

THE EFFECTS OF DIGITAL TRANSFORMATION AND INTELLECTUAL CAPITAL ON ORGANIZATIONAL RESILIENCE IN THE HEALTHCARE INDUSTRY

SAĞLIK SEKTÖRÜNDE DİJİTAL DÖNÜŞÜMÜN VE ENTELEKTÜEL SERMAYENİN ORGANİZASYONEL DAYANIKLILIK ÜZERİNDEKİ ETKİLERİ

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Abstract

In today's rapidly changing business world, influenced by globalization, organizations are facing increased volatility and uncertainty, leading to frequent encounters with crises and unexpected situations. This emphasizes the growing importance of organizational resilience. Digital transformation is seen as a crucial strategy for organizations to enhance their resilience. This need for digital transformation is equally important for healthcare organizations to adapt to the digital age and sustain their organizational resilience. Digital transformation in the healthcare industry involves the incorporation and management of the latest digital technologies into healthcare systems. However, there is a limited amount of empirical research on digital transformation and organizational resilience in the healthcare industry, as well as on the impact of intellectual capital on organizational resilience. This study aims to explore the influence of digital transformation on organizational resilience in the healthcare industry in Türkiye and the role of intellectual capital in this relationship. The study adopts a quantitative research method utilizing a structured questionnaire. The sample comprises 204 healthcare personnel from various types of hospitals. Regression analyses using three-step mediation analyses were conducted, and a Sobel test was performed for further analysis to assess the significance of the mediation effect. The results of the analyses indicated that digital

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transformation has a positive impact on the resilience of organizations in the healthcare industry, and that intellectual capital has a partially mediating effect in this relationship.

Keywords: Organizational resilience, digital transformation, intellectual capital, healthcare

JEL Classification: M10, M19

Öz

Günümüzün, küreselleşmenin etkisiyle hızlı değişim gösteren iş dünyasında, organizasyonlar giderek artan değişkenlik ve belirsizlikle karşı karşıya kalmakta, bu da krizlerle ve beklenmedik durumlarla daha sık karşılaşılmasına neden olmaktadır. Bu durum organizasyonel dayanıklılığın artan önemine dikkati çekmektedir. Organizasyonların dayanıklılıklarını sürdürebilmeleri için dijital dönüşümün etkili bir strateji olduğu düşünülmektedir. Bu dijital dönüşüm ihtiyacı, sağlık kuruluşlarının da dijital çağa uyum sağlamaları ve kurumsal dayanıklılıklarını sürdürebilmeleri açısından aynı derecede önemlidir. Sağlık sektöründe dijital dönüşüm, sağlık sistemlerinde en son dijital teknolojilerin benimsenmesi ve yönetilmesini ifade etmektedir. Ancak sağlık sektöründe dijital dönüşüm ve örgütsel dayanıklılığın yanı sıra entelektüel sermayenin örgütsel dayanıklılık üzerindeki etkisine ilişkin sınırlı sayıda ampirik araştırma bulunmaktadır. Bu çalışma, Türkiye’de sağlık sektöründe dijital dönüşümün örgütsel dayanıklılığa etkisini ve bu ilişkide entelektüel sermayenin rolünü araştırmayı amaçlamaktadır. Çalışma, yapılandırılmış bir anket kullanan nicel bir araştırma yöntemini benimsemiştir. Örneklem çeşitli hastane türlerinde görev yapan 204 sağlık personelinden oluşmaktadır. Regresyon analizleri üç aşamalı aracılık analizleri kullanılarak gerçekleştirilmiş olup, ileri analiz olarak aracılık etkisinin anlamlılığını kontrol etmek amacıyla Sobel testi yapılmıştır. Analizlerin sonuçları, dijital dönüşümün sağlık sektöründeki organizasyonların dayanıklılığı üzerinde olumlu bir etkisi olduğunu ve entelektüel sermayenin bu ilişkide kısmi aracılık etkisinin olduğunu göstermiştir.

Anahtar Kelimeler: Organizasyonel dayanıklılık, dijital dönüşüm, entelektüel sermaye, sağlık

JEL Sınıflandırılması: M10, M19

1. Introduction

The business environment is becoming increasingly ambiguous, volatile, and complex in today’s world. With the globalization and internationalization of business activities, organizations may encounter external disruptions such as crises, political turmoil, natural disasters that may arise at unexpected times, or other challenging circumstances such as pandemics. Such disruptions can become a significant threat because they are often unpredictable and beyond the control of the organizations. These challenging situations pose increasing challenges to the survival and development of organizations and require organizations to respond in resilient and flexible ways and focus on their resilience to establish robust systems (Berkes, 2007). Therefore, how organizations can manage this risk in various crisis environments has become an issue that needs to be addressed by decision makers in organizations. Increasing crises and unexpected challenges have drawn attention to the intervention and coping capabilities of organizations (Penades et al, 2017). Considering all these, the concept of resilience has become an increasingly important topic for both practitioners in organizations and researchers.

There are numerous definitions of resilience extended to several research disciplines such as ecology, engineering, psychology, economics, and sociology. The resilience concept in an organizational context can be defined as the ability of an organization to cope with crises, anticipate potential threats, and take precautions to survive and continue to grow (Annarelli & Nonino, 2016).

