IRMM
INTERNATIONAL REVIEW OF MANAGEMENT AND MARKETING
EJ EconJournals
ISSN: 2146-4405

International Review of Management and Marketing

ISSN: 2146-4405

available at http: www.econjournals.com

International Review of Management and Marketing, 2025, 15(5), 7-17.

The Relationship Between Digital Transformation and Organisational Agility in Public Institutions: The Case of a University

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Received: 19 March 2025 **Accepted:** 05 July 2025 **DOI:** https://doi.org/10.32479/irmm.19720

ABSTRACT

The digital transformation experienced in recent years has caused many organizations to change their shape, update their processes, and renew themselves with new competencies and capabilities. The new order emerging with the rapid change has forced organizations to be more agile. The study was conducted to examine the relationship between digital transformation and organizational agility in public institutions, which are among the organizations affected by transformation. In particular, it was tried to examine how digital transformation affects agility in organizations through a university example. In the evaluation made through the university example, it was revealed how an agile organizational structure can be formed in an institution where digital transformation takes place and how digital transformation is related to the dimensions that constitute organizational agility. In the study, explanatory factor analysis was applied to measure the structural validity of the scales and simple regression analysis was applied to test the hypotheses. As a result, it is seen that the successful realization of digital transformation in public institutions makes organizations more agile and if this is supported by agile management approaches, the advantages that public institutions will gain will increase.

Keywords: Digitalization, Digital Transformation, Organizational Agility, Public Institutions
JEL Classifications: L21, M10, M15

1. INTRODUCTION

Digital transformation is undoubtedly one of the current concepts that seriously affects the public sector as well as the private sector. The technological changes, the increase in the production and dissemination of information, the differentiation of citizen expectations and the increase in global competition force public institutions to rapidly digitalize. Public institutions, especially those that produce knowledge and carry out education and research activities such as universities, should closely follow technological developments and see digital transformation not only as a process that increases efficiency, but also as a tool for organizations to become more capable, agile, flexible and innovative.

The concept of agility refers to the ability for organizations to easily adapt to a rapidly changing environment and respond quickly to change. Digital transformation offers important opportunities to provide and promote agility in organizations. The integration of developing technologies into the organization makes it possible to establish faster decision-making mechanisms in education and research processes, to make resource use efficient, to create flexible organizational structure and flexible working models. It should be constantly remembered in public institutions that digital transformation is not only about the adoption of technological tools, but also about the transformation of organizational structures, business processes and especially leadership approaches.

In this study, a university example will be discussed in order to examine the relationship between digital transformation and organizational agility in the context of public institutions. Understanding the relationship between digital transformation and agility in universities, which play a central role among public institutions due to their contributions to knowledge production, knowledge distribution and education, is considered very important for these institutions to provide more efficient, effective and effective services. Therefore, the study aims to reveal how digital transformation contributes to organizational agility by examining how the impact of digital transformation in universities transforms the concepts of competence, flexibility, responsiveness and speed, which are the dimensions of agility.

1.1. Digital Transformation

Digital transformation is a multifaceted phenomenon that fundamentally changes the way organizations work, deliver value to customers and interact with their environment, while reducing the bureaucratic burden of public institutions. It encompasses a variety of processes and technologies that are integrated into all business processes of an organization, leading to significant changes in business models, operations and customer interactions. The concept of digital transformation refers to a transformation process that led to the integration of technology and digitalization into our daily lives and the business world with the emergence of personal computers and the internet in the late 20th century. These technologies have enabled organizations to reshape their operations by automating processes and improving communication. Especially with the introduction of the World Wide Web in the 1990s, the rise of e-commerce and digital marketing is seen as an important turning point that enables organizations to reach wider audiences and facilitate their activities (Li et al., 2017; Cennamo et al., 2020). The first wave of digital transformation is considered to be when organizations realized the potential of digital technologies and started to use these tools more and integrate them into their core strategies. This wave grew with the spread of mobile technologies and social media in the early 2000s, and the digital transformation process accelerated further. Organizations, including public institutions and agencies, started to use these platforms to interact with beneficiaries in real time, collect data and personalize experiences (Kraus et al., 2021).

Another development during the same period was the emergence of cloud technology, which provides organizations with scalable resources and reduces the costs associated with IT infrastructure (Lima et al., 2022; Hu, 2023). The global financial crisis in 2008 caused many organizations to rethink their strategies and adopt digital transformation more aggressively. The need for cost reduction and efficiency that emerged during this period pushed organizations to adopt digital solutions that would facilitate operations and improve decision-making processes (Yoo and Yi, 2022). In the following process, the concept of "big data" emerged. With the concept, it has been observed that organizations have started to analyze large amounts of information in order to gain insights about consumer behavior and market trends. It is stated that organizations that leverage the power of analytics to foster innovation have experienced a transformation towards data-driven decision-making, and this trend has become one of the cornerstones of digital transformation (Setiawan et al., 2023; Xue et al., 2022).

At its core, digital transformation is a process that involves the adoption and integration of digital technologies to enhance existing processes and create new value propositions. This process should not only be seen as the implementation of new technologies. Digital transformation requires a holistic rethinking/transformation of business strategies and business models. From this point of view, it is reported that digital transformation is driven by the competencies of entrepreneurs and digital platform service providers, and that a successful transformation can be realized with sound information management and corporate architecture (Li et al., 2017). Similarly, it is underlined that digitalization and digital transformation are interconnected and these processes need to be managed effectively (Gradillas and Thomas, 2023).

