

T.C.
GEBZE TECHNICAL UNIVERSITY
SOCIAL SCIENCES INSTITUTE

**DIGITAL TRANSFORMATION AND NEW LEADERSHIP
COMPETENCIES**



AHMET RIFAT ARIK
MASTER THESIS
DEPARTMENT OF BUSINESS ADMINISTRATION

GEBZE
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THESIS SUPERVISOR

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2023



YÜKSEK LİSANS JÜRİ ONAY FORMU

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Gebze Teknik Üniversitesi Sosyal Bilimler Enstitüsü Yönetim Kurulu'nun
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ÖZET

İşletmelerin dijital dönüşümü, teknolojik, insani ve organizasyonel yönleri kapsar ve strateji, vizyon, liderlik, dijital okuryazarlık ve farkındalığın yanı sıra fırsatları belirleme ve bunlardan yararlanma becerisindeki değişiklikleri içeren kapsamlı bir paradigma değişikliği gerektirir.

COVID-19 salgını, pandeminin getirdiği artan rekabet baskıları ve aksaklıklar göz önüne alındığında, her büyüklükteki işletme için dijital dönüşümün gerekliliğini vurguladı. Üçüncü platform teknolojilerini ve sistemlerini benimsemek, işletmelerin rekabetçi tehditleri ele almasına, maliyetleri düşürmesine, müşteri beklentilerini karşılamasına, karar vermeyi iyileştirmesine ve diğer kuruluşlarla rekabet etme yeteneklerini engelleyen dijital uçurumu kapatmasına olanak sağlayabilir.

Bu çalışma, üretken liderliğin, üst yönetim ekibinin dijital okuryazarlığının ve üst yönetim ekibinin dijital farkındalığının firmaların dijital olgunluğu üzerindeki etkisini araştırmaktadır. Araştırma, Türkiye'de faaliyet gösteren 249 şirketin üst, orta, alt düzey yöneticileri ve beyaz yakalı çalışanlarından oluşan 365 katılımcıdan ampirik veri toplamak için anket yöntemi kullanmıştır.

Araştırmanın bulguları, üretken liderlik, dijital okuryazarlık ve üst yönetim ekibinin dijitalleşme fayda algısı konusundaki farkındalığının firmaların dijital olgunluğunu olumlu etkilediğini, üst yönetimin dijitalleşme maliyet algısı farkındalığının ise orta ölçekli firmalar için olumsuz bir etkiye sahip olduğunu ortaya koymuştur. Ayrıca çalışmada üst yönetim ekibinin dijital okuryazarlığının üretken liderlik ile küçük ölçekli firmaların dijital olgunluk düzeyi arasındaki ilişkide aracı etkiye sahip olduğu görülmüştür.

Anahtar Kelimeler: Dijital Dönüşüm, Dijital Olgunluk, Üretken Liderlik, Üst Yönetimin Dijital Okuryazarlığı, Üst Yönetim Ekibinin Dijital Farkındalığı

SUMMARY

The digital transformation of business organizations encompasses technological, human, and organizational aspects, and requires a comprehensive shift in paradigm that includes changes in strategy, vision, leadership, digital literacy and awareness, as well as the ability to identify and capitalize on opportunities.

The COVID-19 pandemic has emphasized the necessity of digital transformation for businesses of all sizes, given the increased competitive pressures and disruptions brought about by the pandemic. Adopting third-platform technologies and systems can enable businesses to address competitive threats, reduce costs, meet customer expectations, improve decision-making, and close the digital divide that has hindered their ability to compete with other organizations.

This study investigates the impact of generative leadership, top management team's digital literacy, and top management team's digital awareness on the digital maturity of firms. The research utilized a questionnaire survey to collect empirical data from 365 participants, comprising upper, middle, first-level managers and white-collar employees of 249 companies operating in Turkey.

The findings of the research revealed that generative leadership, top management team's digital literacy and top management team's awareness on benefits of digitalization positively affect the digital maturity of firms, whereas top management team's awareness on costs of digitalization appears to have a negative effect for medium-sized firms. Additionally, top management team's digital literacy was found to have a mediating effect on the relationship between generative leadership and the level of digital maturity of small-sized firms in the study.

Keywords: Digital Transformation, Digital Maturity, Generative Leadership, Top Management Team's Digital Literacy, Top Management Team's Digital Awareness

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LIST OF ABBREVIATIONS AND ACRONYMS

<u>Abbreviations</u>	<u>Explanations</u>
<u>and Acronyms</u>	
IT	: Information Technology
ICT	: Information and Communications Technology
DOI	: Diffusion of Innovation Theory
TOE	: Technology-Organization-Environment
PLC	: Programmable Logic Controller
DOS	: Disk Operating System
IoT	: Internet of Things
NDTI	: Neuland Digital Transformation Index
IS	: Information System
DT	: Digital Transformation
CEO	: Chief Executive Officer
et al.	: and others
DM	: Digital Maturity

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1. INTRODUCTION

Digital transformation is a process that aims to enhance organizational performance through the implementation of significant changes utilizing information and communication technologies (Vial, 2019). This process, driven by market disruption and gaps in organizational processes and requirements, has been increasingly implemented at a rapid pace in both public and private organizations. In recent years, particularly with the advent of the Covid-19 pandemic, digital transformation has become a crucial requirement for organizational survival and competitiveness, rather than a mere option.

Digital transformation, as a process, encompasses the technological, human, and organizational aspects of a business organization. It requires a comprehensive shift in paradigm, including changes in strategy, vision, leadership, digital literacy and awareness, as well as the ability to identify and capitalize on opportunities. Research has shown that digital transformation can lead to improved competitiveness, increased sales and revenue (Matt et al., 2015), enhanced supply chain efficiency (Accenture, 2017), decreased costs (Verhoef et al., 2021), increased productivity (Silva, 2017), and fostered innovation and growth (Scuotto et al., 2022) for organizations.

The COVID-19 pandemic has highlighted the need for digital transformation in businesses of all sizes. The increased competitive pressures and disruptions caused by the pandemic have made digital transformation a matter of survival for businesses. Through the adoption of third-platform technologies and systems, businesses can address competitive threats, reduce costs, meet customer expectations, improve decision-making, and bridge the digital divide that has long hindered their ability to compete with other organizations. This is made possible by the affordability and accessibility of these technologies and systems, which align with the limited resources, including capital, technology, human resources, and technical expertise.

The ultimate objective of the digital transformation journey is to improve and enhance digital maturity. To achieve this, it is necessary to employ a methodology for assessing the current state of the organization's Information Technology (IT) and Information and Communications Technology (ICT) utilization, such as through the use of digital maturity models. These models serve as instrumental tools for measuring

an organization's current state in its digital transformation journey. As previously reviewed by Williams et al. (2019), these models commonly focus on the capabilities and competencies of the organization, evaluate the present state, identify areas for potential improvement, and provide a roadmap for digital transformation.

The research on the subject indicates that the leadership style plays a crucial role in initiating and successfully implementing the complex and time-consuming process of digital transformation. Top management team's support is deemed essential for the successful implementation of digital transformation initiatives. A leadership style that promotes innovation, adaptability, and sustained high performance is required for the successful implementation of digital transformation (Bolte et al., 2018). Surie and Hazy (2006) have identified the generative leadership style as one that embodies these characteristics. Generative leadership is known to be an effective and innovative style of leadership, as it empowers leaders to identify and seize opportunities, bringing a unique combination of knowledge, energy, creative thinking, and a proactive approach. Among the various leadership styles, generative leadership stands out for its emphasis on visionary innovation and a willingness to take risks. Furthermore, this style of leadership is associated with a collaborative approach, cooperative learning, and the creation of new forms of collaboration (Klimek et al., 2008).

The study of technology adoption at the organizational level has been aided by the use of prominent theoretical frameworks such as the Diffusion of Innovation Theory (DOI) and the Technology-Organization-Environment (TOE) framework. The DOI, proposed by Rogers (1995), highlights the significance of individual factors in the adoption of technology, whereas the TOE framework, introduced by Tornatzky et al. (1990), asserts that technological, organizational, and environmental factors play a pivotal role in shaping organizational processes. The significance of these frameworks has been demonstrated in various studies (Giotopoulos et al., 2017). As a result, it is widely accepted that individual factors are critical in establishing a supportive framework for promoting higher levels of digital maturity.

The Upper Echelons Theory posits that the characteristics of top management team and leadership hold significant predictive power for organizational outcomes (Hambrick and Mason, 1984). In the context of digital transformation, which is characterized by turbulence and dynamism, top-level managers face numerous

challenges, requiring the development of new leadership roles and responsibilities (Vial, 2019). Research on the competencies required for successful digital transformation underscores the importance of merging traditional skills with digital literacy, digital awareness, and knowledge (Gray, 2018). Digital literacy, a critical competency in the digital age, has been the subject of study within the field of technology adoption and a wide range of findings have been reported in various contexts (AlBar and Hoque, 2019; Hashim, 2015).

Digital awareness encompasses a foundational understanding and proficiency in utilizing digital tools, which affords individuals greater access to a multitude of online resources (Johnson et al., 2017).

The concept of digital literacy encompasses a broad set of skills that are deemed crucial in driving decisions related to the adoption of digital technology. According to Mutula and Van Brakel (2007), digital literacy encompasses both technical and communication skills. Furthermore, research by Lau and Yuen (2014) suggests that digital literacy comprises dimensions of computer, information, and Internet literacy. However, prior studies have not fully considered this multidimensionality and its impact on digital maturity. This study aims to examine the direct effects of generative leadership qualifications and the digital literacy and awareness of top management team on digital maturity, within the framework of the Upper Echelons Theory. This is in line with the literature which identifies these factors as key enablers of digital transformation.

Considering all the above explanations, the relationship between leadership style and digital maturity within organizations, as well as the relationship between top management's digital literacy, digital awareness, and digital maturity, require further examination. Additionally, it is important to investigate which specific leadership styles and characteristics are conducive to promoting digital maturity. Based on this reasoning, this study first aims to investigate the effects of generative leadership, digital awareness and digital literacy level of top management on the digital maturity of an organization and whether these relations differentiate or not up to the organization's scale. This study subsequently focuses to investigate the effect of digital literacy and digital awareness on the association between generative leadership and digital maturity, in order to determine whether the incorporation of digital literacy and

digital awareness into the characteristics of a generative leader enhances digital maturity. Hence, the study also aims to investigate the potential mediating effect of digital literacy and digital awareness on the relationship between generative leadership and digital maturity.

The present study is structured into five chapters. The initial part of the study comprises a comprehensive review of the literature pertaining to the variables. The second chapter involves the development of hypotheses. The third chapter outlines the methodology employed. The fourth chapter examines the analyses and findings. The fifth chapter presents the conclusions, discussions, and recommendations for future research based on the findings.



2. LITERATURE REVIEW

In this literature review, the following topics will be thoroughly analyzed and discussed: digital transformation, digital maturity, leadership, and the digital literacy and digital awareness of top management team. The purpose of this review is to provide an in-depth understanding of these concepts.

2.1. Digital Transformation

The term "digital transformation" has attracted the significant attention of not only researchers but also practitioners in recent years, particularly with the emergence of Industry 4.0 and the impact of the Covid-19 pandemic. This concept has the potential to affect both economic and personal realms, as well as public and social spheres. Digital transformation has become a critical skill for businesses around the world in order to sustain competitiveness and adapt to changing environment.

However, there is no clear agreed-upon definition of digital transformation. Rather, it is a complex and multifaceted concept on which researchers cannot agree. At its core, digital transformation involves the integration of digital technologies into all aspects of an organization, with the goal of improving processes, enhancing efficiency, and creating new opportunities for growth.

The word "digital" can be traced back to the Latin term "digitus," which means finger, and refers to the process of digitization. While digitization and digitalization are often used interchangeably with digital transformation, it is important to note that they are distinct concepts that constitute a significant part of the digital transformation process. Overall, the concept of digital transformation has changed our perceptions of business and has become a key consideration for organizations seeking to thrive in the modern world (Gartner, 2019).

2.1.1. Digitization

Digitization is the process of converting analog information, such as physical documents or audio recordings, into digital form, which can be stored, processed, and transmitted by computers. This process has significant value for businesses and

individuals, as it allows for easier access and organization of information. In a broader sense, digitization refers to the incorporation of digital technologies into various aspects of society, including communication, interaction, and business processes, with the aim of increasing efficiency and social benefit. Specifically, digitization can improve areas such as healthcare and education by utilizing digital technologies to streamline processes and enhance accessibility (Brennen and Kreiss, 2016).

2.1.2. Digitalization

Digitalization is a term that refers to the integration of digital technologies into various aspects of society, including business, government, and everyday life. This process involves the restructuring of communication and media infrastructures within a digital framework and is characterized by the transition from analog to digital technology. The adoption of digitalization has the potential to create new value and opportunities for organizations, as well as fundamentally alter traditional business models. The concept of digitalization has garnered significant attention in academic literature, with numerous studies exploring its implications for industry, economy, and society (Gartner, 2019).

2.1.3. The Concept of Digital Transformation

The concept of digital transformation encompasses both digitization and digitalization and represents a process of transformation rather than a one-time action. This process involves the incorporation of digital technologies into all aspects of an organization, including business processes, strategies, business models, and organizational culture (Matt et al., 2015).