Organizational resilience can also be considered as the capability of organizations to cope with negative events, develop situation-specific responses, and ultimately adapt to changing conditions by engaging in transformative activities (Lengnick-Hall & Lengnick-Hall, 2011).

Organizational resilience is a multidimensional and complex concept consisting of multiple capabilities that an organization develops for its success, and includes the phases of perception or anticipation, coping, and adaptation (Duchek, 2020). During these stages, organizations take proactive measures by anticipating events in advance and prepare themselves for the situation. Then, observing and accepting the situation, they develop solutions to cope with these events and take action to implement the solutions. In addition, during the adaptation phase, organizations reflect on these experiences by learning from these unexpected events.

It is among the most prominent views that digital transformation is an effective way to achieve organizational resilience (Velu et al., 2019). Resilient organizations have a well-managed capacity to adapt to changing conditions, detect and intervene in crises and unexpected adverse events, and recover from these situations. With the help of digital technologies, organizations can capture changes in the environment more quickly and carry out transformative activities more easily. In this context, it can be said that digital transformation improves crisis perceptions and triggers resilience in organizations (Lenka et al., 2017).

Digital transformation is the reshaping of the structure, strategies, vision, business processes, corporate culture, and corporate capabilities of an organization to adapt to the digital age. For this purpose, organizations applying digital transformation integrate their internal and external resources through computing, information, and communication technologies (Vial, 2019). Digital technologies were found to contribute to the processing of information in organizations and consequently improve the agility of organizations. Thus, digital transformation is considered to improve organizational resilience through information processing capabilities needed in responding to any changes in the environment (Li et al., 2021). Digital transformation is also effective in organizations in converting activities to a more integrated and coordinated manner, which is needed for organizations to be resilient and mobilize their resources to set against crises (Williams et al., 2017).

It is discussed in both academic and business practice that digital transformation has become a critical way for organizations to increase their resilience. Especially during the recent COVID-19 pandemic that emerged in late 2019, digital transformation has been seen to be effective in finding solutions to prevent further damage to organizations. Despite the importance of the topic, existing literature focuses on the concepts, antecedents, and consequences of digital transformation, and empirical studies analyzing the impact of digital transformation on organizational resilience are still very limited in the management literature (Zhang, 2021).

During crisis times, organizations need to develop capabilities to overcome the crises by responding in an appropriate and resilient way. It has been discussed by many researchers that human capital, social and relational resources of the organizations, and social networks, which are among the components of intellectual capital, contribute to the resilience of the organizations to cope with crises during these challenging times (Douglas, 2021; Lengnick-Hall & Beck, 2009; Powley, 2009; Sutcliffe & Vogus, 2003). Moreover, regarding the dynamic capabilities of organizations and digital transformation,

intellectual capital is considered to have effects on the individuals to make innovations and improve the quality of processes and activities within the organization. Especially, human capital, as an element of intellectual capital, is effective in adapting digital technologies in organizations because digital transformation activities are performed by the personnel in the organization who have digital skills and expertise. Thus, intellectual capital plays an important role in digital transformation implementations and organizational resilience of organizations (Liu et al., 2021).

The service industry, especially healthcare organizations, is an area where the possibility of crisis is always high due to its service-intensive structure, requiring a high level of personal interaction, being greatly affected by the perceptions of service recipients, and its close dependence on technology. Risks in the healthcare industry include the emergence of pandemics, natural disasters, and regulative changes in the healthcare system, system-related problems, and major accidents. The high probability of crisis makes healthcare institutions sensitive to changes in the external environment, and awareness of the increasing importance of organizational resilience leads to strategy research (Panos et al., 2009).

In the existing literature, there has been increasing research on organizational resilience in recent years, which mainly focuses on conceptualization and structural theories. The definitions and conceptualizations of organizational resilience and its factors have been reviewed in the studies (Barasa et al., 2018, Rahi, 2019). However, organizational resilience is a field that is still in its developing stage, and the answer to the question of how to achieve this is still being investigated. Studies in the existing literature on resilience mainly focus on structural theories, and there is a lack of empirical research to prove these theories (Patriarca et al., 2018).

Research on resilience in healthcare field has mostly focused on explaining how work is accomplished in the clinic, rather than on prospective resilience (Anderson et al., 2016; Macrae & Wiig, 2019). Most research on organizational resilience in healthcare has focused on the conceptualization and measurement of resilience at the macro level (Biddle et al., 2020). Governance, service delivery, generation of resources, and financing have been evaluated as concepts used to measure organizational resilience in healthcare systems (Thomas et al., 2020). Therefore, the development and empirical investigation of the conceptual framework of resilience in the healthcare industry has become a priority for studies in this field. Moreover, the studies in the existing literature on the intellectual capital components (human capital, structural capital, and relational capital) and the organizational resilience relationship are limited.

This study aims to contribute to the literature by exploring the impacts of digital transformation and intellectual capital on organizational resilience together for healthcare organizations. First, the theoretical and empirical literature on these concepts was examined, and then the research design, the results, and the implications of our empirical research were presented.

2. Literature Review

The concept of resilience was first introduced by Holling (1973) while trying to measure the ability of an ecological system to absorb and bounce back from unexpected changes. Subsequently, the concept

of resilience has been used by researchers from various disciplines such as psychology, engineering, and management. The conceptualization of resilience has been used differently by these disciplines depending on their perspectives.