The impact of digital transformation goes beyond individual organizations and affects all sectors and social structures. For example, in the context of public health, it is stated that with digital transformation, digital technologies are integrated into health systems, thus improving public health data and achieving broader public health goals (Iyamu et al., 2021). The COVID-19 pandemic, which has increased the widespread impact of digital transformation, has forced organizations to work remotely and adapt to digital interactions, leading to the rapid adoption of digital tools and platforms (Aramyan and Krivopuskov, 2021; Castellar et al., 2021). In a successful digital transformation, it is argued that organizational agility, technological market positioning, value creation, and increased market responsiveness depend on organizations' ability to take advantage of and rapidly integrate new digital opportunities (Kraus et al., 2021; Jafari-Sadeghi et al., 2021). Moreover, the integration of advanced technologies such as artificial intelligence (AI), big data analytics and the ınternet of things (IoT) plays an important role in the success of digital transformation. These technologies enable organizations to optimize their operations, improve decision-making processes and create new business models. The ability to leverage large volumes of data and make it actionable is seen as the key to sustainability for organizations that want to maintain their competitive advantage in the digital economy (Moumtzidis et al., 2022). Therefore, digital transformation, which affects all sectors and social structures, also has economic impacts/contributions.

Along with these positive contributions, the challenges associated with digital transformation are equally important. It is reported that digitalization offers opportunities to organizations, including public institutions and organizations, but it also brings structural changes, cultural changes within organizations, resistance to change, and skill deficiencies, which are challenges to be overcome in the digital transformation process (Dąbrowska et al., 2022). In conclusion, the effects of digital transformation, which started in the late 20th century and have continued to evolve until today, have reshaped the way organizations work and interact with stakeholders. Over time, the ability to embrace change, foster innovation and achieve digital transformation is seen as the only way for organizations to succeed in an increasingly digitalized world.

1.2. Organizational Agility

Organizational agility refers to an organization's ability to adapt to and take advantage of a rapidly changing business environment. In today's business world, sustaining competitive advantage is only possible by being able to respond quickly to market conditions full of uncertainties. Organizational agility requires a holistic approach supported not only by the application of agile methodologies, but also by flexible organizational structures, agile leadership and a strong agile culture (Doz and Kosonen, 2010).

Agile organizational structures are organizational models that have a more flexible, fast and customer-oriented structure by moving away from hierarchical and bureaucratic management models. While traditional organizations are generally rigid, centralized and based on long decision-making processes; agile organizations are structures that work in small and autonomous teams and have a horizontal management model (Aghina et al., 2018). Thanks to this structure, it becomes possible for employees to take more responsibility, managers to make faster decisions, and the organization to adapt flexibly to the changes (Rigby et al., 2018). In agile organizational structures, the organizational structure is supported by creating cross-functional teams instead of classical department-based structures. Functional teams usually come together around a project or product and focus on delivering value to customers. Functional team members have the capacity to solve multidimensional problems as they are formed from different skills and disciplines (Brown, 2014). Agile organizations adopt a governance model based on leadership rather than hierarchical control. Instead of being dictated by top management, decisions are made based on the local knowledge and competencies of teams (Holbeche, 2018). This paves the way for innovation and creativity because teams are empowered to manage their own processes and experiment rapidly (Denning, 2018).

Unlike traditional leadership, agile leadership is leadership that aims to support the development and independence of teams rather than directing and controlling them. Agile leaders provide vision and strategy to their employees and allow teams to chart their own path in line with this vision (Joiner and Josephs, 2007). This leadership style is far from classical management and is more coaching-oriented. Through this coaching and counseling, teams gain the competence to make their own decisions. In agile leadership, the main task of leaders is to remove obstacles and provide the necessary resources (Dyer et al., 2009). Instead of solving problems, leaders create an environment that enables teams to solve problems. In addition, agile leaders facilitate information sharing among teams and build trust by encouraging open communication and transparency (Rigby et al., 2016). These characteristics of agile leadership reveal the importance and role of governance in this type of leadership. In terms of governance, agile organizations have a distributed decision-making mechanism rather than a centralized structure. While decisions are usually made by senior managers in the routine functioning of classical organizations, in agile organizations, the decision-making process is spread to the grassroots and teams are allowed to make fast and effective decisions within themselves (Horney et al., 2010). This enables the organization to take action faster and contributes to the motivation of employees by taking more responsibility.

For an organization to become agile, it is not only possible through structural changes or leadership, but also through a cultural transformation. Agile culture includes core values such as collaboration, continuous learning, experimentation and customer orientation (Denning, 2016). The creation of such a culture can be realized through a strong change management process throughout the organization and the leadership's support for this change. One of the important elements of agile culture is continuous feedback and improvement cycles. In this way, employees are prevented from focusing only on results, they focus on processes and become employees who aim to make improvements at every step (Schein, 2010). Since this process is not a process that can get results only by feeding feedback from top management, feedback from all employees is important and the system will function healthily if all feedback is fed by. In addition, the perspective on the concept of "error" needs to be differentiated throughout the organization. A culture should be created in the organization where making mistakes is accepted as natural and learning from mistakes is encouraged. This will allow the organization to implement more and faster and to generate innovative ideas (Bessant and Tidd, 2015). Another important element in creating an agile culture is customer orientation. In agile organizations, customers are not only seen as an outcome, but are involved in the whole process and positioned at the center (Rigby et al., 2016). Feedback from customers is critical in improving processes and developing products in organizations. In this way, organizations can identify customer needs and respond to these needs faster and more effectively. Agile organizations are structures that focus on team success rather than individual success, thus allowing different teams/employees to work together. Agile culture contributes to agility by encouraging collaboration and teamwork in the organization (Edmondson, 2019). This contributes to increasing innovation in the organization as well as strengthening the organizational commitment of employees. In addition, agile organizational culture necessitates open communication at all levels of the organization as it increases cooperation and awareness of acting together.