One of the most comprehensive descriptions of digital transformation was included in the IBM Institute for Business Value, published in 2011 which posits that digital transformation is a result of the emergence of the internet and globalization and that it is characterized by the incorporation of digital technologies, such as mobile, social media, big data, and online commerce, into business models. This approach emphasizes the need for businesses to redesign their focus on customer value and integrate digital capabilities into their daily operations in order to be successful in the

digital transformation process (IBM, 2011). Similarly, Microsoft defines digital transformation as the significant alteration of traditional processes, products, and services through the implementation of new technologies, resulting in the emergence of data-driven, interconnected, and entirely new business models and efficiency gains (Microsoft, 2020).

There is ongoing debate and confusion surrounding the precise definition of digital transformation, with various institutions and researchers offering definitions from various perspectives. However, it is generally agreed upon that digital transformation involves a comprehensive and holistic approach to the integration of digital technologies within an organization.

There is a lack of consensus within the academic literature regarding the distinction between digitalization and digital transformation. While some scholars view these concepts as distinct, with digital transformation representing the broader and more comprehensive process of integrating digital technologies into an organization, others argue that the two terms can be used interchangeably. One perspective suggests that digital transformation is the result of digitalization, with the latter term referring to the more specific process of converting analog data and processes into a digital format. However, other authors argue that digitalization is itself a form of transformation, encompassing the process of integrating digital technologies into various aspects of an organization in order to fundamentally alter operations and processes (Gartner, 2019).

The current trend toward digital transformation is evident in various fields, driven by the rapid advancement of technologies. The shift from analog to digital media has allowed for the digitization of records and the transfer of processes, such as services, to digital platforms. The COVID-19 pandemic has further demonstrated the potential for digital transformation to occur independently of voluntary adoption, as external circumstances may necessitate the use of digital tools. According to a report by the Turkish Exporters Assembly, the sales of e-commerce sites in Turkey experienced a 200% increase in May 2020 due to the ongoing pandemic (Turkish Exporters Assembly, 2020). This suggests that the pace of digital transformation may continue to accelerate in the future.

The emergence of the digital age, brought about by the proliferation of information communication technologies (ICT), has necessitated digital transformation across various fields. As ICT becomes more affordable and powerful, it is increasingly being adopted by societies, leading to the widespread use of these technologies. According to Cette (2019), digital transformation can be traced back to industry 4.0, which saw the incorporation of new digital technologies such as robots, sensors, and autonomous systems into production processes. However, digital transformation encompasses more than just the use of computers or the internet, and also includes the incorporation of social media, artificial intelligence, and big data into business processes, potentially leading to the creation of new business lines. As these definitions illustrate, digital transformation represents a comprehensive transformation of enterprises, requiring a digital transformation strategy to mitigate the risk of failure and facilitate the planning and evaluation of the transformation process. Digital transformation in businesses not only involves a transformation of business models, but also impacts organizational structures, company culture, and even business ethics (Henriette et al., 2016).

2.1.4. The History of Digital Transformation

The historical evolution of digital transformation can be traced back to several key technological innovations that have had a significant impact on society. The discovery and utilization of fire facilitated the cooking of food and the creation of tools, while the domestication of animals allowed for the development of transportation and agriculture. The discovery of electricity, in turn, led to the proliferation of various electrical devices and systems. However, it was not until the first industrial revolution, also known as Industry 1.0, that a global transformation of this magnitude occurred. This period, which took place in the 18th century, saw the substitution of human labor with machines in production, resulting in the accumulation of capital through mass production and significant changes in the lives and working conditions of the working class.

2.1.4.1. Industry 1.0

One of the key technological innovations of Industry 1.0 was the steam engine, which was invented by English engineer Thomas Savery in 1698 and further developed by Scottish technician James Watt in 1769. The steam engine was initially used for the extraction of water from mines but later found applications in textile workshop weaving looms in 1781 and trains and ships in subsequent years. The implementation of the steam engine in the textile industry, which took place in factories, led to significant changes in the social and economic landscape. The widespread adoption of the steam engine contributed to the growth of industrial industries and the urbanization of society, resulting in a rapid and transformative social, cultural, and economic revolution (Yin et. al, 2018).

2.1.4.2. Industry 2.0

The second industrial revolution, or Industry 2.0, which occurred in the latter half of the 19th century and the first half of the 20th century, was characterized by the globalization of technology. During this time, motor and electric power were introduced, leading to changes in the production system and management. The invention of the telephone, the telegraph, radio, and light bulb also contributed to the emergence of electrical-electronic systems. Mass production became possible through the use of assembly lines, which allowed for the efficient production of standardized products. The second industrial revolution saw the widespread adoption of new technologies that transformed industries and societies on a global scale.

The incorporation of the moving line system for mass production, which was originally utilized in slaughterhouses in 1870, into the operations of the Ford Motor Company in 1903 marked a significant development in the field of manufacturing. Founded by Henry Ford in the United States, the use of this assembly line technique allowed for a reduction in costs and a notable increase in automobile sales. The Second Industrial Revolution saw a shift in the primary sources of power and raw materials, with electricity, petroleum, chemicals, and steel replacing steam, iron, and coal. The use of steel in the construction of railways facilitated the transportation of goods, contributing to an increase in trade. The availability of raw materials also facilitated the rapid development of heavy industry, a significant technological advancement.

During the Industry 2.0 period, the United Kingdom, the United States, Germany, and Japan emerged as dominant players on the global stage (Yin et. al, 2018).

The outbreak of the First World War in 1914 had a detrimental effect on the process of globalization. Following the war, efforts were undertaken to repair the damage to the industry and restore the industrial workforce. However, the already weakened economy further deteriorated as the industry attempted to recover, leading to a reliance on domestic borrowing and the eventual occurrence of the "great depression" economic crisis in 1929 (Agarwal and Agarwal, 2017).

It is crucial to acknowledge that the global transition to the Second Industrial Revolution was not uniform. While some countries were undergoing this transformation, others had yet to complete the transition to the First Industrial Revolution. This lack of uniformity was a contributing factor to the outbreak of two world wars in the 19th century, which served to accelerate mass production and military technological advancement. These developments constitute the foundation of the current transformation, referred to as the Fourth Industrial Revolution (Mokyr, 1999).

2.1.4.3. Industry 3.0

The Third Industrial Revolution, which commenced in the 1970s, was characterized by the transition to an automated production system through the emergence of communication and information technologies. This period saw the development of electrical appliances and the integration of computers into everyday life. The Third Industrial Revolution marked a distinct era in which computer technology was utilized as an interface. In 1969, the first programmable logic controller (PLC) was developed, followed by the creation of the first microcomputer, the Altair 8800, in 1971. In 1976, Steve Jobs and Steve Wozniak developed the Apple I (Troxler, 2013). During this period, the significance of human labor decreased as computer systems facilitated a significant increase in production speed. Programmable machines were equipped with automation systems, enabling the digitization and streamlining of production processes. Advances in fields such as telecommunications, fiber optics, microelectronics, nuclear technology, biogenetics, and bio-agriculture have resulted in a shift in production culture (Smith, 2001).

The implementation of automation systems in factories has facilitated efficient and mass production, leading to a gradual decrease in the share of human labor in production processes. This shift has been accompanied by an increase in the use of software and machines. As a result, there has been a demand for more educated individuals who possess a strong understanding of technology in the workforce. While the DOS (Disk Operating System) was the first computer language to be widely used, the most prevalent operating system today is Windows, developed by Bill Gates and Paul Allen in 1985. The Third Industrial Revolution, also known as Industry 3.0, is characterized by the incorporation of electronic systems and robots in production. During this period, technology continued to advance rapidly, and its impact extended to a wider audience (Troxler, 2013).

2.1.4.4. Industry 4.0

Industry 4.0, also referred to as the "Digital Revolution," refers to the integration of digital technologies with the goal of improving and adapting production processes (Nayyar et al., 2020). This trend aims to offer personalized products to consumers while maximizing financial gain through minimized production costs (André, 2019). The concept of Industry 4.0 was first introduced at the Hannover Fair in 2011 by Henning Kagermann, Wolf Dieter Lukas, and Wolfgang Wahlster, drawing upon the advanced technology utilized by the Germans in the production and manufacturing sector. In 2013, the Industry 4.0 report, which outlined applications and process planning, was presented to the German government by Dr. Siegfried Dais, chairman of the Robert Bosch management, and Henning Kagermann, professor at the German National Academy of Sciences and Engineering. This report emphasized the information age and the innovations it brought to modern production, leading to the recognition of a new Industrial Revolution. With the support of the German government, the term has gained widespread adoption in both the business world and academia (Dalenogare et al., 2018).

In this era of digital transformation, which has far-reaching implications, it is crucial for businesses to stay ahead of the competition and protect their current market position. This trend, initiated by Germany, has been followed by the United States and Japan.

The concept of Industry 4.0 encompasses a range of technologies, including the Internet of Things, Big Data, Artificial Intelligence, Robot Technology, Wearable Technology, and technology-based systems such as Virtual Reality and Augmented Reality.

The development of digital technologies has had a profound impact on human life, particularly in terms of the economy, and Industry 4.0 represents an attempt to achieve this transformation through the production of low-cost, high-quality products (Kumar and Nayyar, 2020). The Fourth Industrial Revolution involves the connection and analysis of data in production systems through networks in order to identify new processes. This concept, also referred to as the "industrial internet" in British literature, aims to redefine the world in the 21st century through the use of the internet, networks, and information operating systems rather than machines and large factories (Evans and Annunziata, 2012). In the past decade, businesses have utilized internet technologies to reduce their reliance on human labor, increase efficiency, and increase production output.

Industry 4.0 marks the beginning of a new era in production systems, characterized by a minimal level of human labor and the use of machines and autonomous systems. As the latest wave of the Industrial Revolution, Industry 4.0 has transformed supply, production, and consumption processes through technological and informatics advancements without experiencing the fundamental economic, social, and political changes associated with previous industrial revolutions (Lu, 2017).

The main factors driving the implementation of Industry 4.0 include increased consumer demand, shortened market supply times for products, and a focus on efficiency. Initially impacting factories, Industry 4.0 has also had a significant effect on our social lives through changes in consumption habits. The internet and internet technologies are at the center of the Industry 4.0 Revolution, which has introduced innovations such as the evolution of robots and artificial intelligence, production with robots, 3D-4D printers, and the integration of the internet into the manufacturing process. The ultimate goal of Industry 4.0 is the fast and error-free production of interconnected components through the internet of things, without sacrificing quality (Posada et al., 2015).

Industry 4.0, also known as the Fourth Industrial Revolution, represents a shift toward automation and high-quality information flows in production within a cyber-physical context (Hwang, 2019). This trend is characterized by digitization, computing power, and accessibility of data (Balog et al., 2019). In order to successfully adapt to Industry 4.0, it is necessary to implement new technologies. These new technologies enable the integration of production facilities, supply chains, and service systems, creating value-added networks in the process.

On the other hand, Industry 4.0 involves both vertical integrations through the digitalization of organizational processes and horizontal integration across internal processes from supplier to customer (Xing and Marwala, 2017). This shift from a centralized mode of production toward a decentralized, integrated network of information, business partners, and customers represents a significant departure from previous industrial revolutions. The rapid pace of change brought about by the digitalization of processes has made the digitalization of businesses and users an inevitability in today's fast-paced business world.

Industry 4.0 offers a glimpse into the future of manufacturing through the incorporation of digital technologies. Smart factories, which are a key focus of Industry 4.0, are expected to drive the production economy of the future through their dynamic nature. In order to remain competitive and secure their future success, businesses must adapt to the principles and dynamics of Industry 4.0 (Kagermann et al., 2013).

Industry 4.0 involves the integration of a variety of technologies in order to facilitate the transformation of traditional production processes into data-driven, smart production methods. These technologies, which include the Internet of Things (IoT), big data and analytics, cloud computing systems, cyber-physical systems, artificial intelligence and robotics, additive manufacturing, simulation, and augmented reality, are crucial for driving the industrial revolution of the 21st century. All these digital technologies, comprising information, programming, communication, and connectivity, are considered to be responsible for digital transformation. (Bharadwaj et al., 2013).

2.1.5. Digital Transformation of Businesses

According to research four stages of digitalization are dependent on the development of digital technologies within businesses: the Personal Computer stage, the Internet stage, the Social Media stage, and the Internet of Things stage. These phases are cumulatively structured, building upon each other in terms of technological advancement (Fitzgerald et al., 2014).

Digitization in businesses was the precursor to the third industrial revolution in the 1970s. The three stages of digitization in enterprises, known as industry 3.0, coincide with this period of time. The internet and social media are important digital technological developments that contributed to this era. The fourth phase of digitization in businesses, known as the fourth industrial revolution, has been brought about by the proliferation of these technologies (Kotarba, 2018).

The use of personal computers in businesses marked the beginning of the third industrial revolution and the first phase of digitization in the 1970s. This phase ended with the integration of the Internet into businesses, leading to the digitization of data and its processing into computers as well as the automation of processes. The automation of processes brought increased speed and efficiency to businesses, and the wholesale automation of similar jobs led to the emergence of integrated software systems (Savić 2019). The development of data banks is another significant advancement made during the digitalization phase, which has provided businesses with benefits such as increased productivity and reduced costs.