In organizational theory, the resilience concept has been studied in areas of crisis management, and high reliability organizations theory (Boin & van Eaten, 2013). Theoretically, organizational resilience is a new approach based on contingency theory. Organizational resilience emphasizes that during unexpected conditions organizations need to develop new capabilities to cope with challenging conditions (Coutu, 2002; Weick, 1988), from this point of view, it can be most appropriately studied and represented by the dynamic capabilities view. Organizations can maintain their resilience in unexpected situations and changing conditions by reconfiguring their resources and adapting them to environmental conditions. These routines and strategies of the organizations are called the dynamic capabilities of the organization (Teece et al., 1997).

The dynamic capabilities view, developed based on resource-based view, has become one of the most important issues of strategic management. The dynamic capability view is defined as the ability of an organization to create, integrate, and reconfigure its capabilities to respond and adapt to rapidly changing environments (Eisenhardt & Martin, 2000; Teece et al., 1997). Dynamic capabilities show themselves by differentiating from the existing operational and ordinary capabilities of organizations such as innovative research and development operations, strategic alliances to access new markets and resources through internal skills including effective marketing capabilities, technological integrations by adding digital capabilities into processes of the organizations, and reconfiguration of customer relations (Teece et al. 1997).

Existing studies on organizational resilience are based on two different perspectives. The first is the approach based on the discipline of ecology. Accordingly, organizational resilience is the operational ability of an organization to continue its activities by absorbing an unexpected threat, then adapting itself to the previous situation and developing a strategy against threats. This perspective focuses on the recovery behavior of the organization (Mallak, 1998). The second perspective on the concept, also called the strategic perspective and based on the dynamic capabilities view, emphasizes the ability of an organization to benefit from changes by adapting and developing new opportunities in a time of crisis or threat. In this approach, organizational resilience is considered as strategic resilience, which is an opportunity through which the organization can develop and progress (Lengnick-Hall et al., 2011; Vogus & Sutcliffe, 2007). The second perspective has the dynamic capability to anticipate destructive and unexpected situations (Hamel, 1991). Thus, according to the second perspective, an organization can go beyond bouncing back from a crisis but also develop new capabilities (Coutu, 2002; Lengnick-Hall & Beck, 2003).

According to Lengnick-Hall and Beck (2005), resilience is divided into three components, namely cognitive, behavioral, and contextual resilience. Cognitive resilience indicates the ability of organizations to recognize and analyze risks and unfamiliar situations. Behavioral resilience includes the elements that enable the organization to work, and to find new ways to resist these events. As the third component,

contextual resilience includes social capital and resource networks to realize both cognitive resilience and behavioral resilience, that is, to mobilize resources, people, and processes to respond to these unexpected events. Consequently, resilience is regarded as the blend of these three properties that improve the ability of an organization to develop necessary actions in coping with unexpected situations.

Organizational resilience has been characterized with four dimensions by Bruneau et al. (2013) and Wicker et al. (2013) which are robustness, redundancy, resourcefulness, and rapidity. In this conceptualization, robustness refers to the continuation of activities during the crisis, redundancy is the ability of an organization to replace any missing resources, resourcefulness refers capability of an organization to mobilize resources during a crisis, and the fourth component, rapidity is defined as responsiveness of an organization to the unexpected events in a timely manner (Bruneau et al., 2003, Wicker et al., 2013).

In recent years, new technologies and digital transformation have had significant impacts on sectors and societies on a global scale, and the healthcare industry is expected to be a part of the digital transformation (Ruiz Morilla et al., 2017). Digital transformation in the healthcare industry refers to the integration of new digital information and technologies into the healthcare field and other processes that occur accordingly. Digital transformation refers to many practices and efforts such as keeping health records in a computerized and electronic environment, using computer-aided decision support systems and visualization systems, monitoring patients at home, and making innovations in health services offered to society using digitalization and communication technologies (European Commission, 2018).

It is considered that research on digital transformation in the field of healthcare industry mostly focuses on technologies used in the field of healthcare rather than structural or strategic issues. It is known that digital transformation in the healthcare industry affects healthcare systems in many aspects such as structural, cultural, treatment approaches and results. Digital transformation also plays an important role in improving the quality of healthcare services, reducing costs, accelerating the flow of information, and increasing patient safety (Sheikh et al., 2015; Sharma et al., 2016).

According to dynamic capability theory, digital transformation provides organizations an innovative process to restructure their resources, structures, and processes, therefore it can be considered a trigger for the acquisition of dynamic capabilities (Warner & Wager, 2019). Digital technologies can help organizations expand knowledge and accelerate decision-making processes by quickly aggregating internal and external information sources. Digital technologies are an important tool in increasing the operational capabilities and agility of organizations (Lenka et al., 2017).

Digital transformation increases the ability of organizations to rebuild by breaking existing business logic and enabling business model innovation as well (Li, 2020). Digital transformation is considered to have a significant impact on improving the organization's ability to perceive, integrate, coordinate, and rebuild itself, consequently affecting organizations to maintain their resilience during crisis times, which is needed to cope with these unexpected or adverse events (Zhang et al., 2021). According to Zhang et al.'s study (2021) which explored the relationships between digital transformation, ambidextrous innovation, and organizational resilience, it was found that digital transformation has

a positive impact on the organizational resilience of enterprises, mediated by both exploitative and exploratory innovation. Consequently, we proposed the following hypothesis:

H₁. Digital transformation has a positive influence on the organizational resilience.