Another element that enables organizational agility is ınformation technology (IT). The role of IT in the development of organizational agility is undeniable. Research shows that the acquisition of IT capabilities, especially in order to provide the necessary infrastructure for rapid decision making and operational flexibility, is of fundamental importance in the development of agility (Lu and Ramamurthy, 2011; Chakravarty et al., 2013). Integrating IT into organizational processes not only enhances agility but also acts as a catalyst for "digital transformation," which is increasingly vital in today's rapidly changing technology-driven environment (Zhang et al., 2023). Moreover, organizations that align IT strategies with agility initiatives tend to achieve better performance outcomes by emphasizing the interdependence of these two constructs (Chakravarty et al., 2013; Panda and Rath, 2016).

1.3. Relationship Between Digital Transformation and Organizational Agility

Digital transformation and agility are two important concepts that support and complement each other. Digital transformation is defined as a process that enables organizations to become more

efficient and flexible by adapting their processes, products and services to digital technologies (Fitzgerald et al., 2014). Agility is a management approach that enables organizations to adapt to rapidly changing customer expectations, technological innovations and market conditions in the digital transformation process. While digital transformation provides the necessary technological infrastructure for the implementation of agility, agility helps to realize digital transformation more effectively and efficiently (Weill and Woerner, 2015).

Digital transformation plays an important role in increasing the agility of organizations. First of all, digital technologies meet the speed and flexibility requirements of agility management by automating business processes and strengthening data-driven decision-making mechanisms (Kane et al., 2015). For example, digital tools such as cloud computing, artificial intelligence and big data analytics enable organizations to make data-driven decisions and create fast action plans to implement these decisions. Thanks to these technologies, agile teams can analyze not only their internal processes but also customer feedback in real time and adapt their strategies on the fly (Ross et al., 2017).

Digital transformation also strengthens collaboration and communication between teams. Digital communication tools and project management platforms allow teams to collaborate effectively even if they are geographically dispersed. Communication, which constitutes an important dimension of agility, especially for large organizations operating in large geographies, is realized in a healthier way with digitalization (Davenport and Westerman, 2018). Thanks to digital tools, teams can instantly access information that supports rapid decisions and change processes and manage processes more effectively. Today, many organizations and employees use social media tools effectively as a means of communication.

The synergy that emerges with the combination of digital transformation and agility changes the structure of organizations. The common characteristics of digital and agile organizations include flexibility, which refers to being able to adapt quickly to changing customer demands and technological developments; customer orientation, which refers to trying to continuously improve products and services with feedback to increase customer satisfaction; innovation, which refers to organizations generating innovative solutions to emerging problems; and data-driven decision making, which refers to using technologies such as big data analytics and artificial intelligence and thus making more informed decisions (Kane et al., 2015; Denning, 2018; Rigby et al., 2016; Ross et al., 2017).

It is possible to face some difficulties in the process of implementing digital transformation and agility concepts in organizations. Digital transformation and preparing the necessary infrastructure is a costly process. Digital transformation may often require organizations to completely renew their technological infrastructure. This cost and difficulty can make it difficult to create a digital infrastructure compatible with agile methods (Fitzgerald et al., 2014). In addition, rapid decision-making processes, which are one of the requirements of agility, may become difficult due to the complexity of digital projects and the lack of competencies of employees or managers. To work with advanced digital technologies such as big data analytics and artificial intelligence, employees need to have a high level of technical knowledge. This requirement and the inability to find qualified staff can be a serious obstacle for some organizations (Weill and Woerner, 2015). Again, digital and agile transformation processes may require difficult, serious and significant changes in organizational culture. Changing culture in organizations is a time-consuming process and can sometimes result in failure. Giving up traditional hierarchical structures in favor of more horizontal and autonomous structures will facilitate this process. However, such cultural transformations may encounter resistance, especially in large and bureaucratic organizations (Holbeche, 2018).

Digital transformation and agility are two important elements that increase the ability of organizations to adapt to rapidly changing technological processes and other conditions. While digital transformation provides the necessary technological infrastructure for agility management, agility management contributes to the realization of digital transformation more efficiently and effectively. However, as the integration of these two processes requires structural and cultural changes in organizations, some challenges may be encountered. A successful digital and agile transformation depends on the harmonious execution of both technological and cultural adaptation processes.

2. METHODS AND DATA

2.1. Research Model and Hypotheses

In the study, a working model was created to analyze the impact of digital transformation on organizational agility. The model explains the impact of digital transformation on the four basic dimensions of organizational agility, competence, flexibility, responsiveness and speed. In this context, the effects of digital transformation on organizational agility in general and on the components of organizational agility are examined and hypotheses are formed on the following basis:

H_1: Digital transformation has a statistically significant positive effect on organizational agility.

Competence: It is examined whether digital transformation improves the competence dimension of organizational agility by increasing the capacity of organizations to use knowledge, skills and technology. H_{1a}: Digital transformation has a statistically significant positive effect on the competency dimension of organizational agility.

