrugalska & Ahmed (2021), technologies such as the Internet of Things (IoT), artificial intelligence, and advanced robotics can increase manufacturing flexibility and responsiveness. These technologies enable production systems that can autonomously reconfigure in response to changing demand patterns or supply disruptions.

The findings of this study have several important implications for managers seeking to enhance organizational agility. First, the sectoral differences in agility perception suggest that agility development strategies should be contextualized to address sector-specific challenges and opportunities. Service sector managers should leverage their organizations’ inherent flexibility while focusing on systematizing agility practices to ensure consistency across the organization (Sherehiy et al., 2007).

Industrial sector managers face the challenge of overcoming structural constraints on agility. Adopting modular production architecture, as recommended by Bustelo et al. (2006), can enhance manufacturing flexibility without sacrificing efficiency. Additionally, developing what Gunasekaran et al. (2018) term “agile supply chains” collaborative networks of suppliers that can rapidly reconfigure in response to changing demand—can enhance overall organizational agility.

Digital transformation represents a critical priority for managers across both sectors. As noted by Nambisan et al. (2019), digital technologies enable organizations to develop “digital options” IT-enabled ca-

pabilities that create strategic flexibility. Managers should prioritize investments in digital technologies that enhance sensing capabilities (e.g., advanced analytics), seizing capabilities (e.g., digital platforms), and reconfiguring capabilities (e.g., cloud computing).

Organizational culture plays a crucial role in agility development. Sherehiy et al. (2007) identify several cultural attributes that support organizational agility, including tolerance for uncertainty, empowerment of front-line employees, and continuous learning orientation. Managers should foster these cultural attributes through leadership behaviors, reward systems, and organizational structures that encourage experimentation and rapid adaptation.

Cross-functional collaboration represents another critical enabler of organizational agility. As noted by Tallon et al. (2019), organizations with strong cross-functional integration demonstrate higher agility by facilitating rapid information sharing and coordinated responses to market changes. Managers should implement mechanisms such as cross-functional teams, integrated information systems, and collaborative decision-making processes to enhance organizational agility.

While this study provides valuable insights into sectoral differences in agility perception, several limitations should be acknowledged. First, the study focused on organizations in the Istanbul region, potentially limiting the generalizability of findings to other geographic contexts. Future research should examine agility differences across diverse geographic and cultural contexts to develop a more comprehensive understanding of contextual influences on agility development.

Second, the study relied on managerial perceptions of organizational agility rather than objective measures of agility performance. While perceptual measures provide valuable insights into organizational capabilities, they may be subject to social desirability bias and other response biases (Podsakoff et al., 2012). Future research should complement perceptual measures with objective indicators of agility performance, such as new product development cycle times, market response times, and adaptation to disruptive events.

Third, the cross-sectional design of this study limits causal inferences regarding the relationship between sectoral characteristics and agility development. Longitudinal research designs would provide stronger evidence regarding the development trajectories of agility capabilities across different sectoral contexts. Additionally, case study research could provide deeper insights into the specific mechanisms through which sectoral characteristics influence agility development.

Future research should also explore the relationship between organizational agility and performance

outcomes across different sectoral contexts. While existing research suggests that agility contributes to superior performance (Tallon & Pinsonneault, 2011), the strength of this relationship may vary across sectors due to differences in competitive dynamics and customer expectations. Understanding these contingencies would provide valuable guidance for managers regarding the strategic value of agility investments.

The role of digital transformation in enhancing organizational agility represents another promising direction for future research. As noted by Nambisan et al. (2019), digital technologies are transforming the nature of organizational capabilities, including agility. Future research should examine how specific digital technologies contribute to different dimensions of organizational agility across sectoral contexts, providing guidance for targeted technology investments.

7.2. Implications

The service sector's dynamic structure, focused on customer interactions and experiences, naturally requires higher levels of responsiveness and flexibility. Service organizations must continuously adapt to changing customer preferences, market conditions, and competitive pressures. This constant need for adaptation may contribute to a heightened awareness and perception of agility within service organizations.

In contrast, industrial sector organizations, while equally capable of agility, may face different constraints and requirements that influence their agility perception. The physical nature of production processes, longer product development cycles, and capital-intensive operations may create different agility challenges and opportunities.