Intellectual capital refers to the knowledge, experience, capabilities, and skills of the individuals within an organization, as well as intangible assets such as patent information systems, licenses, agreements, and copyrights. Thus, it can be concluded that intellectual capital is an intangible asset that is an important factor for an organization to achieve a sustainable and competitive advantage for organizations (Umer et al., 2014). Intellectual capital can also be defined as a non-monetary and non-physical resource that contributes to the value of an organization and it is held by individuals within an organization but also stored in organizational processes, systems, databases, and relationships (Serenko & Bontis, 2004; Zharinova, 2011).

It has been widely accepted by scholars that intellectual capital has been evaluated into three main components or sub-dimensions human capital, structural capital, and relational capital (Chen, 2008; Hsu and Fang, 2009; Shih et al., 2010). Human capital refers to the resources of the organization related to the individuals in the organization, which consists of skills, knowledge, experience, abilities, and innovativeness (Inkinen, 2015; Sveiby, 2019). According to Liu et al. (2021), human capital is particularly critical for digital transformation and innovation because organizations need employees with digital skills, competencies, and expertise to adapt to the digital age. Structural capital consists of the organization's infrastructure that supports its human capital and includes processes, structural systems, technology, practices, information systems, and intellectual property (Bontis & Chua, 2019). The third component of intellectual capital, relational capital refers to the internal and external relationships of the organization, and its networks with stakeholders (Jiang et al., 2021). Relational capital is also important for adapting digital technologies and maintaining resilience because organizations need to build strong relationships with technology suppliers, customers, as well as other stakeholders to access new technologies (Liu et al., 2021).

In a study examining the relationship between organizational resilience and human capital, it was found that activities that improve human capital, such as performance management and training, positively affect organizational resilience (Okuwa et al., 2016). Another study revealed that organizations where human capital development is carried out through performance management systems, rewards, and training are more resilient to crisis periods and the resilience and performance increase of the organizations (Douglas, 2021). Relational capital is considered to play an important role in maintaining organizational resilience by providing social networks, which are among the basic resources to cope with crises (Morsut et al., 2022). Thus, we established the following hypothesis:

H₂. Intellectual capital has a positive influence on the organizational resilience.

Several scholars have stated that the relational and social resources of organizations have an important role in responding resiliently during crises. In this context, intellectual capital is very important in improving the ability of organizations to cope with crises (Powley, 2009; Sutcliffe and Vogus, 2003).

Social networks, resource exchange and information sharing, which are elements of intellectual capital, have a positive impact on the resilience of organizations (Lengnick-Hall & Beck, 2009) and support the successful development of organizations in the face of crises or other disruptive situations (McGuinness & Johnson, 2014). Information sharing, shared vision, and goals are also effective in finding and implementing solutions in organizations during unexpected events (Weick et al., 1999).

The trend of digital transformation of organizations produces new information flows that increase the human capital of organizations by increasing the demand for highly educated and highly qualified personnel (Innocenti & Golin, 2022). There are studies in the literature that show that organizations that prioritize the development of human capital for digital transformation can achieve better innovation performance and financial results (Qazi et al., 2021).

A study found that digital transformation has a positive effect on the increase in human capital, which is one of the components of intellectual capital (Song et al., 2022). According to the findings of another study, the digital orientation of organizations increases organizational resilience, and human resources have a moderating effect on this relationship (Liu et al., 2023). Thus, the following is hypothesized,

H₃. Intellectual capital has a mediating impact on the relationship between digital transformation and organizational resilience.

The conceptual framework of the research is based on the dynamic capability view suggesting that organizations adapt their capabilities and competencies to changing and dynamic environmental conditions. With the rapid increase in technological developments in today's organizational environment, sustaining and increasing the resilience of organizations is possible by increasingly digitalizing organizational processes and developing intellectual capital. The research model in the study is depicted in Figure 1.

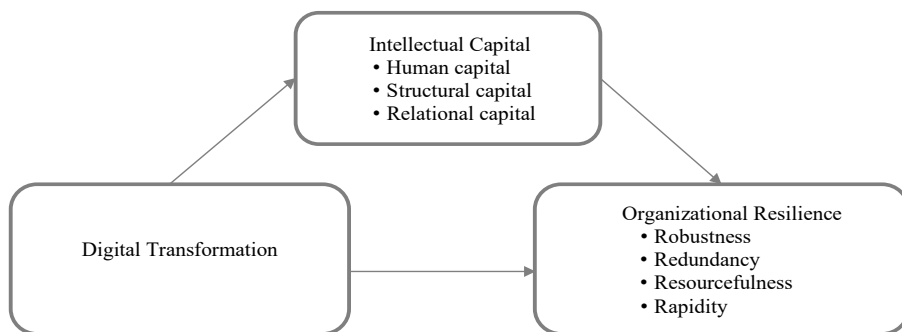


Figure 1: The Research Model

In this study, it was aimed to explore the impacts of digital transformation on organizational resilience for the healthcare organizations in Türkiye, and the role of intellectual capital in this relationship. The

dependent variable is organizational resilience, the independent variable is digital transformation in the research model, and intellectual capital is hypothesized as mediating variable.