Responsiveness: With digital transformation, the ability of organizations to respond to changes in the internal and external environment was analyzed. H_{1b}: Digital transformation has a statistically significant positive effect on the responsiveness dimension of organizational agility.

Flexibility: How digital transformation strengthens organizations' ability to change in order to adapt to changing conditions. H_{1c}: Digital transformation has a statistically significant positive effect on the flexibility dimension of organizational agility.

Speed: It was evaluated how digital transformation accelerates the organization in terms of decision-making processes and functional activities. H_{1d}: Digital transformation has a statistically significant positive effect on the speed dimension of organizational agility.

In order to test the relationship between digital transformation and organizational agility, a survey was conducted, the necessary data were collected and analyzed. The model developed to explain the impact of digital transformation on organizational agility in accordance with the purpose of the study is shown in Figure 1.

2.2. Research Sample and Data Collection Method

The population of the study consists of academic and administrative staff working at the university. Data were collected by convenience sampling method among all employees working at the university. The sample size was obtained as follows for the 95% confidence interval and according to the formula to be applied when the population size is known (Balci, 2016):

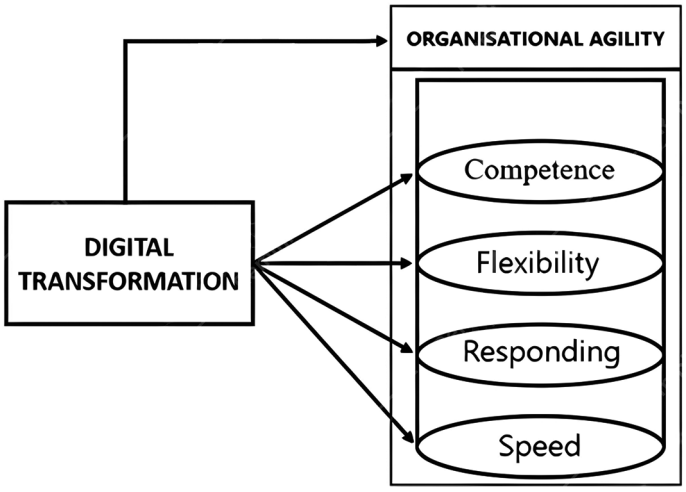
$$n = \frac{Nt^2(pq)}{d^2(N-1) + t^2(pq)}$$

Where n is the sample size; N is the population size; t is the table value of the confidence level (such as 1.64; 1.96; 2.57); p is the probability of the event under study; q is the probability of the event not occurring; and d is the tolerance level (0.05 or 0.01). Accordingly, when the tolerance level is 0.05, the minimum sample size required for the study is calculated as follows;

$$n = \frac{2727*(1{,}96^2)*(0{,}5*0{,}5)}{(0{,}05)^2*(2727-1) + (1{,}96)^2*(0{,}5*0{,}5)} \approx 336{,}832$$

According to the result obtained, it was determined that at least 337 people should be surveyed within the scope of the study. Due to the possibility of missing information or wrong answers in the questionnaires and the fact that the universe consists of 2727 people, a total of 500 questionnaire forms were distributed to 500 employees. At the end of the application, 397 complete and fully returned questionnaire forms were reached. Thus, a return rate of 79% was achieved and a sufficient sample size was reached.

Figure 1: Research model



Within the scope of the study, a face-to-face/online survey was conducted with the employees of the relevant university. In the study, the "Digital Transformation Scale" developed by Nadeem et al. (2018) and introduced into Turkish literature by Sağlam (2021) and the "Organizational Agility Scale" developed by Sharifi and Zhang (1999) and introduced into Turkish literature by Akkaya and Tabak (2018) were used. While the digital transformation scale consists of 12 items and a single dimension, the organizational agility scale consists of four dimensions, namely "competence" (8 items), "flexibility" (3 items), "responsiveness" (3 items) and "speed" (3 items), and a total of 17 items. A 5-point Likert scale ("strongly disagree = 1," "disagree = 2," "neutral = 3," "agree = 4," "strongly agree = 5") was used.

2.3. Methodology of the Study

In the study, exploratory factor analysis was used to measure the construct validity of the scales and simple regression analysis was used to test the hypotheses.

2.4. Explanatory Factor Analysis

Exploratory factor analysis aims to explain the common variance (or variance shared by the explanatory variables explained by the underlying relationships) by combining similar items (Norris and Lecavalier, 2009). This statistical approach involves the analysis of the dimensionality of a scale, with the objective being the identification of the minimum number of interpretable factors necessary to elucidate the correlations among a set of items (McCoach et al., 2013).

At the outset of exploratory factor analysis, the KMO (Kaiser-Meyer-Olkin Measure of Sampling Adequacy) is evaluated. This index, ranging from 0 to 1, signifies the adequacy of the sample for factor analysis. A value of 1 denotes perfect predictability between variables, with a lower threshold set at 0.5. A KMO value of 0.5 or greater indicates adequate correlation between variables, suggesting the feasibility of factor analysis. Additionally, the outcomes of Bartlett's Test of Sphericity are a crucial metric. This test determines the suitability of the data for factor analysis by assessing the significance level. A significance level >0.05 suggests that factor analysis is not applicable to the data (Durmuş et al., 2011). Additionally, the explained variance, which is defined as the proportion of the total variance (100%) in the dimensions that can be attributed to them, is a critical component of factor analysis. Ideally, the value of explained variance should be 50% or greater, as indicated in the literature (Kalayci, 2010: 328).