The role of digital transformation in enhancing organizational agility cannot be overlooked in this discussion. Alakaş (2024) demonstrates that digital transformational leadership and organizational agility have synergistic effects on digital transformation success, with digital strategy and digital culture serving as critical mediating factors (Alakaş, 2024). This suggests that organizations in both sectors can enhance their agility through strategic digital transformation initiatives.

The findings have several important implications for managers and practitioners in both sectors:

Organizations should develop sector-specific agility strategies that are tailored to their sector's unique characteristics and requirements. Service sector organizations can leverage their naturally higher agility perception to further enhance their competitive advantage, while industrial sector organizations should focus on identifying and addressing specific barriers to agility.

Digital Transformation Initiatives is very important. Based on the research by Pelletier et al. (2025), organizations, particularly in the manufacturing sector, should strategically align their IT capabilities to enhance agility. This involves combining dynamic IT capabilities (sensing, learning, coordinating, integrating) with operational IT capabilities (IT management, IT infrastructure, e-business) (Pelletier et al., 2025).

Organizations should invest in developing digital transformational leadership capabilities, as these have been shown to significantly impact organizational agility and digital transformation success.

Creating an organizational culture that supports agility is crucial for both sectors. This involves developing employee talents, empowering teams, and adopting new business models that facilitate rapid adaptation to change.

7.3. Conclusion

This study provides empirical evidence that agility perception differs significantly between industrial and service sectors, with service sector organizations demonstrating higher levels of perceived agility. The findings contribute to our understanding of how organizational agility manifests across different sectoral contexts and highlight the importance of sector-specific approaches to agility development.

The integration of recent theoretical developments in organizational agility research, particularly the multidimensional conceptualization and the role of digital transformation, provides a more comprehensive understanding of these sectoral differences. The research demonstrates that organizational agility is not a monolithic concept but rather a complex, multifaceted capability that requires careful cultivation and strategic alignment with organizational and sectoral characteristics (Pelletier, et al., 2025; Alakaş, 2024, Asghar et al., 2025).

The practical implications of these findings suggest that organizations should develop tailored agility strategies that account for their sector's unique characteristics and requirements. Service sector organizations can build upon their naturally higher agility perception to further enhance their competitive advantage, while industrial sector organizations should focus on identifying and addressing specific barriers to agility development.

Furthermore, the critical role of digital transformation in enhancing organizational agility across both sectors cannot be overstated. Organizations must strategically invest in digital capabilities, develop digital transformational leadership competencies, and foster digital cultures that support agility initiatives.

As businesses continue to face increasing uncertainty and rapid change in the global marketplace, the ability to maintain and enhance organizational

agility will remain a critical success factor. This study contributes to the growing body of knowledge on organizational agility and provides a foundation for future research and practice in this important area.

The research findings underscore the importance of understanding sectoral nuances in agility perception and development, while also highlighting the universal importance of agility as a strategic capability for organizational success in the contemporary business environment.

7.4. Limitations and Future Research

While this study provides valuable insights into sectoral differences in agility perception, several limitations should be acknowledged. The study was conducted only in the Istanbul region, which may limit the generalizability of findings to other geographic contexts. The cross-sectional nature of the study prevents causal inferences about the relationships between sector type and agility perception. The study relies on perceptual measures of agility rather than objective indicators.

Future research is recommended to consider the following:

Conducting longitudinal research to examine how agility perceptions change over time and in response to various organizational and environmental factors.

Expanding the research to include multiple countries and cultural contexts to enhance generalizability.

Incorporating objective measures of organizational agility alongside perceptual measures to provide a more comprehensive assessment.

Investigating potential mediating factors that might explain the relationship between sector type and agility perception, such as organizational culture, leadership style, and digital maturity.

Finally, future research should explore the micro foundations of organizational agility—the individual-level skills, behaviors, and cognitive processes that collectively constitute organizational agility capabilities. As argued by Teece (2007), understanding these micro foundations is essential for developing effective interventions to enhance organizational capabilities. Research examining how individual agility competencies aggregate to create organizational agility would provide valuable insights for talent management and leadership development.

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