3. Methodology

3.1. Variables and Instrument

The study adopted a quantitative research method by using a structured questionnaire consisted of 58 items. Ethical approval related to the study was obtained from Marmara University Social Sciences Research Ethics Board on 02.06.2023 with 2023-10/4 number. The questionnaire used in the study began with eight questions about the characteristics of the organizations and respondents (e.g. number of personnel of the organization, the years that the organization is in business, the age, gender, and the education level of the respondent). To measure the variables in the model, total 50 items were used with a five-point interval scale which range from 1 to 5, indicating (1) strongly disagree, (2) agree, (3) neither agree nor disagree, (4) agree, and (5) strongly agree.

The scales employed in the questionnaire were based on the existing literature related to the variables used in the research model (see Table 1). Organizational resilience was measured with the scale from Wicker et al. (2013), digital transformation was measured with the scale developed by Nadeem et al. (2018), and the scale for intellectual capital was taken from Wang et al. (2014).

Table 1: The Measurement of the Variables

Variable	Number of items	Number of dimensions	Dimensions	Number of items	Scale origin
Organizational resilience	21	4	Robustness	5	Wicker et al. (2013)
			Redundancy	5	
			Resourcefulness	6	
			Rapidity	5	
Digital transformation	12	1	-	-	Nadeem et al. (2018)
Intellectual capital	17	3	Human capital	5	Wang et al. (2014)
			Structural capital	7	
			Relational capital	5	

3.2. Data Collection and Sample

Data was collected from healthcare personnel working at various types of hospitals through anonymous self-report questionnaires. The questionnaires were distributed to full-fledged hospitals having surgical departments and having various other departments, and in terms of type, these healthcare organizations were training and research, public, university and private hospitals. A sample of 204 usable questionnaires was obtained from healthcare professionals working in various departments of these hospitals and volunteering to participate in the questionnaires. The

distribution of respondents by hospital types are 108 training and research, 43 state, and 53 private hospitals. 57.8% of the respondents are women, and 42.2% are men. The ages of the participants are 27.5% below 25, 68.1% between 26-50, and 4.4% above 50. In terms of experience of the participants in their organization, 10.8% have experience of shorter than one year, 78.4% have experience of 1-10 years, and 10.8% have experience longer than 10 years in their organization.

4. Findings

Prior to the hypotheses tests, first the scales were tested for their validity and reliability. Then the hypotheses were tested with regression analyses.

4.1. Scale Reliability and Validity

Exploratory factor analyses were carried out to specify the underlying factor structures of the scales since these scales were not used in healthcare industry before. The Kaiser-Meyer-Olkin (KMO) value is the sampling adequacy measurement, when KMO value is above .80, the sampling adequacy is considered as significant meaning that the data are appropriate to use in the factor analysis. After the factor analyses, Cronbach's Alpha reliability analyses were conducted to test the reliability of the constructs. The Cronbach's Alpha value of .70 or higher indicates the acceptable reliability of the scales (Hair et al., 2011).

Organizational resilience scale

The results of exploratory factor analysis and reliability tests for organizational resilience scale are shown in Table 2. According to the results of the factor analysis for the organizational resilience scale, KMO was found as .95 and Barlett's Test of Sphericity was found significant. The original organizational resilience scale has four dimensions with the names of robustness, redundancy, resourcefulness, and rapidity, and total 21 items. The factor analysis for organizational resilience scale revealed 21 items and 3 factors.

When the items were evaluated, it was found that seven items were related to the robustness factor with factor loadings ranging between .60 to .76, seven items were related to the rapidity factor with the factor loadings in the range of .53 to .80, and seven factors were about the resourcefulness factor with factor loadings between .51 to .69. The items in redundancy factor in the original scale were distributed to these three factors. Total variance explained was calculated as 63.62%.

Reliability analysis results indicated that the Cronbach's alpha was calculated as .91 for the robustness factor, .90 for the rapidity factor, and .87 for the resourcefulness factor of the organizational resilience scale. The Cronbach's alpha value was found as .95 for the overall 21-item organizational resilience scale.

Table 2: Factor Analysis and Reliability Analysis Results for Organizational Resilience

Factors	# of items	Item no	Factor loading (%)	VE (%)	Reliability
Robustness	7	OR1	.76	23.63	.91
		OR2	.75		
		OR3	.74		
		OR4	.72		
		OR5	.65		
		OR10	.63		
		OR6	.60		
Rapidity	7	OR17	.80	20.66	.90
		OR18	.76		
		OR16	.68		
		OR19	.66		
		OR20	.58		
		OR15	.54		
		OR21	.53		
Resourcefulness	7	OR12	.69	19.33	.87
		OR8	.69		
		OR13	.68		
		OR9	.59		
		OR14	.59		
		OR7	.51		
		OR11	.51		
Total	21			63.62	.95

Note. KMO=.95; Barlett's test of sphericity $\chi^2(210) = 2874.19$ $p=.000$; VE = variance explained

Digital transformation scale

For digital transformation scale, KMO value was found as .94, and Barlett's Test of Sphericity was found significant. The scale was found to have 12 items and unidimensional, as in the original scale. Total variance explained was calculated as 66.04%. The Cronbach's alpha for digital transformation scale was found as .95 (see Table 3).