Various rotation methods are employed during the factor loading calculation process. The most frequently utilized approach in the rotation phase is the varimax method. The objective of the varimax method is to maximize the factor loadings of a given variable within a specific dimension, concurrently minimizing the factor loadings in other dimensions where the variable is not included. Consequently, as posited by Tabachnick and Fidell (2013), the explained variance, calculated according to the factor loadings, is maximized. The factor loadings, obtained during the

factor analysis, serve to determine the dimension in which each variable is closely related (Kalayci, 2010). Specifically, in a data set with a minimum of 350 observations, a factor loading of 0.3 is sufficient. However, a factor loading of 0.5 or above becomes more significant. Consequently, the minimum accepted factor loading is set at ±0.3, contingent on the number of observations (Hair et al., 2013:115).

2.5. Simple Linear Regression Analysis

Simple regression analysis was utilized to evaluate the hypotheses formulated for this study. This method entails the calculation of values of one variable based on its observed values. Simple regression analysis involves the estimation of the dependent variable (Y) through the manipulation of the independent variable (X) (Armutlulu, 2008). In essence, simple regression analysis can be defined as a technique that quantifies the impact of an independent variable on a dependent variable. The underlying mathematical formulation is expressed as follows:

$$Y = \alpha + \beta X$$

In the equation under consideration, Y is designated as the dependent variable and X is designated as the independent variable. Alpha (α) and Beta (β) represent the coefficients of the equation, which are derived through simple regression analysis. The utilization of simple linear regression is contingent upon the assumption that the relationship between variables is linear. In the present study, organizational agility and its sub-dimensions were identified as dependent variables, and digital transformation was designated as the independent variable. In accordance with the postulated hypotheses, the findings of this study demonstrate a linear relationship between organizational agility and its sub-dimensions and digital transformation. However, it is imperative to note that for simple linear regression analysis to generate precise results, it is essential that certain assumptions are fulfilled. These assumptions can be articulated as follows (Durmus et al., 2011):

In accordance with the aforementioned information, the following mathematical models are proposed for consideration in this study, contingent upon the following assumptions being made:

- A linear relationship between variables is postulated, under the assumption of linearity (Linearity assumption)
- The error terms are presumed to adhere to a normal distribution, operating under the normality assumption (Normality assumption)
- Errors are assumed to possess a constant variance, an assumption known as equivariance (Assumption of equivariance).

Organizational Agility= α+β (Digital Transformation) "Model 1"

Organizational Agility Competency Dimension= α+β (Digital Transformation) "Model 2"

Organizational Agility Flexibility Dimension= α+β (Digital Transformation) "Model 3"

Organizational Agility Responsiveness Dimension= α+β (Digital Transformation) "Model 4"

Organizational Agility Speed Dimension= α+β (Digital Transformation) "Model 5"

3. FINDINGS

Firstly, the demographic characteristics of the participants were summarized. The demographic information of the participants is presented in Table 1.

When the information in Table 1 is analyzed, it is seen that 210 participants (52.9%) are female and 187 participants (47.1%) are male. When the age ranges of the participants were examined, it was determined that 6 (1.5%) were 18-25 years old, 10 (2.5%) were 26-30 years old, 42 (10.6%) were 31-35 years old, 100 (25.2%) were 36-40 years old, 83 (20.9%) were 41-45 years old, 50 (12.6%) were 46-50 years old, 63 (15.9%) were 51-55 years old, 31 (7.8%) were 56-60 years old and 12 (3%) were 61-65 years old. 13.9% of the participants were Research Assistant/Lecturer, 10.1% were Assistant Prof. Prof. Dr., 9.6% Assoc. Prof. Dr., 10.1% Prof. Dr., 3% Head of Department/Managers, 7.6% Chiefs and 45.8% Officers. It was concluded that 1.8% of the participants had <1 year of experience, 3.3% had 1-3 years, 14.4% had 4-9 years, 29.5% had 10-15 years, 19.1% had 16-20 years, 10.6% had 21-

Table 1: Demographic characteristics of participants

Demographic characteristics	Category	Frequency	Percentage
Gender	Woman	210	52.9
	Male	187	47.1
	Total	397	100
Age	18-25 years old	6	1.5
	26-30 years old	10	2.5
	31-35 years old	42	10.6
	36-40 years old	100	25.2
	41-45 years old	83	20.9
	46-50 years old	50	12.6
	51-55 years	63	15.9
	56-60 years	31	7.8
	61-65 years	12	3.0
	Total	397	100
Title	Research Assistant/ Lecturer	55	13.9
	Assist. Prof. Dr.	40	10.1
	Assoc. Prof. Dr.	38	9.6
	Prof. Dr.	40	10.1
	Head of Department/ Manager	12	3.0
	Chief	30	7.6
	Officer	182	45.8
	Total	397	100
Working time	<1 year	7	1.8
	1-3 years	13	3.3
	4-9 years	57	14.4
	10-15 years	117	29.5
	16-20 years	76	19.1
	21-25 years	42	10.6
	26-30 years	46	11.6
	31 years and above	39	9.8
	Total	397	100
Administrative duty	Yes	128	32.2
	No	269	67.8
	Total	397	100

25 years, 11.6% had 26-30 years and 9.8% had 31 years or more. Finally, 128 (32.2%) participants had administrative duties, while 269 (67.8%) participants did not have administrative duties.

After summarizing the demographic information of the participants, explanatory factor analyses of the scales used in the data collection method of the study were conducted. The results of the explanatory factor analysis of the digital transformation scale are shown in Table 2 also shown below.