The emergence of the Internet in the 1990s marked the beginning of the second industrial revolution for businesses, significantly altering the way they communicate with internal and external stakeholders. With the advent of the Internet, businesses gained the ability to gather more information about their competitors and customers, while also increasing their visibility to a wider audience. The introduction of email and intranet further facilitated communication within organizations. Today, many institutions rely heavily on email for communication, while the intranet serves as a private, closed network for businesses, offering benefits such as data sharing and remote work capabilities (Wigand, 1997).

The third phase of digitalization, characterized by the emergence of Web 2.0 and mobile devices, enabled the production of interactive content for Web 2.0 users. Web 2.0, closely linked to social media, has not only transformed businesses but also altered customer behavior. The increased presence of customers on social media has led to the creation of customer-centric products. In addition, social media has demonstrated the superiority of collective solutions over individual ones, introducing the concept of crowdsourcing, which allows for the development of business models in which customers actively participate. Through social media, businesses have been able to construct business models that allow for the promotion of both their own and other products, as well as receive feedback from customers. Social media has activated small markets as well as large ones, enabling the identification and sale of niche products. Mobile devices, a new feature of this phase, allow for the customer-business relationship to occur independent of time and place. The ultimate goals of this stage include the development of new business models, entry into new markets, and the establishment of new collaborations (Liang and Turban, 2011).

The current stage, also referred to as the Internet of Things (IoT), coincides with Industry 4.0. The IoT has enabled the creation of cyber-physical systems, which allow for the monitoring and communication of various objects with each other. As a result, the concept of smart factories has emerged. Smart factories, through the use of cyber-physical systems, essentially allow for the production of goods without the need for human intervention. This phenomenon extends beyond production and impacts all business value chains (Burmeister, et al., 2016). The IoT not only affects production but also the resulting product, providing valuable information about customers. With the processing of data in the cloud, businesses are able to gain insights about their customers, leading to a shift in the nature of their relationships. Through the use of data, businesses aim to reach customers with innovative business models and offer personalized services and products. While the IoT enables businesses to leverage data-driven, personalized offerings as a key asset, traditional businesses may face threats to their viability (Burmeister, et al., 2016). At this stage, the goal for businesses is to undertake digital transformation, adapt to new customer and market conditions, and ultimately, achieve a competitive advantage.

2.2. Digital Maturity

The term "maturity" denotes a state of full, perfect, or optimal readiness that is achieved through a gradual process (Achi et al., 2016). The character of maturing systems is shaped by the progressive development of skills over time. Although "digital transformation" and "digital maturity" are sometimes used interchangeably, there is a distinction between them. Digital maturity is a systematic approach to the digital transformation of an organization that reflects the level of digital transformation achieved. This approach comprises not only the extent to which technology is utilized by the organization to carry out tasks, but also the extent to which management has undergone digital transformation. Therefore, digital maturity is a holistic concept with both technological and managerial aspects. For an organization to reach a high level of digital maturity, both the technological and managerial aspects must be strong and well-integrated. This requires a thorough understanding of the digital foundation and the ways in which technology can be leveraged for business advantage (Chanas & Hess, 2016).

2.2.1. Digital Maturity Models

Maturity models, which have been the subject of criticism for their perceived oversimplification and lack of empirical basis, are generally understood to refer to the ways in which an organization's capabilities evolve as a result of a planned, desired, or logical process (Gottschalk, 2009; McCormack et al., 2009). These models are commonly used to assess the maturity of commercial processes by evaluating the achievement of specific tasks and objectives. Many maturity models are founded on the "Plan-Do-Check-Act" approach proposed by Deming (2018) in the realm of quality management systems (Mullaly, 2014). Despite these criticisms, maturity models remain a valuable tool for the analysis and improvement of organizational processes.

There are a number of differing perspectives on the comprehensive definition of digital maturity models. Paulk, Curtis, Chrissis, and Weber (1993) defined digital maturity models as the stages of improvement in software development processes that aim to increase an organization's software capabilities, building upon Deming's (2018) basic approach. Klimko (2001) characterized digital maturity as the process of development over time for an asset within an enterprise, with the asset in question

potentially being human capital or any other element of an organization's business function. Meanwhile, Pullen (2007) characterized digital maturity models as structured collections of elements that describe the characteristics of effective operations at different stages of the development process.

Given the far-reaching effects of digitalization, companies must carefully consider their strategies for adopting and utilizing digital technologies. To this end, various models have been developed to assess the digital maturity of organizations (Bley, et al., 2016). Maturity models, which have a well-established literature including both sector-specific national policies and privately developed variations, provide a broad overview of an organization's digital maturity as well as specific areas with potential for optimization in the realm of digitalization (Barata and Cunha, 2017; Garci et al., 2012; Wendler, 2012). In the literature, it is common to find maturity models that focus on digital maturity in the context of Industry 4.0. Barata and Cunha (2017) conducted a study in which the maturity models developed for Industry 4.0 applications were divided into two categories: those developed by commercial enterprises and those developed by academic institutions and individuals.

In order to encompass a wider range of sectors beyond those such as Industry 4.0 and smart factories that have traditionally been the focus of digital maturity and transformation research, a broader selection of digital maturity models has been examined. Schwer et al. (2018) compiled studies featuring digital maturity models using keyword searches in academic databases such as Scopus, EBSCO - Business Source Premier, and ProQuest, and relevant digital maturity models were examined chronologically.

One of the early models developed to assess the level of digital transformation is the "Digital Maturity Map" created by Mueller, Baer, and Weber (2006) for the automotive industry. This model, which was designed to evaluate the demand for early automation in the automotive sector in comparison to other industries, is particularly applicable to specialists in the automotive industry. Mueller et al. (2006) evaluated the level of digital maturity across three main dimensions: data maturity, digital product maturity, and engineering process maturity. Data maturity refers to the timeliness and appropriateness of data, which serves as the foundation of digital methods and processes. Digital product maturity involves comparing the digital model of a product

to the actual product's functional behavior and market-required features. During the maturity process, the engineering phase is employed to assess the quality of the process, taking into consideration the integrations made (Mueller et al., 2006).

The "Digital Capability Framework" developed by O'Hea (2011) is a maturity model designed to assess the digital business capacity of enterprises. The model defines digital competence as the ability to "redefine businesses, customer value propositions, and alter operating models through the use of digital technologies for enhanced customer interaction and collaboration." O'Hea's (2011) model examines digital maturity across five dimensions:

- **Strategy and Planning:** In order to stay competitive in the business environment, it is essential for the company to identify new opportunities for digital transformation and to effectively manage and respond to its business strategy through digital channels.
- **Business and Leadership:** To meet the needs of customers and achieve success, the company should tailor its value creation process and have a clear, defined digital vision.
- **Process Management:** Implementing digital methods in processes can lead to increased efficiency and productivity gains for the company.
- **Technical Competence:** It is crucial for the company to understand the impact of existing technologies on its operations and to evaluate the potential benefits and applicability of new technologies.
- **Employees and Corporate Culture:** Digital tools should be used to support collaboration among employees, and the company should prioritize the development and continuous improvement of communication and customer experience analysis.

According to Berman and Bell (2011), the process of digital transformation is a continuous one that has evolved over time. The development of digital products in the early 1990s marked the first phase of this transformation. In the 2000s, the widespread adoption of internet and network technologies led to the growth of digital sales and marketing processes. More recently, in the 2010s, the proliferation of hyper-digitalization and mobile transformation has led to a decrease in the dependency on physical space and infrastructure and the emergence of disruptive technologies such

as social media and artificial intelligence has created a need for multidimensional transformation within businesses. The IBM Maturity Model developed by Berman and Bell (2011) is based on six sub-dimensions that measure both "Reshaping the value offered to the customer" and "Reshaping the business model" simultaneously. These sub-dimensions are as follows:

- **Business Model Innovation:** This sub-dimension encompasses the design and integration of new corporate business models, as well as the creation of a revenue stream structure that prioritizes the creation of customer value at all levels as a core competency.
- **Customer and Community Collaboration:** This sub-dimension involves extending customer focus to all aspects of the business and leveraging social networking tools and capabilities to create new opportunities for customer interaction.
- **Cross-channel integration:** This sub-dimension involves integrating digital and physical touchpoints with customers into the company.
- **Analytical Vision:** This sub-dimension involves actively using information and analysis based on predictive forecasting and advanced data analysis for all processes.
- **Digitally enabled supply chain:** This sub-dimension involves optimizing and integrating all elements of the supply chain using digital capabilities across companies.
- **Networked Workforce:** This sub-dimension involves providing the necessary digital competency skills to take advantage of business opportunities.

The "Digital Mastery" maturity model proposed by Westerman, Bonnet, and McAfee (2014) is a framework for assessing an organization's ability to successfully implement and manage digital transformation. The model consists of two dimensions: "Digital Intensity," which measures the density of digital initiatives and capabilities, and "Transformation Management Intensity," which reflects the organization's capacity for managing digital transformation. The model categorizes organizations into four categories based on these dimensions: "beginners," "conservatives," "followers of fashion," and "digital masters." The model aims to provide guidance on how organizations can effectively leverage digital change. Accordingly, the sub-

dimensions determined to evaluate the degree of maturity are as follows (Westerman et al., 2014):

- **Vision and Leadership:** Initially, a clear vision is essential, which should not only encompass digital transformation, but also be effectively communicated to employees. This ensures that employees are aware of the organizational objectives and the role of digital transformation in achieving them.
- **Digital Governance:** The establishment of clear rules and guidelines to ensure that digital activities align with and support the organization's strategic goals.
- **Engagement:** The commitment and engagement of employees are crucial for the successful implementation of digital change.
- **IT-Business Alignment:** Developing a shared understanding between the IT and business units is vital for effective digital transformation.
- **Customer Experience:** The use of technological tools to increase understanding of and engagement with customers is crucial for driving digital change.
- **Operational Processes:** The digitization of processes leads to increased efficiency and dynamic capabilities.
- **Business Models:** The alignment of the business model with the goals of digital transformation is necessary for the long-term success of the organization.

In the digital maturity model proposed by Fenwick and Gill (2014), the digital transformation evaluation is conducted through the distinction between digital operational excellence and digital customer experience. The model assesses the maturity of an organization in terms of its internal competencies, in terms of operational excellence, and its ability to effectively manage external factors that impact customer experience in terms of digital customer experience. Fenwick and Gill (2014) categorize the maturity levels from lowest to highest as "Digital Dinosaurs", "Digital Adopters", "Digital Collaborators" and "Digital Masters." These categories serve as a framework for organizations to identify their current level of digital maturity and devise strategies to progress toward digital mastery. The developed maturity

model for digital transformation in organizations comprises several sub-dimensions, including (Fenwick and Gill 2014):

- The enhancement of operational capabilities through the implementation of lean, cross-functional digital processes, which enable the application of digital business models beyond the scope of the organization's core competencies.
- The facilitation of customer-centric innovation via the formation of dynamic teams comprising customers, suppliers, and employees, thus increasing the chances of survival for the organization.
- The prioritization of digitization for agility over efficiency, especially in light of the continuously evolving market conditions.
- The emphasis on a holistic digital customer experience is attained through enterprise-wide analysis of customer relationships and the provision of positive experiences across touchpoints.
- The integration of digital services and products into physical offerings, as well as the leveraging of sophisticated algorithms, big data, and improved understanding of customers, ensure the reliability of machines.

The Digital Transformation Index (DTI) model, as proposed by Azhari, Faraby, Rossmann, Steimel, and Wichmann (2014), seeks to reveal specific areas of potential optimization within individual and procedural contexts, as well as to quantitatively assess the level of digital maturity across various functional and disciplinary domains. This model, known as the Neuland Digital Transformation Index (NDTI), serves as a foundation for the development of a digital roadmap aimed at achieving a state of sustainable digital excellence within the organization. The NDTI evaluates the conversion index across eight discrete sub-dimensions (Azhari et al., 2014).

- Strategy: One key aspect of achieving digital maturity is the documentation and communication of required strategies to employees. The purpose of this is to ensure that both managers and employees understand the strategy and that all branches of the organization follow it. Periodic updates to the strategy may also be necessary. This approach can help to ensure that the organization is aligned in its efforts towards digital transformation and can help to facilitate the process of achieving digital maturity.

- **Leadership:** Leadership and governance in the digital realm are integral to the successful design and execution of the organization's digital strategy. The management level assumes primary responsibility for this task, while employees across various hierarchical levels collaborate as peers within teams. The implementation of a digital strategy necessitates the creation of new roles and responsibilities for managers, such as that of a Digital Operations Manager for example.
- **People:** The emergence of new digital experts as a result of changing processes plays a crucial role in driving innovation within organizations. These experts typically assume increasingly broader areas of responsibility, contributing significantly to the development and growth of the organization.
- **Culture:** The organizational culture is characterized by transparency and adaptability. Decision-making is facilitated through the incorporation of digital media. Employees who interface with customers have a high degree of autonomy. Digital transformation is the primary focus of strategic innovation within the organization.
- **Products:** The organization has expanded its business network by introducing new digital services aimed at gaining a competitive advantage. These products not only facilitate innovation within the organization but also enable the digitization of the entire value chain.
- **Transactions:** Interaction with customers is considered a fundamental principle, that underpins the organization's efforts to foster a high degree of connectivity with external stakeholder groups. New organizational units have been established to effectively implement the digital strategy, which aims to digitize core processes and business values while collaborating with external stakeholders such as suppliers.
- **Technology:** The organization employs cutting-edge technologies throughout its operations, utilizing a variety of methodologies. The product development process is heavily reliant on software-based tools and techniques.
- **Governance:** The governance of digital activities within the organization is essential and requires the identification of various digital strategies and stakeholders. Established guidelines and steering committees play a crucial

role in this process. An integrated control mechanism is implemented to oversee digital activities.