Table 3: Factor Analysis and Reliability Analysis Results for Digital Transformation

Variable	# of items	Item no	Factor loading (%)	VE (%)	Reliability
Digital transformation	12	DT1	.76	66.04	.95
		DT2	.84		
		DT3	.83		
		DT4	.83		
		DT5	.80		
		DT6	.78		
		DT7	.78		
		DT8	.84		
		DT9	.84		
		DT10	.85		
		DT11	.77		
		DT12	.82		

Note. KMO=.94; Barlett's test of sphericity $\chi^2(66) = 2048.45$ $p=.000$; VE = variance explained

Intellectual capital scale

According to intellectual capital scale factor analysis results, KMO value was .94, and Barlett's Test of Sphericity was found significant. In the original scale the intellectual capital has three dimensions with the names of the factors are human capital, structural capital, and relational capital, and total 17 items. The results of the factor analysis indicated that the scale consists of two factors and 14 items. According to the factor analysis, three items in the human capital dimension in the original scale were removed.

When the remaining items were examined, it was observed that seven items were related to relational capital, and the factor loadings of these items were found to be between .63 and .83. The other seven items were related to innovation characteristics regarding to structure and individuals in the organization, and the structural characteristics of the organization. Therefore, considering that the items contained in the factor also changed, the factor was called innovative structural capital, unlike in the original scale. It was observed that the factor loadings of the items in this factor varied between .59 and .81. Total variance explained was found as 64.8% (see Table 4).

For the intellectual capital, the Cronbach's alpha value was calculated as .92 for relational capital factor, and .89 for the innovator structural capital, and for the overall 14-item intellectual capital scale, the Cronbach's alpha reliability was found as .94.

Table 4: Factor Analysis and Reliability Analysis Results for Intellectual Capital

Factors	# of items	Item no	Factor loading (%)	VE (%)	Reliability
Relational capital	7	IC15	.83	32.64	.92
		IC14	.83		
		IC16	.77		
		IC17	.70		
		IC13	.70		
		IC11	.65		
		IC12	.63		
Innovator structural capital	7	IC7	.81	32.16	.89
		IC9	.76		
		IC8	.74		
		IC6	.71		
		IC5	.69		
		IC10	.61		
		IC4	.59		
Total	14			64.8	.94

Note. KMO=.94; Barlett's test of sphericity $\chi^2 (210) = 1911.43$ $p=.000$; VE = variance explained

Reliability test results showed that the Cronbach's Alpha values of the scales used in the research are above .7 threshold; therefore, all scales were accepted as reliable.

4.2. Regression Analyses

After proving that all the variables used in the analysis as reliable for the measurement, a series of regression analyses were applied to analyze the research model. Since intellectual capital was hypothesized as mediating variable in the research model, the three-step regression analyses were applied using the procedure developed by Baron and Kenny (1986).

Table 5 shows the results of the regression analyses that examined the effect of digital transformation on organizational resilience and the mediating role of intellectual capital in this relationship.

In the first step of the mediation model, the effect of digital transformation on organizational resilience was found positive and significant ($\beta=.72$, $p=.00$) indicating that digital transformation has a positive effect on organizational resilience. In the second step, digital transformation was found to affect intellectual capital significantly ($\beta=.79$, $p=.00$).

Consequently, our hypotheses H1 and H2 were supported through the regression analyses since both digital transformation and intellectual capital were found to affect organizational resilience positively.

After finding that the results were found significant in the first two steps of the mediation test, the mediation impact of intellectual capital was explored in the relationship between digital transformation and organizational resilience. When intellectual capital was included in the regression model to explore the mediating effect, the results showed that the effect of digital transformation on organizational resilience was still statistically significant, however the beta value is decreased ($\beta=.46$; $p=.00$) and intellectual capital have a positive effect on organizational resilience ($\beta=.33$, $p=.00$). The results indicated that the introduction of intellectual capital into the regression model weakened the impact of digital transformation on organizational resilience but remained significant, which revealed the existence of partial mediation effect on intellectual capital in the relationship between digital transformation and organizational resilience. R^2 of the model was calculated as .56 meaning that the regression model could explain 56% of variance in organizational resilience.

Our H3 hypothesis that the intellectual capital has a mediating impact in the relationship between digital transformation and organizational resilience was supported. Together with that, intellectual capital was found to have a partially mediating role in the relationship between digital transformation and organizational resilience.

Table 5: Results of the Regression Analysis

Step	Dependent variable	Independent variable/s	B	s.e.	β	t	p	R ²	F	p
1	organizational resilience	digital transformation	.60	.04	.72	14.83	.00	.52	219.83	.00
2	intellectual capital	digital transformation	.70	.04	.79	18.47	.00	.63	341.14	.00
3	organizational resilience	digital transformation	.38	.06	.46	6.04	.00	.56	128.32	.00
		intellectual capital	.31	.07	.33	4.26	.00			

Note. B=unstandardized coefficient, β = standardized coefficient, s.e= standard error

The findings of the regression analysis indicated that any increase in digital transformation will lead to an increase in resilience of healthcare organizations, and intellectual capital has a partial mediating effect. The findings of the study are consistent with the existing theoretical literature on the relationships between digital transformation and organizational resilience, intellectual capital and organizational resilience, and digital transformation and intellectual capital.