Table 2: Explanatory factor analysis results of the digital transformation scale

Kaiser - Meyer - Olkin measure of sampling adequacy		0.956
Bartlett's test of sphericity	Significance	0.0000
Variance explained (%)		73.972

Question no	Factor loadings of dimensions
1	0.845
2	0.875
3	0.869
4	0.835
5	0.849
6	0.906
7	0.885
8	0.889
9	0.899
10	0.819
11	0.790
12	0.854

Table 3: Explanatory factor analysis results of organizational agility scale

Kaiser-Meyer-Olkin measure of sampling adequacy		0.964
Bartlett's test of sphericity	Significance	0.000
Variance explained (%)		84.598

Question No.	Factor loadings of dimensions			
	Dimension 1 (competence)	Dimension 2 (flexibility)	Size 3 (answering)	Dimension 4 (speed)
1	0.696			
2	0.672			
3	0.616			
4	0.657			
7	0.626			
8	0.472			
9		0.791		
10		0.782		
11		0.353		
12			0.612	
13			0.467	
14			0.326	
15				0.835
16				0.749
17				0.604

In the exploratory factor analysis for the Digital Transformation Scale, the KMO value and Bartlett's sphericity test results were first examined. Accordingly, the KMO value of 0.956 and the significance level of the Digital Transformation Scale, which is <0.05, indicate that the scale is suitable for factor analysis and the sample is sufficient. Since the value calculated for the Digital Transformation Scale in the study is >0.5 (73.972), it can be seen that the questions in the scale explain 73.972% of the variance. When analysing the distribution of the questions, it was found that the factor loadings of each of the 12 questions were higher than the threshold of 0.3. In addition, it was found that the 12 questions were included in a single dimension, which was in line with the theoretical framework. The results of the explanatory factor analysis of the organizational agility scale, which is another scale used in the study, are given in Table 3.

The KMO value for the organizational agility scale is above 0.90. In this case, it is stated that the sample size is perfectly sufficient for factor analysis in the organizational agility scale. As a result of Bartlett's Sphericity Test, it was concluded that this scale is suitable for factor analysis since the significance level of the organizational agility scale is <0.05. Since the value calculated for the organizational agility scale within the scope of the study is >0.5 (84.598), it is seen that the questions in the scale explain 84.598% of the variance. As a result of the factor analysis, questions 5 and 6 of the 17 questions that make up the organizational agility scale were excluded from the scope of the study due to the imbalance in factor loadings. It was seen that the remaining 15 questions were grouped under 4 dimensions. It was concluded that the factor loadings of the questions constituting all dimensions were more than 0.3 and therefore above the threshold value.

The construct validity of both scales used in the study was ensured. In the next stage, the hypotheses generated within the scope of the study were tested. However, the assumptions for simple linear regression analysis were tested first. First, correlation analysis was performed to test the linearity assumption for all models and the results were obtained as Table 4.

When Table 4 is examined, it is seen that all correlation values are significant at 0.05 significance level. It is possible to say that there are linear relationships between digital transformation and organizational agility and sub-dimensions of organizational agility. After the linearity assumption was met, the normality assumption,

Table 4: Analysis results

	Digital transformation	Organizational agility	Competency dimension	Flexibility dimension	Responding dimension	Speed dimension
Digital transformation	1					
Organizational agility	0.878**	1				
Competency dimension	0.871**	0.967**	1			
Flexibility dimension	0.825**	0.924**	0.860**	1		
Responding dimension	0.821**	0.949**	0.870**	0.864**	1	
Speed dimension	0.771**	0.927**	0.854**	0.791**	0.884**	1

*P<0.01; **P<0.05; ***P<0.1

which is another assumption of simple linear regression analysis, was tested. The results obtained are presented in the Table 5 below.

Table 5 shows that the maximum kurtosis value is 5.985 and the skewness value is 0.731. When the kurtosis and skewness values are examined, it is suggested that the skewness value should be within ±3 and the kurtosis value should be within ±10 in order to accept that the data have a normal distribution (Kline, 2010). Accordingly, it can be said that all calculated values are close to the normal distribution and the normality assumption is met. In order to perform simple linear regression analysis, the scatter diagrams between the error terms and the independent variables were examined for the last assumption, the assumption of equivariance. The scatter diagrams of all models are presented in Graph 1 below.

Table 5: Skewness and kurtosis values of error terms

Model	Kurtosis	Skewness
Model 1	4.517	0.236
Model 2	4.124	−0.453
Model 3	5.985	0.731
Model 4	3.943	0.345
Model 5	2.863	−0.155

In the points in the scatter diagram, the fact that the error terms remain within a certain range with an increase in the independent variable is an indication of equivariance. Even if the values of the independent variable, digital conversion, increase, the error terms are within a certain range and do not show an increasing or decreasing trend. Therefore, it is possible to say that the error terms fulfill the assumption of equivariance. After all assumptions are met, the results of simple linear regression analysis are obtained as follows.