In a study conducted by Kiron, Kane, Palmer, Phillips, and Buckley (2016) in partnership with MIT Sloan Management Review and Deloitte, over 3,000 global company executives were surveyed on their adoption of business models that incorporate digital technologies and processes, enhance organizational capabilities, and generate new value. The participants were prompted to evaluate their own businesses and assess their level of maturity based on their perceptions of an "ideal organizational structure that leverages the talents of its personnel. The dimensions and definitions of dimensions employed in this study are as follows (Kiron et al., 2016):

- **Strategy:** The implementation of a "strategic focus" approach, to effectively respond to the digital future. This approach entails the examination of a 10-year time horizon and forecasting of market and customer requirements. In contrast, the "tactical zoom" approach pertains to the next 6-12 months.
- **Talent Acquisition:** Complex and prolonged recruitment processes can act as a barrier to identifying and acquiring the necessary talent. New working models such as freelancing or telecommuting should be considered as potential solutions.
- **Organizational Culture:** The cultivation of a risk-taking culture is essential for achieving success in the digital age.
- **Human Capital Development:** Employees should be provided with opportunities to acquire new digital skills. Outsourcing should be utilized sparingly, as a short-term solution, to avoid impeding the development of digital competencies within the organization.
- **Organizational Structure:** Hierarchical management structures are conventionally viewed as stable. However, in the digital era, it is advisable to adopt more flexible and loosely-designed management structures, to facilitate rapid responses to changes.

In another study, De Carolis, Macchi, Negri, and Terzi (2017) developed the Digital Readiness Assessment Maturity Model (DREAMY) and the Competency Maturity Model, as a means of evaluating the digital transformation readiness of

enterprises operating within the production sector. The model is specifically tailored to assess the digital maturity of manufacturing companies, and the analysis dimensions are classified as process, monitoring and control, technology, and organizational dimensions. These dimensions are succinctly defined as follows (De Carolis et al., 2017):

- Design and Engineering: This dimension pertains to the design of the production process.
- Production: This dimension encompasses production planning and management.
- Quality: This dimension aims at ensuring quality assurance through product testing and quality management within the production process.
- Maintenance: This dimension encompasses structured maintenance activities.
- Logistics: This dimension encompasses all logistics activities.

Digital Maturity Model (2020) was developed by the Izmir Development Agency, taking into account the business methods and corporate culture prevalent in Turkey, featuring the most distinctive aspect of considering the national business culture and methods, being inclusive of all sectors, and providing guidance for the digital transformation journeys of institutions. This model for evaluating the level of digital maturity was developed, incorporating various dimensions such as culture, strategy, technology, processes, and governance. It is believed that this model, which is tailored to the local context of the study country, will be especially suitable for evaluating the digital maturity of businesses in the Turkish context, as it considers local business practices, corporate culture, and core values. Thus, the X-led model was employed to measure the digital maturity of the businesses in question (İZKA, 2020). The dimensions will be explained in detail below.

2.2.1. Strategy Dimension

The Strategy Dimension encompasses digital action plans and ideas that evolve with changing processes and encompass different time horizons related to market and customer needs. The digital strategy points to structures internalized by managers and employees. The questions in this dimension focus on the extent to which the digital

strategy aligns with key performance indicators, the centrality of digital processes in the company's business plan and strategy, the basis of technological investment and digitalization budgets on the results of the digital strategy, the individual approaches of senior staff members to the overall digital strategy, the optimization of interdisciplinary and interdepartmental collaboration and the use of value-adding business tools, the degree of ownership of key performance metrics based on the digital process, and the extent to which the compatibility of the results with the channels used is considered (İZKA, 2020).

2.2.2. Governance Dimension

The Governance dimension includes different hierarchical organization levels that can integrate with the internal and external stakeholders of the enterprise, digital management guides, and controls for digital activities. In this dimension, a set of questions were carefully considered, including the level of coordination of digital initiatives within the organization, the degree to which digital transformation is considered a necessity, the alignment of internal behaviors and programs with the external perspective, and the extent to which business models and processes are rethought and redesigned to align with digital transformation goals. Additionally, the organization's understanding of governance, particularly with regard to the integration of people from different business units, and the support for evaluating new technological opportunities, were also evaluated. The leader's belief that digital transformation is a key element for success must also be taken into account. These questions provide a comprehensive overview of the organization's digital transformation capacity and serve as a valuable tool in determining areas for improvement (İZKA, 2020).

2.2.3. Technology Dimension

The technology dimension pertains to the existing technologies of the enterprise and the benefits and applicability of the technologies it aims to have on the company. It points to the dimension of adopting new technology that will change the core competencies of the business in a way that will create competitive advantage. In this dimension, the degree of the use of SMAC (Social, Mobile, Analytics, and Cloud)

technologies for digital business applications and the adoption of next-generation enablers like IoT and smart automation are assessed. The extent to which digital technologies are used for communication with suppliers and stakeholders is evaluated, as well as the company's ability to gather digitized/digital data on its business processes. The use of this data in decision-making processes and the potential for it to inform corporate vision is also assessed. The collection of digital data from individuals through communication channels is also a subject of inquiry (İZKA, 2020).

2.2.4. Processes Dimension

The Processes dimension refers to the digitalization of the business values created with the main activities within the organization and external stakeholders. Essentially, internal and external stakeholders are defined as the digitalization of all interactions and the ability to create a network structure. The following set of questions is included in this dimension. Firstly, the extent to which innovation programs within the company are fragmented and uncoordinated is considered. Secondly, the existence of an in-house innovation program that is not aligned with the goals of digital transformation is taken into account. Thirdly, the objectives of the digital transformation program and its ability to create a continuous and collaborative improvement environment for the company as a whole are evaluated. Fourthly, the company's use of digital marketing techniques in marketing processes and its capacity to utilize digital tools are assessed. Fifthly, the company's ability to use digital technologies to transform existing business processes is examined. Finally, the digitalization of the processes that make up the core competencies of the company is evaluated (İZKA, 2020).

2.2.5. Culture Dimension

The culture dimension pertains to the integration of digital ideas and practices into the way of doing business. It is defined as the set of opportunities provided by the institution for the organization of the work environment or the development of skill sets. It includes the willingness to take risks within the company in order to achieve individual and corporate goals in the age of digitalization. The questions in this dimension assess the level of support for digital transformation among the executive

leaders of the company, and the challenges in sharing digital data among different units of the company. The degree to which lifetime customer value is a core measure for all digital initiatives, investment in increasing the digital skills of employees, and the use of scalable and technology-driven platforms to support digital targets and key performance indicators are also evaluated. Measurable metrics for transactions both inside and outside the organization, and continuous real-time monitoring of digital interactions with customers to optimize their experience, are also taken into consideration (ÍZKA, 2020).

2.2.6. Employee Dimension

This dimension was adopted from Alexander Rossman's Digital Maturity: Conceptualization and Measurement Model (2018) and was subsequently incorporated into the questionnaire. In this dimension, the organization is evaluated in terms of its capacity to accommodate digital competencies, including the availability of experts in digital core issues, opportunities for further education in digital topics, implementation of measures to enhance digital literacy development, and creation of new job profiles for employees with expertise in digital core topics. The set of questions included in this dimension aims to assess the level of digital maturity within the firm (Rossmann, 2018).

2.3. Leadership

Leadership is a multifaceted concept that has been studied from various perspectives throughout history. The trait theory of leadership emphasizes the characteristics and personality traits of effective leaders, while the behavioral theory focuses on the actions and interactions of leaders with their followers. The situational theory posits that leadership is shaped by the specific context in which it occurs. Additionally, the transformational leadership theory emphasizes the role of values and vision in shaping effective leadership (Fairholm, 2002).

Leadership has been defined in various ways throughout the literature, with different perspectives and approaches. Wren (1995) describes leadership as a multifaceted concept, encompassing aspects such as personality, goal achievement,

motivation, and group dynamics. Rost (1991) focuses on the relationship between leaders and followers, and their shared goal attainment. Kouzes and Posner (2007) emphasize the role of leadership in mobilizing others toward a common vision. These various definitions highlight the complexity and multidimensional nature of leadership as a concept. In all of these definitions, leadership involves providing direction, facilitation, and cooperation to achieve established goals. Smith (2009) further highlights that leadership also encompasses the characteristics of the leader, the needs of followers, and the expectations of the leader.

2.3.1. Leadership in Digital Transformation

Digital transformation, as defined by Vial (2019), refers to the process of improving an organization through the integration of information and communication technologies. This process encompasses various aspects of a business, including technological, human, and organizational elements. It involves a comprehensive shift and change in perspective, including changes to strategy, vision, leadership, digital awareness and capabilities, and the ability to identify and capitalize on opportunities. Thus, digital transformation represents a comprehensive and holistic approach to organizational improvement.

The literature suggests that leadership and leadership styles play a crucial role in the initiation and successful implementation of the complex and prolonged process of digital transformation (Bolte et al., 2018). As with any IT or Information Systems (IS) initiative, the support of executive management is essential for the successful realization of digital transformation. The process of digital transformation within organizations requires a leadership style that promotes innovation, organizational adaptability, and sustained high performance (Bolte et al., 2018).

The Upper Echelons Theory posits that organizational outcomes can be predicted by the characteristics of executive management (Hambrick & Mason, 1984). The highly dynamic and turbulent nature of digital transformation presents challenges for executive-level managers (Bolden and O'Regan, 2016; Vial, 2019) and calls for the emergence of new digital leadership roles and responsibilities (Haffke et al., 2016).

Leadership capabilities are crucial for effectively driving digital transformation within an organization. They provide the framework for setting direction, building

momentum, and ensuring alignment toward a common goal. According to Westerman, Bonnet and McAfee (2014), leadership capabilities in digital transformation are based on four main areas: Transformative Vision, Engagement, Strong Governance, and Technology Leadership. They argue that executive managers must take the lead in creating a compelling vision of the future, and communicating it throughout the organization, in order to effectively steer the organization toward digital transformation. Furthermore, it is important for leaders to engage employees throughout the organization, establish strong governance structures and systems, and possess a deep understanding of technology and its potential applications in order to drive successful digital transformation efforts (Westerman et al., 2014).

The most distinguished leadership characteristic in the era of digital transformation, which is an extensive process that companies are currently facing, is to possess visionary and innovative qualities. Being a leader entails having a futurist, entrepreneurial mindset (Sullivan, 2017). However, simply having a vision for the future is not sufficient, it must also be innovative in nature (Sainger, 2018). This involves embracing open innovation, where in addition to all employees, customers are also integrated into the innovation process (Kreutzer et al., 2017). The leader should possess an inspiring digital vision (Sullivan, 2017) and foresight for innovative business models (Kreutzer et al., 2017). Additionally, the leader should recognize that innovation is a learnable skill, thus creating a culture that promotes and fosters innovation within the organization (Sainger, 2018).

In the context of digital transformation, the ability to establish and effectively manage networks, both technically and organizationally, is of paramount importance. As such, another key characteristic of leadership in the era of digital transformation is networking intelligence. Networking intelligence refers to the capability to swiftly assemble and coordinate proficient networked teams (Bawany, 2019; Herder-Wynne et al., 2017). The leader should possess the ability to link the knowledge, skills, and resources of teams, to oversee processes and collaborate with teams in executing tasks, and to distribute tasks based on team competencies (Bauer et al., 2015).

Motivation is a crucial aspect in successfully managing digital transformation. In this regard, the leader should act as a motivating coach during the DT process. This entails encouraging employees to embrace the challenges of the transformation,

alleviate fears related to changes in tasks and positions, and cultivate a culture of transformation (Bawany, 2019; Junita, 2019). This can be achieved by acting as a mentor or coach and breaking down hierarchical organizational structures (Fisk, 2002).

Mastering complexity is a critical characteristic of effective leadership in the digital era, as it requires the ability to comprehend and navigate complex situations and to effectively resolve conflicts (Paulin, 2014). Effective leaders achieve this by systematically breaking down complexity through decoupling and modularizing conflicting issues (Doz and Kosonen, 2010; Hearsom, 2015).

Moreover, the digital leader should adopt a democratic delegative leadership style. This style involves creating a flat organizational structure with minimal hierarchies and bureaucracy, and delegating tasks based on the competencies of employees. By removing hierarchies and promoting soft skills such as trust and respect, the digital leader should prioritize trust over control (Bolte et al., 2018). Additionally, the digital leader should also be employee-oriented, focusing on the growth and well-being of employees in the organization. This can be achieved by providing employees with autonomy in terms of work content, time, and place, as well as implementing innovative employee evaluation methods (Bolte et al., 2018).

Upon examination of the aforementioned characteristics, it can be observed that there is a correlation between the leadership traits required for digital transformation and those associated with generative leadership.

2.3.2. Generative Leadership

The rapidly changing business environment of the present era has led to a shift in the paradigm of leadership, moving away from traditional leadership styles to a more generative approach. Traditional leadership characteristics, such as charisma, may no longer be sufficient in driving organizational change and activating businesses in the face of increasing global competition. In this context, organizations require leaders who possess the ability to navigate change and direct the organization toward progress. Despite its recent emergence, generative leadership has received relatively limited attention in the academic literature (Klimek et al., 2008).