Moreover, the Sobel test was performed to control the significance of the mediating effect. The Sobel test is used to test whether there is a reduction in the effect of the independent variable on the dependent variable after the addition of the mediator variable (Sobel, 1982). The results of the Sobel test revealed that organizational resilience is affected from digital transformation which is mediated by intellectual capital ($z=4.16, p=.00$).

In addition to the mediation analysis indicating the mediating effect of intellectual capital in the relationship between digital transformation and organizational resilience, further mediation analyses were performed on sub-dimensions of the variables. With these analyses, it was aimed to see the effects of digital transformation on each factor of organizational resilience, namely robustness, rapidity, and resourcefulness. Moreover, the mediation impacts of intellectual capital factors, namely relational capital and innovator structural capital on these relationships were examined. Based on this, the further analyses were based on the following hypotheses.

H_{3a}. Intellectual capital factors have a mediating impact on the relationship between digital transformation and robustness.

H_{3b}. Intellectual capital factors have a mediating impact on the relationship between digital transformation and rapidity.

H_{3c}. Intellectual capital factors have a mediating impact on the relationship between digital transformation and resourcefulness.

In these three regression models, the dependent variables are robustness, rapidity, and resourcefulness respectively. The independent variable is digital transformation, and the mediator variables are relational capital and innovator structural capital.

Firstly, for the robustness dimension of organizational resilience, the three-step mediation analyses were carried out.

Table 6: Results of Regression Analysis for Robustness

Step	Dependent variable	Independent variable/s	B	s.e.	β	t	P	R ²	F	p
1	robustness	digital transformation	.60	.05	.62	11.30	.00	.39	127.67	.00
	relational capital		.74	.05	.74	15.55	.00	.55	241.73	.00
2	innovator structural capital	digital transformation	.67	.04	.74	15.66	.00	.55	245.27	.00
		digital transformation	.49	.09	.51	5.70	.00			
3	robustness	relational capital	.09	.09	.10	1.01	.31	.40	43.67	.00
		innovator structural capital	.07	.10	.06	.66	.51			

Note. B=unstandardized coefficient, β = standardized coefficient, s.e= standard error

In the first step of the regression, it was found that digital transformation positively affects robustness of organizations ($\beta=.62$, $p=.00$). In the second step, it was found that digital transformation affects relational capital ($\beta=.74$, $p=.00$) and innovator structural capital positively ($\beta=.74$, $p=.00$). In the third step of the regression analysis, it was found that none of the intellectual capital factors have a mediating effect in the relationship between digital transformation and robustness of healthcare organizations ($p>0.05$). Thus, the H3a hypothesis was not supported (see Table 6).

The regression analysis results for the rapidity factor are shown in Table 7. The regression analyses findings showed that in the first step of the analysis, digital transformation has a positive impact on the rapidity of organizations ($\beta=.72$, $p=.00$). The effect of digital transformation on relational capital and innovator structural capital was found positive, as also shown in the previous regression model for robustness. In addition, in the third step, the regression analysis results showed that the beta value of digital transformation decreased ($\beta=.42$, $p=.00$), both relational capital and innovator structural capital positively affect rapidity of organizations, the beta coefficients were found $\beta=.17$ ($p=.00$) for relational capital, and $\beta=.24$ ($p=.00$) for innovator structural capital.

These results showed that both relational capital and innovator structural capital have partial mediating impacts on the relationship between digital transformation and rapidity of organizations. When the coefficients were examined, it was concluded that the impact of innovator structural capital is higher than the impact of relational capital. Consequently, our H3b hypothesis was supported.

Table 7: Results of Regression Analysis for Rapidity

Step	Dependent variable	Independent variable/s	B	s.e.	β	t	P	R ²	F	p
1	rapidity	digital transformation	.66	.05	.72	14.69	.00	.52	215.72	.00
	relational capital		.74	.05	.74	15.55	.00	.55	241.73	.00
2	innovator structural capital	digital transformation	.67	.04	.74	15.66	.00	.55	245.27	.00
		digital transformation	.38	.07	.42	5.56	.00			
3	rapidity	relational capital	.16	.07	.17	2.16	.03	.57	89.87	.00
		innovator structural capital	.25	.08	.24	3.05	.00			

Note. B=unstandardized coefficient, β =standardized coefficient, s.e=standard error

For the third factor of organizational resilience, namely resourcefulness, the three-step regression analysis was performed (see Table 8).

Table 8: Results of Regression Analysis for Resourcefulness

Step	Dependent variable	Independent variable/s	B	s.e.	β	t	p	R ²	F	p
1	resourcefulness	digital transformation	.55	.05	.65	12.20	.00	.42	148.72	.00
2	relational capital	digital transformation	.74	.05	.74	15.55	.00	.55	241.73	.00
	innovator structural capital	digital transformation	.67	.04	.74	15.66	.00	.55	245.27	.00
3	resourcefulness	digital transformation	.37	.07	.43	5.12	.00	.45	55.35	.00
		relational capital	.12	.08	.14	1.61	.11			
		innovator structural capital	.14	.08	.15	1.70	.09			

Note. B=unstandardized coefficient, β = standardized coefficient, s.e= standard error

The results in the first step of the regression showed that digital transformation positively affects resourcefulness of organizations (β =.65, p =.00). In the second step, it was found that digital transformation affects relational capital and innovator structural capital positively, as mentioned in the previous regression analysis. In the third step of the regression analysis, none of the intellectual capital factors were found to have a mediating impact between digital transformation and resourcefulness relationship (p >.05). Therefore, the H3c hypothesis was not supported.