The values in the 'Model Sig.' section of Table 6 indicate whether the models created in the study are statistically significant. Since the significance values found for all the models are <0.05, it can

Graph 1: Equivariance distributions of error terms

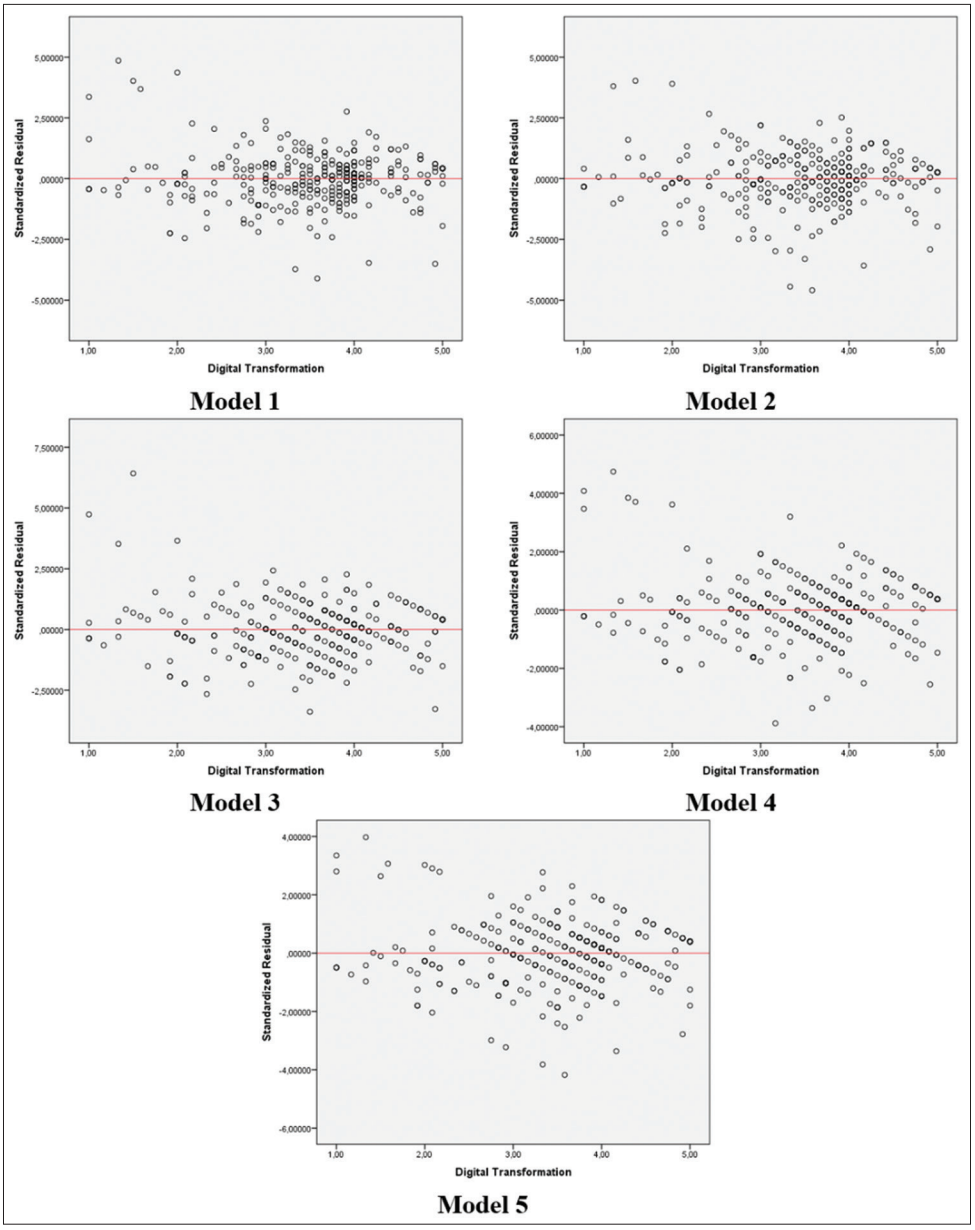


Table 6: Equivariance distributions of error terms

Models	Dependent variable	Independent variable	Coefficient	Significance	R^2	Model significance
Model 1	Organizational agility	Constant	0.271	0.003	0.771	0.000
		Digital transformation	0.910	0.000		
Model 2	Competence	Constant	0.216	0.028	0.758	0.000
		Digital transformation	0.933	0.000		
Model 3	Flexibility	Constant	0.291	0.011	0.681	0.000
		Digital transformation	0.899	0.000		
Model 4	Responding	Constant	0.196	0.098	0.675	0.000
		Digital transformation	0.920	0.000		
Model 5	Speed	Constant	0.436	0.001	0.595	0.000
		Digital transformation	0.865	0.000		

be said that the models are significant. In addition, the significance values calculated for the coefficients are interpreted in the same way. Since the significance values calculated for the t-statistics for all the coefficients are also <0.05, the coefficients obtained are also significant (except for the constant coefficient in model 4). In all the mathematical models established, it is possible to say that digital transformation positively affects both organizational agility and all sub-dimensions of organizational agility. It has been determined that digital transformation has an effect of 77.1% on organizational agility; 75.8% on the competence dimension of organizational agility; 68.1% on the flexibility dimension of organizational agility; 67.5% on the responsiveness dimension of organizational agility and 59.5% on the speed dimension of organizational agility.

4. CONCLUSION

Digital transformation, which refers to the incorporation and adoption of new technologies by organizations and the transformation of their processes, business models, cultures and personnel according to these new technologies, has become one of today's concrete and most important competitive tools. It is possible to say that digital transformation processes, which have an intense impact on public institutions as well as businesses, provide convenience to citizens and make public institutions more dynamic organizations. The innovations brought about by concepts such as digitalization and the increasing change and transformation in the world with the effect of globalization have made it necessary for organizations to adapt to these processes more quickly. The concept of agility, which refers to instant and correct reaction to these changes and transformations, is an important concept that provides organizations with the ability to quickly integrate and adapt to new conditions. The ability of agility, which facilitates activities such as rapid decision-making, changing the organizational structure, becoming compatible with new technologies in the face of various uncertainties arising from crises, disasters, epidemics and many other factors, provides advantages such as turning the crisis into an opportunity, providing competitive advantage and ensuring a sustainable life for organizations. Therefore, organizational agility refers to the creation of a tendency to direct the external environment by developing a proactive behavior instead of accepting what it brings.