Generative leadership is defined as a holistic perspective that extends beyond the conventional functions of decision-making, directing, controlling, motivating, and empowering. The ultimate goal of generative leadership is to enhance the generativity, creativity, and self-esteem of individuals in the organization (Sagaria and Johnsrud, 1988).

According to Klimek et al. (2008) conceptualize generative leadership, as a leadership style that recognizes the organization as a dynamic and self-renewing system. The aim of this type of leadership is to foster the potential and creativity of stakeholders within the organization by creating an environment that enables individuals to achieve their goals and contribute to organizational change, innovation, and production. This involves challenging existing thought patterns and encouraging the organization to constantly think organizationally.

Macaux (2015) defines generative leadership as a mode of being, where the leader's qualities, such as wisdom, experience, and practical insight, have a direct impact on others. Furthermore, a generative leader is characterized by interpersonal and social compatibility in relationships with others.

Surie and Hazy (2006) define generative leadership as innovation over time, characterized by aspects of leadership that promote organizational cohesion and high performance. Goldstein et al. (2010) further elaborate that generative leadership involves a combination of bottom-up and top-down perspectives on leadership to foster innovation.

The concept of generative leadership emphasizes the ability to generate new ideas and possibilities within organizations, as opposed to authoritarian leadership styles that focus on maintaining the status quo. This type of leadership is characterized by its ability to motivate, inspire and facilitate creativity among team members (Klimek et al., 2008). Generative leaders are known for their high energy and ability to think creatively, and for their ability to collaborate and involve employees in the goal-setting process. They also differ from authoritarian leaders in that they prioritize the empowerment of employees rather than exerting control over them (Klimek et al., 2008). Generative leadership, as a leadership orientation, possesses several key characteristics. According to Klimek et al. (2008), these include:

- The view of the organization as a dynamic structure

- An emphasis on cooperation over authoritarianism
- The utilization of collective thinking and the constant questioning of default assumptions
- The perception of the future as malleable
- A focus on innovation
- The challenging of assumptions
- The raising of fundamental questions
- The encouragement of re-evaluation of past actions
- The incorporation of a creative perspective in problem-solving and the identification of new alternatives.

Surie and Hazy (2006) emphasized that generative leadership is the promotion of innovation, organizational cohesion, and enhanced performance. This approach includes implementing strategies to foster collaboration, experience-sharing, and efficiency among group members throughout the course of their work. Additionally, generative leadership focuses on establishing a framework for fostering innovation and collaboration within the organization (Surie and Hazy, 2006).

Lichtenstein (2014) claims that the concept of generative leadership emphasizes the importance of fostering a culture of innovation within organizations. This approach focuses on developing the capacity for complex problem-solving and systematically building upon it, both for the organization and for individual employees. In doing so, generative leaders aim to inspire and guide the next generation of leaders and innovators within the organization.

Mike (2018) summarized the key elements of generative leadership as follows;

- The ability to explain complex structures rather than solely relying on predictions
- Fostering creativity and diverse perspectives
- Promoting interaction and the exchange of information
- Fostering organizational flexibility and solidarity while embracing diversity
- Drawing the boundaries by adapting the constraints to the environment
- Adopting innovations combined with knowledge from the past.

As Mike (2018) stated, generative leadership supports the creative and dynamic process within organizations by emphasizing learning and fostering a culture of sharing.

2.3.2.1. The Features of Generative Leadership

Traditional leaders generally organize the distribution of tasks and oversee the process of doing the assigned tasks. The aim here is to preserve the existing status quo. Generative leadership, in contrast to traditional leadership, focuses on fostering innovation and change within an organization. This orientation prioritizes questioning the status quo, encouraging creative thinking and guiding the organization toward a more dynamic and adaptive structure. The scope of this approach can range from the leader's own team to the entire organization (Klimek et al., 2008).

Klimek et al. (2008) posit that generative leadership as a leadership approach that recognizes the energy, creativity, and collective work of organizational members to bring about change and growth within the organization. In contrast, authoritarian leaders may not have the ability to effectively manage this complex process and may not fully utilize the potential of organizational members. Generative leaders view their organizations as dynamic structures and view their members as integral parts of them. As highlighted by Klimek et al. (2008), experienced generative leaders possess six certain traits that set them apart from others. These include:

- Constant curiosity
- An emphasis on reflection in the learning process
- An understanding of the importance of professional interviews
- The recognition of the organization as a living entity
- An ability to foster creativity and innovation within the team
- Desire to lead both the present and future

Generative leadership is a collaborative approach that emphasizes the empowerment of team members. The vision of generative leaders is to foster creativity and productivity within their teams. To achieve this goal, they create an environment conducive to innovation and align team goals with this objective. By providing opportunities for learning, reflection, and communication, generative leaders aim to develop the capacity of their team members to handle complex tasks and challenges.

Additionally, they encourage a culture of experimentation, experimentation, and continuous improvement, which allows for the exploration of new opportunities and the adaptation to changing circumstances (Klimek et al., 2008).

In this context, according to Sagaria and Johnsrud (1988), the characteristics of generative leaders are as follows;

- An emphasis on fostering participation rather than seeking followers
- A focus on developing the leadership capacity of others
- A willingness to share experiences
- Consideration of individual characteristics within the group
- Recognition of the importance of interpersonal relationships
- An ability to facilitate the contribution of unique qualities by each group member

In this way, generative leaders both support the creativity of individuals and contribute to the decision-making and cooperation processes in the organization.

2.3.2.2. From Traditional Leadership to Generative Leadership

Klimek et al. (2008) provided a ranking of leadership styles, with the least generative style at the bottom and the most generative style at the top.

Traditional Leadership: Traditional leadership is characterized by adherence to established norms and practices, with a focus on maintaining the status quo and enforcing established rules and regulations. The hierarchical structure and chain of command are emphasized in this leadership style (Klimek et al. 2008).

Pragmatic leadership: They are characterized by a reluctance to innovate unless deemed necessary. The decision to innovate is contingent on specific circumstances. Despite the presence of a hierarchical structure in this leadership style, it is adaptable to changing conditions (Klimek et al. 2008).

Exploratory Leadership: According to Klimek et al. (2008), leaders who possess this style actively cultivate curiosity within the organization and leverage it to drive innovation and change. These leaders are inclined to challenge conventions and continuously seek new opportunities for growth and development. Though they may exhibit authoritarian tendencies in certain circumstances, such instances are deemed

necessary and strategic. These leaders also actively encourage organizational members to engage in research and inquiry.

Generative Leadership: As identified by Klimek et al. (2008), they are characterized by a focus on fostering creativity, and innovation within the organization. These leaders view their organizations as dynamic and constantly evolving entities and prioritize the development and empowerment of their team members to contribute to this process. This approach to leadership is particularly valuable in facilitating organizational change and progress, as it encourages individuals within the organization to utilize their unique skills and perspectives to drive progress and growth. Furthermore, generative leadership prioritizes creativity and innovation as key elements of organizational success and fosters a culture of commitment to the future of the organization among its members.

Generative leaders, as outlined by Bushe (2019), adopt a collaborative approach in which they guide and empower team members toward achieving common goals. This approach is characterized by an emphasis on innovation, creativity and motivation, as opposed to a traditional top-down, directive leadership style. Such leaders seek to make goals and tasks engaging and stimulating, rather than simply dictating them to be followed blindly. This approach has been found to be effective in fostering a culture of creativity and innovation within organizations (Bushe, 2019).

Generative leaders, as identified by Surie and Hazy (2006), serve as catalysts for innovation and dynamism within the organizations they lead. They facilitate the acceleration of learning and foster an increase in inner diversity within the organization. Through their own experiences and understanding of the organization, generative leaders establish and define the organization's purpose and subsequently establish mechanisms to facilitate the creation and sharing of new experiences among members.

Generative leaders possess a mindset that prioritizes innovation and creativity in their approach to problem-solving, which ultimately leads to an increase in productivity. They actively engage in collaboration with other members of the organization to find novel solutions to existing issues, rather than simply adhering to traditional methods. This mindset is characterized by a continuous curiosity, a willingness to challenge the status quo, and a holistic perspective that allows for seeing

beyond established norms. These leaders strive to bring change to the traditional structures and processes within the organization (Surie and Hazy, 2006).

The current research model is operationalized through the utilization of Generative Leadership Scale. The construct of Generative Leadership is measured using a 27-item scale developed by Çetin and Demirbilek (2020). The Generative Leadership Scale comprises 27 items and is assessed in a four-point Likert-type format based on teacher perceptions of school principals' generative leadership. The scale is comprised of two sub-dimensions, the first being "Revealing Creative Dynamics" which consists of 14 items, and the second being "Innovation Generating Capacity" with 13 items. These sub-dimensions align with the literature on generative leadership, such as the findings of Klimek et al. (2008), and support the characteristics of generative leadership as identified in the literature, including the promotion of innovation and creative generation throughout the organizational system, as demonstrated by Goldstein et al. (2010), and the fostering of creative tensions in the organization and the modeling of creativity and innovation, as described by Mike (2018) (Çetin and Demirbilek, 2020).

2.4. Digital Literacy and Digital Awareness of Top Management

Digital transformation is a process of utilizing digital technologies to fundamentally change the way an organization operates and delivers value to its stakeholders (Matt et al., 2015). This process involves the integration of digital technologies into all aspects of an organization, including its structure, processes, functions, and business models. This can lead to significant changes in the way an organization operates, such as increased automation, enhanced data analytics capabilities, and improved customer engagement through digital channels (Sahu et al., 2018).

The acquisition of digital literacy among the workforce is crucial for organizations to effectively leverage their investments in technology and achieve their organizational objectives (Kane et al., 2019; Blount et al., 2016). Digital literacy, defined as the skills, knowledge, and abilities required for individuals or groups to

interact with digital technologies (Stordy, 2015), has been previously identified as a critical dynamic capability for organizations undergoing digital transformations (Vial, 2019).

In order to realize the full potential of digital technologies and achieve successful digital transformation, organizations must prioritize the development of digital literacy among their workforces. Real-world digital transformation projects highlight the importance of executive managers possessing a high level of digital awareness and literacy in driving the success of these efforts. This includes fostering a culture of ongoing learning and development, as well as providing support and resources to facilitate the acquisition of digital skills (Eden et al., 2019). By understanding the current level of digital literacy within the organization, managers can implement targeted strategies to improve it and better prepare the workforce to effectively respond to digital transformation (Eden et al., 2019).

The digital mindset, awareness, attitudes, and behaviors of leaders are interrelated factors that are essential in the development of digital skills within an organization. It is posited that leaders who possess a strong digital mentality and exhibit generative characteristics are more likely to effectively cultivate digital competencies within their workforce (Alma et al., 2022).

The capability of digital literacy is deemed essential for organizations to remain competitive in the digital era (Eshet, 2004). This capability is also considered a fundamental aspect of digital transformation (Liley et al. 2017; Manyika et al., 2017). To attain a high level of digital maturity, organizations should consistently strive to enhance digital skills through structured development programs (North et al., 2019).

In the realm of leadership, it is widely recognized that technology plays a crucial role in driving change, and conversely, that change necessitates the implementation and utilization of technology. (Barba-Sánchez et al., 2007). In align with it, Bayo-Moriones and Lera-Lopez (2007) contend that the owners and managers of organizations hold the belief that the implementation and utilization of Information and Communication Technologies (ICTs) will have a positive impact on various aspects of business operations (Bayo-Moriones and Lera-Lopez, 2007).

According to the dictionary of IGI Global, “It is the awareness of the knowledge, skills, and attitudes required for individuals to use digital tools effectively.”.

International ICT Literacy Panel (2002) posits that digital awareness, which encompasses a broader understanding of its critical components, will drive the transformation of skills and knowledge acquired through education and training, thereby enhancing the quality of education for the future workforce. The panel holds the conviction that higher levels of digital awareness have the potential to positively impact not only the individuals who acquire the necessary skills and knowledge but society as a whole (Panel, I. L., 2002).

Studies have established that digital transformation models are crucial for organizations to chart a path toward digital success. However, it is imperative to have an understanding of the current state of the digital awareness of the organization in order to plan the transformation effectively. Organizational Digital Awareness represents the collective digital awareness of an organization. This organizational digital awareness can be compared to individual digital awareness, which refers to an individual's understanding of themselves within a digital context (Fujii-Takamoto and Langford, 2022).

Enhancing digital awareness among employees constitutes a significant role in bridging the knowledge gap among staff members. Digital awareness initiatives not only bolster the internal resilience of an organization but also have the potential to elicit changes in both behavioral and cultural dimensions in terms of digital transformation (Hauser, 2016). Considering the Upper Echelon Theory, the digital awareness of organizations and employees is closely associated with the digital awareness of the top management team.

3. DEVELOPMENT OF HYPOTHESES AND RESEARCH MODEL

In the context of digital transformation, visionary and innovative qualities are considered to be essential leadership characteristics (Sullivan, 2017). Effective communication and facilitation, the ability to create a compelling vision for the future (Westerman et al., 2014), a futurist and entrepreneurial mindset (Sullivan, 2017), collaborative nature (Gilli et al., 2022; Promsri, 2019), enthusiasm and motivation (Magesa and Jonathan, 2021), and an ability to raise awareness of the benefits of digital transformation and effectively organize change (Cichosz et al., 2020) are all deemed crucial attributes of a successful digital leader. Additionally, the ability to generate innovation, leading to knowledge creation and increased market accessibility through the development of new products and services, has been identified as a critical component of digital development (Magesa and Jonathan, 2021; Scuotto et al., 2022).