The overall results of the conducted regression analyses are shown in Table 9.

Table 9: Summary of the Regression Results

Hypothesis	Hypothesis Description	Result
1	Digital transformation has a positive influence on the organizational resilience.	Supported
2	Intellectual capital has a positive influence on the organizational resilience.	Supported
3	Intellectual capital has a mediating impact on the relationship between digital transformation and organizational resilience.	Supported*
3a	Intellectual capital factors have a mediating impact on the relationship between digital transformation and robustness.	Not supported
3b	Intellectual capital factors have a mediating impact on the relationship between digital transformation and rapidity.	Supported**
3c	Intellectual capital factors have a mediating impact on the relationship between digital transformation and resourcefulness.	Not supported

Note. *Intellectual capital was found to have a partial mediating effect. ** Relational capital and innovator structural capital were found to have partial mediating effects.

The results of the performed regression analyses revealed that any increase in digital transformation would lead to an increase in resilience of the organizations in the healthcare industry, which is partially mediated by intellectual capital. In terms of factors of organizational resilience and intellectual capital, the results of the regression analyses demonstrated that any increase in digital transformation would lead to an increase in rapidity of organizations, which is partially mediated by the relational capital and innovator structural capital.

5. Conclusion and Discussion

In today's business world, where unexpected events, crises, and turbulent political and economic periods can occur, organizations face challenges in managing and reacting to these situations on time to maintain their survival and sustainability. In this context, the importance of resilience in organizational context is increasing as a prominent concept in both academic research and business processes. Organizational resilience is being researched as an attitude and strategic reaction that will enable organizations to adapt to uncertain changes and turn challenging conditions into an opportunity. Resilient organizations possess the characteristics of coping with challenging conditions while maintaining their ability to achieve their goals (Benn Dunphy and Griffiths, 2014).

As emphasized in the dynamic capabilities perspective, organizations that ensure their flexibility and resilience by increasing their steps towards digital transformation in their business practices, designs, business models, processes, and activities; when faced with challenging conditions, can be able to manage the process effectively thanks to their high ability to perceive the situation, collect, process and analyze data, and then take quick actions and show the necessary reactions towards the solutions. In this mechanism, digital transformation can be used as a tool to build and maintain organizational resilience. Organizational resilience focuses on not only recovering from challenging events, but also improving adaptive capacity of organizations, and transformative activities (Lengnick-Hall & Beck, 2005). The source of this capacity in organizations is the workforce, which is the human capital. Based on this, intellectual capital, which include the human capital, has an important role in the resilience of the organizations.

The empirical results of this study, in which we investigated the impact of digital transformation on organizational resilience and the role of intellectual capital in this relationship, showed that when organizations in the healthcare industry are faced with unexpected and unusual situations, it is possible to manage this process in the most appropriate and efficient way through digital transformation and also by developing their intellectual capital by investing in human capital such as knowledge, skills and education and strengthening their social relations with their stakeholders. By adapting the business processes and structures developed with e-health and digital health applications in the healthcare industry, rapid decision-making, and solutions can be achieved in extraordinary situations and optimal management of the process can be achieved in these situations. Thus, by managing the processes well, it is even possible to restructure organizational capabilities and turn this situation into an opportunity. For the healthcare organizations to maintain and improve their resilience, they need to evaluate and invest in their intellectual capital consisting of human, structural, and relational capital elements, and make the necessary improvements and appropriate organizational structures for digital transformation in their business processes.

The study also revealed the importance of relational capital and innovator structural capital components of intellectual capital, thus recommends that organizations in the healthcare industry should improve the relational capital and innovator structural capital by supporting innovation, social network, internal and external relationships with its stakeholders, technology used in the

organizations, systems, and know-how of the organization to remain resilient in challenging, changing, and unstable environments. Moreover, successful implementation of digital transformation and application of digital technologies have significant benefits in maintaining and improving resilience in healthcare organizations. The study contributes to the literature by investigating the effects of both digital transformation and intellectual capital on the resilience of organizations in the healthcare industry. As for further research, it is recommended to confirm the results using Structural Equation Modeling with a larger data set to ensure that the results can be generalized and tested in different industries.

Author Contribution

CONTRIBUTION RATE	EXPLANATION	CONTRIBUTORS
Idea or Notion	Form the research idea or hypothesis	Sema Onaran E. Serra Yurtkoru
Literature Review	Review the literature required for the study	Sema Onaran E. Serra Yurtkoru
Research Design	Designing method, scale, and pattern for the study	Sema Onaran E. Serra Yurtkoru
Data Collecting and Processing	Collecting, organizing, and reporting data	Sema Onaran E. Serra Yurtkoru
Discussion and Interpretation	Taking responsibility in evaluating and finalizing the findings	Sema Onaran E. Serra Yurtkoru

Conflict of Interest

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