The concept of organizational agility has four basic dimensions. These sub-dimensions are responsiveness, which refers to the rapid reaction of the organization by noticing change, flexibility, which is an indicator of the ability to keep up with change, speed, which refers to the competence to perform the necessary processes as soon as possible, and competence, which refers to the sum of these three dimensions and the ability to gather all the skills needed. It is possible to use digital transformation as an important tool in fulfilling the requirements of these dimensions. Organizations that fulfill the requirements of digital transformation become more agile in many aspects and gain competitive advantage.

The dimension of responsiveness, which refers to being able to recognize changing customer expectations and sectoral innovations in advance and to act proactively by interpreting change signals, can be realized more easily with tools such as big data analytics and artificial intelligence brought along by digital transformation processes. By using technology correctly, organizations can perceive possible changes more easily and react quickly. An example of the relationship between digital transformation and the responsiveness dimension is the rapid determination of customer demands with the data analytics to be used by the organization and taking action before competitors to meet them. The ability to discover and use new technologies, which are among the competencies that digital transformation brings to organizations, and the willingness to develop strategies to follow and win digital innovations and applications are factors that strengthen the responsiveness dimension.

The flexibility dimension, which refers to the ability of organizations to effectively manage the processes emerging as a result of innovation, adapt to changing conditions and the ability of the organization and personnel to keep pace with change, can be realized more easily with tools such as remote working, digitalization of workforce platforms, digitalization of production systems brought about by digital transformation processes. Innovations such as strategic initiatives to create flexible and value-producing units, utilizing the cooperation of stakeholders for the missing competencies needed, and global interactive digital connections brought about by digital transformation are factors that strengthen flexibility.

The speed dimension, which refers to the adaptation of organizations to change and innovation as soon as possible, can be realized more easily with the robotic coding brought about by digital transformation processes, time savings in processes thanks to automation, artificial intelligence-supported models, technologies that enable high-speed communication and information flow. The digital leadership roles and digital management approach brought

about by digital transformation, flexible and more technological working environment and the provision of qualified personnel and the ability to make quick decisions through data analysis are the factors that strengthen the speed dimension.

The competency dimension, which is formed by the combination of the three dimensions of agility and refers to the organization's ability to sustain, renew and acquire the capabilities that the organization has or will need in order to adapt to change, can be realized more easily with digital skills development and training programs brought about by digital transformation processes. Value-creating digital activities brought about by digital transformation, improvements in organizational structure, competencies and processes, digitalized strategies and strong digital infrastructure are the elements that strengthen the competency dimension.

As can be seen, the digital transformation process and the gains obtained as a result of this process are considered as a fundamental factor that strengthens all dimensions of organizational agility. Integrating digital technologies into the organization allows organizations to respond faster to changes, increase their competencies, gain flexibility and accelerate their processes. Today, it has become a necessity for organizations that want to be one step ahead of the competition to design their digital transformation strategies with a focus on agility. For this reason, it is very important to have a strong digital infrastructure, to ensure organizational flexibility, to develop strategies that will make digital transformation sustainable and finance it, and thus to ensure organizational agility.

Universities, which are the focus of this study, are independent and complex public institutions, rich in stakeholder diversity, with important missions such as serving society by producing science, education and research. In recent years, universities have to cope with technological change, the evolution of student expectations, financial problems, and both national and global competition. Digital transformation and organizational agility can be used as an effective tool to solve these problems. When we think of digital transformation for universities, we should not only think of online courses and producing digital content. Digitalization in universities involves digitalization of management processes, improvement of services provided to students, acceleration of research and development activities, and especially the use of innovative methods in education, such as virtual classrooms and digital libraries. This also contributes to making institutions more efficient, flexible and innovative. Organizational agility refers to the ability of universities to respond quickly and effectively to changes in the external environment and to create a flexible and adaptable organizational structure. It facilitates adaptation to rapidly changing student demands, technological innovations and innovative and global educational trends. Organizational agility enables universities to develop innovative solutions in research and teaching, strengthen global collaborations with universities, and respond quickly to changing social and cultural needs. Many of these benefits apply to all public institutions

Universities that have achieved digital transformation and gained agility can quickly transition to an online education system in crisis situations (such as the COVID-19 pandemic), facilitate management activities by strengthening their administrative processes with automation, make faster decisions, and respond quickly to the needs of students. It can enable both academic and administrative units to react faster to developments and change and make strategic decisions in a more agile way, enable them to develop innovative solutions and continuously improve their existing processes, facilitate collaborations and improve teaching methods, and transform managers into agile leaders who can make faster and more effective decisions using digital tools and systems.

Digital transformation and organizational agility are two important concepts that complement each other for organizations. This situation, which is also supported by the findings obtained in the study, can be realized by transforming the digitalization processes of organizations not only by adopting technological tools, but also by transforming their organizational structures, business processes and organizational culture in accordance with the digital age and achieving successful agility. Thus, organizations can become more innovative, more flexible and more sustainable. In addition, it becomes possible for them to reach the set goals faster and more efficiently.

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