The literature on digital transformation and digitalization has consistently highlighted the importance of leadership characteristics and skills in guiding these efforts within business enterprises (Henderikx and Stoffers, 2022). Research has emphasized that traditional leadership traits are insufficient in the digital age (Kaivo-oja et al., 2016), and that innovativeness, the ability to establish interactive relationships, the ability to find creative solutions, and collaboration are more highly valued. Previous studies have also investigated the role of innovation as an individual characteristic of leaders, particularly in regard to their willingness to adopt new technologies. Personal innovation has been defined as the willingness to use new technology (Agarwal and Prasad, 1999) and leadership innovation has been identified as a determinant of information technology adoption behavior in previous studies (AlBar and Hoque, 2019; Dalvi-Esfahani et al., 2018; Ghobakhloo et al., 2011; Kareen et al., 2018; Mohd Sam et al., 2012). Contrarily, some studies have yielded inconsistent results with regards to the relationship between leadership and innovation in the context of digital transformation. Some studies have found insignificant results, such as Cho (2006) and Safari et al. (2015), which suggest that firm-level adoption and use of different contexts and other types of technology may be more relevant than the scope of DT practices. Given that digital transformation encompasses not only

technical aspects but also social and human aspects, it is important to consider multiple dimensions in the assessment of digital maturity, including technological, strategic, cultural, managerial, process, and employee maturity.

Nevertheless, as far as is known, there is no extant literature that examines the relationship between leadership styles and digital maturity. This study aims to address this gap by first identifying prominent leader characteristics deemed necessary for effective digital transformation through a review of existing literature. These characteristics were then matched with different leadership styles, with the finding that traits associated with generative leadership were found to be more relevant for digital transformation practices.

In the literature, it has been claimed that digital transformation is not solely the responsibility of a single individual, but rather is achieved through repeated interactions throughout the organization. Generative leadership, which prioritizes interactive relationships, generates new opportunities, and fosters innovation, adaptability and resilience in dynamic environments, has been identified as a particularly effective leadership style for facilitating digital transformation (Gruzina et al., 2019). However, the empirical relationship between generative leadership and digital maturity has yet to be investigated. Thus, this study aims to examine the impact of generative leadership on digital maturity based on the conceptual arguments presented in the literature. Based on these arguments in the literature, the following hypothesis is proposed:

H1: Generative leadership has a positive effect on the digital maturity of organizations.

Digital orientation, which encompasses a strategic positioning aimed at leveraging digital technologies, encompasses market orientation, learning orientation, and entrepreneurial orientation. This positioning encompasses attitudes and behaviors that support the creation and application of market insights, proactive innovation, and an openness to new concepts (Quinton et al., 2018). In addition to external factors, organizational capabilities, individual characteristics and skills, as well as intrinsic value assessment, are determinants of digital orientation (Quinton et al., 2018). Using the TOE framework, Kim et al. (2015) found that IT expertise and executive managers' knowledge are significant indicators of e-business capability.

Previous research has identified the owner/manager as a key factor in influencing technology adoption (Alshamaila et al., 2013). The level of IT knowledge of owners/managers has been found to be a crucial antecedent in the adoption of digital technology (Michaelidou et al., 2011; Quinton et al., 2018). The lack of IT familiarity among leaders diminishes their awareness of the benefits of digitalization, which in turn impacts technology decisions and the development of a corporate culture conducive to digitalization (Mohd Sam et al., 2012). The relationship between digital technology adoption and technology skills has also been established (AlBar and Hoque, 2019; Hashim, 2015; Jeon et al., 2006). However, some studies have yielded insignificant results, revealing conflicting findings (Chatzoglou and Chatzoudes, 2016; Dalvi-Esfahani et al., 2018; Mohd Sam et al., 2012).

Previous research on digital literacy has yielded mixed results and has primarily focused on the technical aspect of digital literacy. Additionally, the literature has utilized various terms to refer to digital technology capabilities, including information, computer, ICT, technology, digital and network literacy, digital awareness, which are often used interchangeably (Ongardwanich et al., 2015).

However, digital literacy is distinguished from IT knowledge as it encompasses a broader set of skills that are deemed crucial in driving decisions related to digital technology adoption. According to Mutula and Van Brakel (2007), digital literacy encompasses technical and communication skills. Furthermore, Lau and Yuen (2014) posit that digital literacy is a broad concept that encompasses the dimensions of computer, information, and internet literacy: Information literacy, being aware of one's information needs, evaluating the quality of information, exploring and effectively using information (Catts and Lau, 2008), computer literacy, having knowledge about computers and using that knowledge to efficiently use computers and related applications (Oliver and Towers, 2000), and Internet literacy, having basic skills for Internet use and the ability to search, collect, understand, and evaluate online content (Kim and Yang, 2016).

In light of this information, it is essential to evaluate digital skills in a multidimensional manner and this approach is examined in this study. Additionally, prior research has primarily focused on the adoption of specific technologies, rather than assessing the extent of digital transformation or digital maturity (Chatzoglou and

Chatzoudes, 2016; Dalvi-Esfahani et al., 2018; Hashim, 2015; Jeon et al., 2006). Therefore, digital skills should be evaluated from a broader perspective, including the leader's knowledge, internet, and computer skills. Although some studies have considered digital skills from a broader perspective, the primary focus of these studies was to investigate the relationship between the digital skills of the owner/manager and ICT adoption or coverage. However, the examination of digital maturity or its dimensions has been neglected (Alma Çallı and Çallı, 2021).

The adoption process of information and communication technologies (ICT) within an organization is largely influenced and directed by the CEO, who is often the company owner, partner, or manager (Ghobakhloo, 2012). This is due to the significant impact that the CEO's perceptions, values, personality, attitudes, and characteristics have on ICT adoption within the organization.

Studies have investigated the relationship between IT adoption and CEO characteristics. Thong and Yap (1995) found that the CEO's perceptions and knowledge, attitudes, IT knowledge and experiences, and the personal trait of innovativeness are among the most important factors related to top management in IT adoption.

Research has also indicated that in-house innovations, cooperation with others for the purpose of large-scale innovations, and ICT expenditures are key components of innovation and entrepreneurship (Redoli et al., 2008). Furthermore, recent studies have emphasized the importance of the IT knowledge, skills, and experience of the owner or manager as top management-related factors (Drew, 2007).

However, in this digital era, more recent research highlights the concept of digital literacy as an umbrella term that encompasses both cognitive and technical skills associated with new-age technology (Lau and Yuen, 2014).

Academic studies have recognized the importance of digital awareness as a vital organizational skill in the rapidly changing technological landscape. This understanding is seen as critical in guiding the implementation of digital transformation in a meaningful way that aligns with long-term organizational goals, rather than simply adopting technology for technology's sake (Fujii-Takamoto and Langford, 2022).

Moreover, digital awareness is recognized as a critical component for creating value for customers in digital transformation initiatives. The findings indicate that a lack of digital awareness is prevalent among 60% of companies, whereas 90% of successful digital transformation efforts incorporate digital awareness into their operating models (Forth et al.2020).

Based on arguments in the literature, the following hypotheses are proposed:

H2a: Top management team's digital literacy has a positive effect on the digital maturity of organizations.

H2b: Top management team's awareness on benefits of digitalization has a positive effect on the digital maturity of organizations.

H2c: Top management team's awareness on costs of digitalization has a negative effect on the digital maturity of organizations.

Previous literature has emphasized the need for traditional leadership traits to be augmented with new digital leadership traits in order for digital transformation to be successful in businesses (Gray, 2018). Studies have examined these leadership characteristics from a multidisciplinary perspective. They discussed the characteristics that these leaders should have. Consequently, it is emphasized that they have their own unique attitudes, behaviors, and additional qualities. (El Sawy et al., 2016; Larjovuori et al., 2018). The concept of digital maturity is multi-faceted and has been conceptualized in different ways by various scholars. These frameworks, which aid in determining the organization's standing across various dimensions in its digital transformation journey, highlight the importance of leadership competencies and capabilities. Adequate digital skills, regularly updated and developed through continuous learning, are considered crucial elements for effectively managing IT resources, enhancing digital market presence, developing digitally-enabled processes and business models, and fostering a digital mindset within the organization (North et al., 2019).

Previous research has emphasized the importance of informed, adaptable, enabling, and digitally-aware leadership in the digital age. Studies have shown that employees are more likely to accept innovations and new digitally-enabled business models when their leaders possess high levels of digital skills and awareness (Erhan et

al., 2022). Digital literacy has been identified as a key leadership quality driving digital transformation efforts (Abbu et al., 2022; Karakose et al., 2021; Promsri, 2019). It has been argued that digital skills and awareness are essential for leaders in the 21st century, as they contribute to increased credibility and effectiveness (Ngayo Fotso, 2021; van Laar et al., 2017; Yukl, 1998).

In previous literature, the importance of digital literacy and digital awareness as leadership skills have been emphasized, yet the relationship between digital literacy, digital awareness, and other leadership skills in relation to outcomes of digital transformation, such as digital maturity, has yet to be empirically examined. Other leadership qualities that have been frequently discussed in studies include knowledge sharing, innovation, collaboration, communication, and adaptability (Sullivan, 2017; Sainger, 2018; Bauer et al., 2015; Paulin, 2014). In this regard, these qualities, which align with the concept of generative leadership, form the basis for the following hypothesis: the relationship between high digital literacy and digital awareness skills of a generative leader and digital maturity outcomes.

In this study, it is aimed to examine the relationship between generative leadership and digital maturity, with a specific focus on the role of digital literacy and digital awareness within this relationship. Despite the recognition of digital literacy and digital awareness as important leadership skills in previous studies, the link between digital literacy, digital awareness, generative leadership, and digital maturity outcomes has yet to be empirically tested. Furthermore, it is aimed to address this literature gap by proposing a hypothesis regarding the potential impact of a generative leader's high level of digital literacy and digital awareness on digital maturity outcomes.

H3a: Top management team's digital literacy has a mediating effect on the relationship between generative leadership and the level of digital maturity of organizations.

H3b: Top management team's awareness on benefits of digitalization has a mediating effect on the relationship between generative leadership and the level of digital maturity of organizations.

H3c: Top management team’s awareness on costs of digitalization has a mediating effect on the relationship between generative leadership and the level of digital maturity of organizations.

The operationalized research model is depicted below.

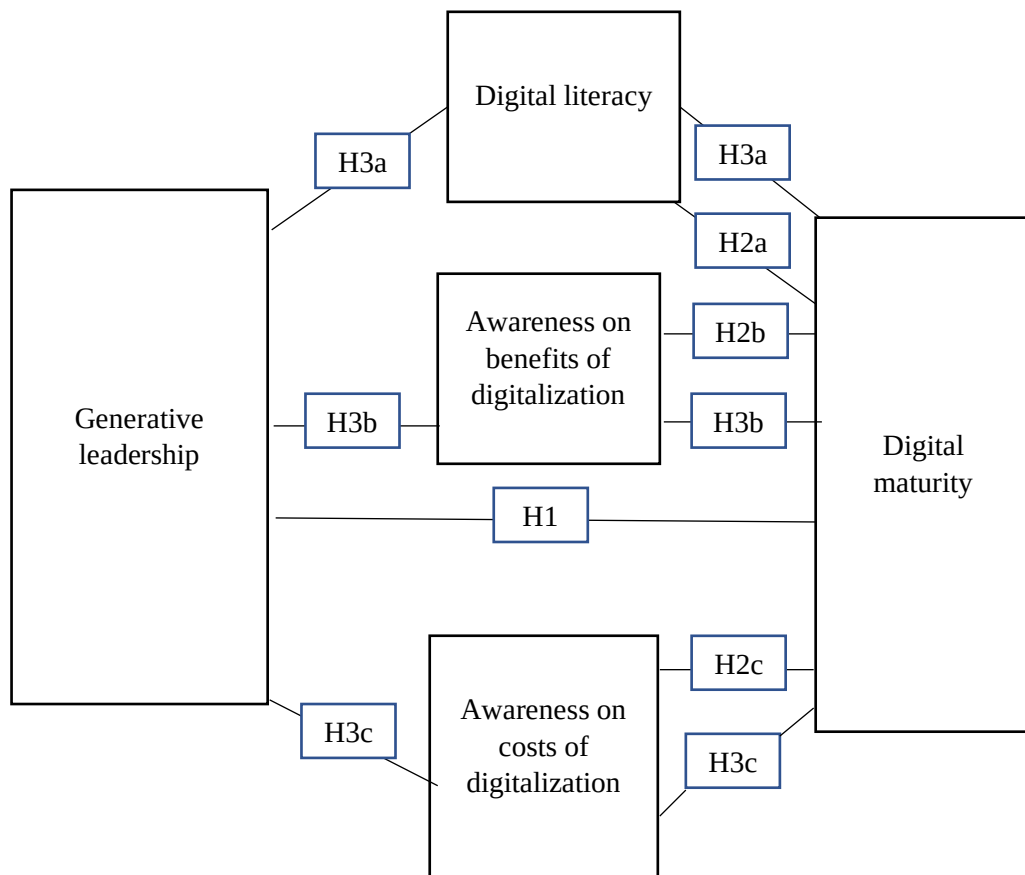


Figure 3.1. Research Model

4. METHODOLOGY

The present study employs quantitative research. The sample population and characteristics, as well as the measurement tools utilized in the study, will be outlined in this section. The data collected will be analyzed using statistical techniques such as factor analysis, reliability analysis, and regression analysis, with the aid of the SPSS program. The findings of this research will be discussed and recommendations for future research and practical implications will be provided.

4.1. Purpose of The Research

The current study seeks to examine the relationship between generative leadership and digital maturity in an organizational context. This study aims to investigate the effect of the generative leadership characteristics of a firm's top management on the firm's digital maturity. Additionally, this study aims to investigate the effects of digital literacy and digital awareness of top management on the digital maturity of the organization. Furthermore, the study aims to explore the extent to which digital literacy and digital awareness of top management serve as mediating variables between generative leadership and digital maturity. These research objectives are significant as they provide a deeper understanding of the underlying factors that contribute to digital maturity.

The concept of digital transformation, closely associated with Industry 4.0, refers to the process of utilizing digital technologies to transform business operations. Despite being a topic of consideration for some time, the implementation of digital transformation efforts has become increasingly imperative, particularly in light of the disruptions caused by the COVID-19 pandemic. Organizations must adapt to this rapidly evolving landscape in order to remain competitive.

Digital maturity, or the extent to which an organization has adopted and integrated digital technologies, is a key determinant of competitiveness but this process necessitates a reevaluation of traditional management approaches. However, managing the digital transformation process requires new management strategies and leadership styles, as traditional methods may not be sufficient. The shift in leadership

competencies required to effectively navigate digital transformation is of paramount importance. The characteristics of leaders, particularly those in executive positions, must also evolve to effectively guide organizations through the digital transformation process. This highlights the need for new leadership competencies in the context of the digital age.

The primary objective of this thesis is to identify the necessary leadership competencies in the digital transformation process of businesses and, subsequently, to provide guidance in facilitating the attainment of digital maturity more efficiently and expediently.

4.2. Research Method

The methodology of this study involves a comprehensive explanation of the sample and data utilized in the research. In order to accurately measure the variables of interest, appropriate tools and scales were employed. In the following sections, the specifics of the sample and data as well as the tools and scales used will be explained in detail to provide a thorough understanding of the methodologies employed in this study.

4.2.1. Sample and Data

The present study aims to gather data from businesses operating in Turkey. The sample population for this study was comprised of individuals occupying upper, middle, and first-line management levels, as well as white-collar employees. The rationale for this sample selection was to mitigate potential biases that may arise from self-assessment by top management, as well as to garner more accurate evaluations based on the participants' in-depth knowledge and familiarity with business' operations.

In this study, a non-probability sampling methodology was employed, utilizing the convenience sampling technique. This choice was made due to the characteristics of the target population, comprising top-level, middle-level, and first-line managers and white-collar employees. As Aaker et al. (2007) posited when the target population

is not homogeneous or random sampling is unfeasible, non-random sampling methods such as convenience sampling can be utilized.

A total of 365 questionnaires were completed by respondents from 249 companies. As a result, data obtained from 365 managers of 249 companies were analyzed using the SPSS 21.00 Statistical Package Program and the PROCESS Macro.

4.2.2 Instruments

The independent variables were assessed through three scales: Generative Leadership (Çetin and Demirbilek, 2020), Digital Literacy (Lau and Yuen, 2014), and Digital Awareness (Tan et al., 2010). The scale of Generative Leadership consisted of 27 items, the scale of Digital Literacy consisted of 10 items, and the scale of Digital Awareness consisted of 18 items. Participants were asked to rate the Generative leadership, digital literacy, and digital awareness of their top management using a five-point Likert scale ranging from 1 (Never) to 5 (Always). The survey items were designed to measure various aspects of generative leadership, digital literacy, and digital awareness, such as the degree to which top management supports innovation, the perception of top management regarding the role of technology in creating new business opportunities, and the level of knowledge of top managers about important new technologies relevant to the organization. The assessment of the generative leadership in this study was based on the items such as "The predominant members of the top management team in the organization are proponents of innovations that have a positive impact on the organization," while the digital awareness was evaluated with items such as "The top managers in the majority of cases believe that information and communication technologies offer new business prospects," and the digital literacy was evaluated with items such as "The top managers in the majority of cases are knowledgeable about important technological developments relevant to the business.

In the present study, a 40-item Likert scale was utilized to assess digital maturity as the dependent variable. This scale, which was based on a report produced by the Izmir Development Agency, was designed with a 6-point Likert format and encompassed 36 items in five dimensions (8 items strategy, 6 items governance, 11 items technology, 6 items processes, 5 items culture) as detailed in the literature review. In addition, the sixth dimension (4 items employee) was adopted from

Alexander Rossman's Digital Maturity: Conceptualization and Measurement Model (2018) and was subsequently incorporated into the questionnaire. Respondents were asked to rate their business' digital maturity along dimensions such as strategy, technology, culture, governance, processes, and employee maturity using the scale. For example, participants were asked to rate statements such as "Our business leverages digital technologies to support and transform existing and emerging business processes," on a scale ranging from "1" (Absolutely not suitable for our business) to "6" (Absolutely suitable for our business).



5. ANALYSES AND RESULTS

This section encompasses a comprehensive data analysis approach, including both descriptive and inferential statistics. The analyses conducted include factor analyses, reliability analyses, correlation analyses and regression analyses, providing a thorough examination of the data set.

5.1. Analyses of Data

The study conducted factor, reliability, and validity analyses on the data obtained from 365 questionnaires. Subsequently, the data were aggregated at the company level, with the mean scores obtained from multiple participants within each organization being represented by a single score for that particular company. This resulted in a sample size of 249 observations, on which correlation and regression analysis were performed.

The data evaluation was conducted using the SPSS 21.00 Statistical Package Program, augmented by the PROCESS Macro developed specifically for SPSS. For certain ordinal variables, such as education level, and for all nominal variables, including demographic characteristics like gender, descriptive analyses were applied. Meanwhile, for items that used the Likert-type ordinal scale, factor analyses were utilized. The reliability of the extracted factors was determined through the application of the Cronbach Alpha method. Furthermore, correlation analyses were performed to assess the relationships between variables, and regression analyses were performed to test the research hypotheses.

5.2. Descriptive Analyses

The sample population for this study consisted of 365 participants from 249 different companies, comprising white-collar employees, first-line, middle-level, and upper-level managers from various firms.

The gender distribution of the participants was recorded as 239 males and 118 females, with 8 individuals not specifying their gender. In terms of age, the largest

proportion of participants (37%) belonged to the 31-40 age group with 135 participants, followed by the 21-30 age group with 101 participants (27.7%) and the 41-50 age group with 80 participants (21.9%). The 51-60 age group with 42 participants comprised 11.5% of the participants, while those who were 61 years old and above with 6 participants constituted 1.6% of the sample population.

In this study, 78 participants, representing 21.4% of the respondents, reported that they held the position of the business owner or partner in the company they worked for. A total of 67 participants, accounting for 18.4% of the sample, held upper-level management positions, while 99 participants (27.1%) and 106 participants (29%) held middle-level and first-line management positions, respectively. The remaining 15 participants, constituting 4.1% of the sample, were classified as white-collar employees. With regards to the duration of employment, 12 participants (3.3%) had worked in their current company for 0 to 1 year, 102 participants (27.9%) for 1 to 4 years, 127 participants (34.8%) for 5 to 9 years, 79 participants (21.6%) for 10 to 14 years, 20 participants (5.5%) for 15 to 19 years, and 22 participants (6%) for 20 years or more. Three participants did not specify the length of their employment.

The educational background of the participants was varied, with 1.1% (4 managers) having completed primary school, 9% (33 managers) having completed high school, 1.9% (7 managers) having completed vocational high school, 59.7% (218 managers) being university graduates, 19.7% (72 managers) being graduate degree holders, and 8.2% (30 managers) having obtained a doctoral degree. One participant did not indicate their level of education. The descriptive analysis results for the individual factors are presented in the table below.

Table 5.2.1. Descriptive Analysis of the Demographic Characteristics of The Participants' Results

Respondents' Demographics		Frequency	Valid Percent
Gender	Male	239	66,9
	Female	118	33,1
Age	21-30 y. old	101	27.7
	31-40 years old	135	37
	41-50 years old	80	21.9
	51-60 years old	42	11.5
	61+ years old	6	1.6
Statue	Owner/Partner	78	21.4
	Upper-level managers	67	18.4
	Middle-level managers	99	27.1
	First-line managers	106	29
	white-collar staff	15	4.1
Tenure	0-1 years	12	3.3
	1-4 years	102	27.9
	5-9 years	127	34.8
	10-14 years	79	21.6
	15-19 years	20	5.5
	20 years and over	22	6
Education	Primary School	4	1.1
	High School	33	9
	Vocational High School	7	1.9
	College	218	59.7
	Graduate	72	19.7
	Doctorate	30	8.2

The study involved 249 companies, with a breakdown of their age and size as follows: 9% (22 companies) were 0-4 years old, 17.6% (43 companies) were 5-9 years old, 22.4% (55 companies) were 10-14 years old, 11.8% (29 companies) were 15-19 years old, 18% (44 companies) were 20-29 years old, 15,1% (37 companies) were 30-49 years old, and 6,1% (15 companies) had been operating for more than 50 years. The distribution of the 249 companies in the sample population is as follows: 3.6% (9) of the companies belong to the public sector, 90.4% (225) to the private sector, 3.6% (9) to a mixed structure, and 2.4% (6) to an international structure. Among these companies, 46.2% (115 companies) were in the manufacturing sector, 38.2% (95 companies) operated in the service sector, and 15.7% (39 companies) operated as trade enterprises. With regards to employee size, 10.5% (26 companies) employed between 1-9 people, 33,2% (82 companies) employed 10-49 people, 15.8% (39 companies) employed 50-99 people, 9.3% (23 companies) employed 100-249 people, 9.7% (24 companies) employed 250-499 people, 2.8% (7 companies) employed 500-999 people, and 18.6% (46 companies) employed more than 1000 people. The descriptive analysis results of these demographic factors are provided in Table 5.2.2.

Table 5.2.2. Descriptive Analysis Results of The Companies

Organizations' Demographics		Frequency	Valid Percent
Industry	Manufacturing	115	46.2
	Service	95	38.2
	Trade	39	15.7
Ownership	Public	9	3.6
	Private	225	90.4
	Mixed	9	3.6
	International	6	2.4
Size	1-9 people	26	10.5
	10-49 people	82	33,2
	50-99 people	39	15.8
	100-249 people	23	9.3
	250-499 people	24	9.7
	500-999 people	7	2.8
	1000+ people	46	18.6
Life Span	0-4 years	22	9
	5-9 years	43	17.6
	10-14 years	55	22.4
	15-19 years	29	11.8
	20-29 years	44	18
	30-49 years	37	15.1
	50+ years	15	6.1

5.3. Factor Analyses

In this study, a survey questionnaire consisting of 95 questions was employed to assess the variables of interest. The questionnaire was structured using 5- and 6-point Likert scales and aimed to measure four independent variables, namely generative leadership, digital literacy, digital awareness and one dependent variable, digital maturity. Data analysis was performed using SPSS 21.00 Statistical Package Program and the PROCESS Macro, which was specifically designed for SPSS. The independent and dependent variables were separated and categorized into distinct groups to facilitate the analysis process.

Eleven items of digital maturity were excluded from the analysis due to their lack of loading on any factor. The remaining 29 items were grouped into three factors. A factor was formed by the 8 items of strategic digital maturity and 2 items of process digital maturity, while another factor was formed by 3 items of employee digital maturity and 2 items of cultural digital maturity. The remaining items; 9 items of technological digital maturity, 3 items of governance digital maturity and 2 items of cultural digital maturity were loaded onto technological and governance digital maturity factor.

All scales were analyzed using the Principal Components method and the Varimax Rotation technique. The total variances explained as a result of factor analyses were found to be %71.41 for the independent variables and %73.87 for the dependent variables. The variables subjected to factor analyses are presented in the tables below (table 5.3.1. and 5.3.2.) along with their factor loads.

Table 5.3.1. Factor Analysis Results of Independent Variables

Questions	Generative Leadership	Awareness on Benefits of Digitalization	Awareness on Cost of Digitalization	Digital Literacy
GenL18	,832			
GenL7	,823			
GenL6	,818			
GenL27	,810			
GenL20	,803			
GenL17	,802			
GenL23	,801			
GenL3	,790			
GenL16	,782			
GenL9	,780			
GenL11	,771			
GenL25	,770			
GenL4	,770			
GenL22	,762			
GenL26	,761			
GenL13	,752			
GenL19	,751			
GenL10	,751			
GenL2	,743			
GenL1	,740			
GenL21	,734			
GenL15	,732			
GenL24	,731			
GenL8	,731			
GenL5	,717			
GenL14	,708			
GenL12	,577			
Benefit5		,854		
Benefit2		,839		
Benefit6		,828		
Benefit3		,824		
Benefit1		,814		
Benefit9		,811		
Benefit7		,810		
Benefit8		,807		
Benefit4		,794		
Benefit10		,731		
Cost6			,879	
Cost2			,868	
Cost4			,848	
Cost5			,847	
Cost3			,844	
Cost7			,834	
Cost1			,827	
Cost8			,817	
DigLit6				,758
DigLit5				,754
DigLit8				,725
DigLit9				,721
DigLit3				,720
DigLit7				,712
DigLit4				,700
DigLit1				,678
DigLit2				,664
DigLit10				,564
Total Variance Explained %71,412				
Kaiser-Meyer-Olkin Measure of Sampling Adequacy ,960				
Extraction Method: Principal Component Analysis.				
Rotation Method: Varimax with Kaiser Normalization.a a. Rotation converged in 8 iterations.				

Table 5.3.1. Factor Analysis Results of Dependent Variables

Questions	Technological and Governance Digital Maturity	Strategic and Process Digital Maturity	Employee and Cultural Digital Maturity
DigTech9	,764		
DigTech1	,758		
DigTech8	,734		
DigTech7	,709		
DigTech3	,690		
DigTech11	,689		
DigCult1	,680		
DigGov1	,665		
DigTech10	,662		
DigTech6	,660		
DigGov3	,659		
DigCult5	,657		
DigTech5	,641		
DigGov4	,628		
DigStr5		,753	
DigStr6		,751	
DigStr3		,742	
DigStr2		,735	
DigStr8		,716	
DigStr7		,695	
DigStr4		,693	
DigStr1		,671	
DigPrc2		,661	
DigPrc1		,604	
DigEmp4			,777
DigEmp2			,776
DigEmp3			,772
DigCult3			,717
DigCult4			,662
Total Variance Explained %73,866 Kaiser-Meyer-Olkin Measure of Sampling Adequacy ,971 Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.a a. Rotation converged in 8 iterations.			

5.4. Reliability Analysis

The reliability of the measurement used in this study was assessed through the application of the Cronbach Alpha Coefficient. The concept of reliability in this context refers to the internal consistency of the measurement, which is demonstrated by the average correlation between the questions used to gauge a particular variable. In the social sciences, a Cronbach Alpha Coefficient value of greater than 0.70 is commonly considered a sufficient indicator of reliable measurement (George and Mallery, 2018). The results of the reliability analysis, as demonstrated by the accompanying table (Table 5.4.1), show that the Alpha values for all scales exceeded 0.70, thereby demonstrating the internal consistency of the variables and the reliability of the measurement scales employed in the study.

Table 5.4.1 Reliability (α) Values of Factors

Variables		Number of Questions	Cronbach Alpha
Generative Leadership		27	,971
Digital Literacy		10	,948
Digital Awareness	Awareness on Benefits of Digitalization	10	,971
	Awareness on Costs of Digitiaization	8	,968
Digital Maturity	Technological and Governance	14	,962
	Strategic and Process	10	,961
	Employee and Cultural	5	,927

5.5. Correlation Analysis

The study conducted correlation analyses on the relationships between generative leadership, digital literacy, awareness on digital costs and awareness on digital benefits (sub-dimensions of digital awareness), and digital maturity. The data analyses were conducted using 365 surveys collected from 249 organizations and comprised of factor analyses, reliability analyses, and descriptive analyses. In order to examine the impact of generative leadership, and awareness on digital costs, awareness on digital benefits and digital literacy on digital maturity, the data were aggregated at the organizational level by computing the mean of the responses from multiple participants from each company. The resulting data were then analyzed using 249 observation data. The correlation coefficients of the measurement variables (based on 365 observation data) are presented in the upper diagonals of the matrices in Table 5.5.1, along with the means, standard deviation values, and correlation coefficients of the variables. The lower diagonals of the table present the correlation coefficients of the variables reduced to the firm level (based on 249 observation data).

Table 5.5.1. Mean, Standard Deviation Values and Correlation Coefficients of The Variables

Variables	Mean	Standart Deviation	Digital Literacy	Awareness on Benefits of Digitalization	Awareness on Costs of Digitalization	Generative Leadership	Technological and Governance DM	Strategic and Process DM	Employee and Cultural DM	Digital Maturity
Digital Literacy	3,9632	,79255	1	,362**	-,135*	,747**	,812**	,757**	,662**	,796**
Awareness on Benefits of Digitalization	3,9027	,91638	,501**	1	-,700**	,386**	,388**	,376**	,265**	,365**
Awareness on Costs of Digitalization	2,1542	1,03428	-,245**	-,608**	1	-,092	-,188**	-,131*	-,121*	-,155**
Generative Leadership	4,0974	,71280	,747**	,433**	-,152*	1	,720**	,706**	,610**	,726**
Technological and Governance DM	4,7245	1,00049	,806**	,521**	-,306**	,700**	1	,838**	,788**	,938**
Strategic and Process DM	4,7207	,96908	,761**	,510**	-,273**	,692**	,844**	1	,765**	,928**
Employee and Cultural DM	4,5028	1,14032	,620**	,367**	-,259**	,567**	,784**	,732**	1	,923**
Digital Maturity	4,6479	,96110	,782**	,498**	-,299**	,700**	,943**	,920**	,916**	1

**-. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The results of the correlation analysis, as shown in Table 5.5.1, indicate that generative leadership has a significant relationship at the $p < 0.01$ level with all variables, except for the cost subdimension of digital awareness, with which it does not exhibit a significant correlation. Similarly, digital literacy demonstrates a significant relationship at the $p < 0.01$ level with all variables except for the cost subdimension of digital awareness but does exhibit a significant relationship with the cost sub- dimension at either the $p < 0.01$ or $p < 0.05$ level.

As revealed by Table 5.5.1, the benefit subdimension of digital awareness demonstrates a significant correlation with all variables at a level of $p < 0.01$. Conversely, the cost subdimension of digital awareness only exhibits significant relationships with the technology-governance subdimension of digital maturity (at a level of $p < 0.01$ or $p < 0.05$) and with the benefit subdimension of digital awareness (at a level of $p < 0.01$).

The subdimension of technology and governance of Digital Maturity demonstrates a significant correlation with all variables at a level of $p < 0.01$. The strategy and process subdimension also shows a significant correlation with all variables except the cost subdimension of digital awareness, with a correlation level of $p < 0.01$, or $p < 0.05$ with the cost subdimension of digital awareness. Meanwhile, the employees and culture subdimension of Digital Maturity exhibits a significant correlation with all variables except the cost subdimension of digital awareness, at a level of $p < 0.01$, but does not demonstrate a significant correlation with the cost subdimensions of digital awareness.

5.6. Hypotheses and Regression Analyses

In this study, the impact of generative leadership, top management team's digital literacy and top management team's digital awareness on the digital maturity of the business is examined. The hypotheses regarding the overall research model will be evaluated using regression analysis.

To investigate the relationship between generative leadership and digital maturity the following hypothesis was proposed.

H1: Generative leadership has a positive effect on the digital maturity of organizations.

The following hypotheses were proposed to investigate the relationship between top management team's digital literacy and top management team's digital awareness and digital maturity.

H2a: Top management team's digital literacy has a positive effect on the digital maturity of organizations.

H2b: Top management team's awareness on benefits of digitalization has a positive effect on the digital maturity of organizations.

H2c: Top management team's awareness on costs of digitalization has a negative effect on the digital maturity of organizations.

The following hypotheses were proposed to investigate the mediating effect of top management team's digital literacy and top management team's digital awareness on the relationship between generative leadership and the level of digital maturity of organizations.

H3a: Top management team's digital literacy has a mediating effect on the relationship between generative leadership and the level of digital maturity of organizations.

H3b: Top management team's awareness on benefits of digitalization has a mediating effect on the relationship between generative leadership and the level of digital maturity of organizations.

H3c: Top management team's awareness on costs of digitalization has a mediating effect on the relationship between generative leadership and the level of digital maturity of organizations.

Table 5.6 1. Regression Analyses on The Relationships Between Dependent and Independent Variables

Independent Variables	Dependent Variable	Standart β	P	Adjusted R2	F Value
Generative leadership for small-sized firms	Digital maturity	,671***	,000	,444***	84,197
Generative leadership for middle-sized firms		,758***	,000	,568***	75,798
Generative leadership for large- scale firms		,827**	,005	,679**	159,921
Awareness on Benefits of Digitalization for small-sized firms		,628***	,000	,427***	28,526
Awareness on Costs of Digitalization for small-sized firms		-,064	,539		
Awareness on Benefits of Digitalization for middle-sized firms		,602***	,000	,571***	34,310
Awareness on Costs of Digitalization for middle-sized firms		-,280**	,009		
Awareness on Benefits of Digitalization for large- scale firms		,635**	,001	,161**	7,520
Awareness on Costs of Digitalization for large- scale firms		,325	,074		
Top management team's digital literacy small-sized firms		,810***	,000	,652***	196,125
Top management team's digital literacy middle-sized firms		,747***	,000	,551***	74,547
Top management team's digital literacy large-scale firms		,762***	,000	,575***	103,726

*: $p \leq 0.05$ **: $p \leq 0.01$ ***: $p \leq 0.001$

According to the regression analysis results in Table 5.6.1, generative leadership for small-sized firms ($\beta=,671$; $p\leq 0.001$), medium-sized firms ($\beta=,758$; $p\leq 0.001$) and large-scale firms ($\beta=,827$; $p\leq 0.01$) affects digital maturity positively, and H1 (Generative leadership has a positive effect) on the digital maturity of organizations) hypothesis is supported.

According to the results of the regression analysis, top management team's digital literacy for small-sized firms ($\beta=,810$; $p\leq 0.001$), medium-sized firms ($\beta=,747$; $p\leq 0.001$) and large-scale firms ($\beta=,762$; $p\leq 0.001$) positively affects digital maturity and H2a (Top management team's digital literacy has a positive effect on the digital maturity of organizations.) hypothesis is supported.

According to the results of the regression analysis, digital maturity is positively affected by awareness on benefits of digitalization of top management team for small-sized firms ($\beta=,628$; $p\leq 0.001$), medium-sized firms ($\beta=,602$; $p\leq 0.001$) and large-scale firms ($\beta=,635$; $p\leq 0.001$). The hypothesis of H2b (Top management team's awareness on benefits of digitalization has a positive effect on the digital maturity of organizations.) is supported.

On the other hand, no significant relationship was found with the top management team's awareness on costs of digitalization for small-sized firms ($\beta=-,064$; $p= 0.539$) and large-scale firms ($\beta=,325$; $p= 0.074$).

On the other hand, the top management team's awareness on costs of digitalization for medium-sized firms ($\beta=-,280$; $p\leq 0.01$) negatively affects digital maturity and H2c (Top management team's awareness on costs of digitalization has a negative effect on the digital maturity of organizations.) hypothesis is supported for medium-sized firms.

According to Baron and Kenny (1986), a model comprising mediator variables is composed of three fundamental relationships. These relationships include:

- the direct impact of the independent variable on the mediator variable,
- the direct effect of the mediator variable on the dependent variable,
- and

- the direct impact of the independent variable on the dependent variable.

According to Baron and Kenny (1986), a model with a mediator variable should demonstrate three distinct relationships:

- A change in the independent variable should result in a variation of the mediator variable.
- A change in the mediator variable should result in a variation of the dependent variable.
- The effect of the independent variable on the dependent variable should either decrease or become negligible once the mediator variable is taken into account.

According to Baron and Kenny (1986), the most widely accepted method for conducting mediator analysis is through the use of multiple regression analysis. This method involves the following steps:

- Establishing a regression model to investigate the effect of independent variables on the dependent variable
- Developing a regression model to examine the effect of independent variables on the mediator variable
- Establishing a regression model to investigate the effect of the mediator variable on the dependent variable
- Finally, a regression model is created to investigate the combined effect of the independent and mediator variables on the dependent variable.

After these steps are carried out, the effects of the independent variables on the dependent variables are reduced or eliminated when the mediator variables are introduced into the model as independent variables, the mediator variable effects may be present.

Table 5.6 2. Between Generative Leadership and Digital Maturity Digital Literacy Mediator Regression Analyses

	Independent Variables	Dependent Variable	Standart β	Sig.	Adjusted R^2	F Value
1. Regression	Generative leadership for small-sized firms	Digital maturity	,671***	,000	,444***	84,197
	Generative leadership for middle-sized firms		,758***	,000	,568***	75,798
	Generative leadership for large-scale firms		,827**	,005	,679**	159,921
2. Regression	Generative leadership for small-sized firms	Digital Literacy	,747***	,000	,554***	128,920
	Generative leadership for middle-sized firms		,830***	,000	,684***	126,259
	Generative leadership for large-scale firms		,742***	,000	,545***	90,779
3. Regression	Top management team's digital literacy small-sized firms	Digital maturity	,810***	,000	,652***	196,125
	Top management team's digital literacy middle-sized firms		,747***	,000	,551***	74,547
	Top management team's digital literacy large-scale firms		,762***	,000	,575***	103,726

**Table 5.6 3. (Continued) Between Generative Leadership and Digital Maturity
Digital Literacy Mediator Regression Analyses**

4. Regression	Generative leadership for small-sized firms	Digital maturity	,142	,109	,658	99,077
	Top management team's digital literacy small-sized firms		,703***	,000		
	Generative leadership for middle-sized firms	Digital Maturity	,448**	,004	,605	44,689
	Top management team's digital literacy middle-sized firms		,374*	,015		
	Generative leadership for large-scale firms		,575***	,000		
	Top management team's digital literacy large-scale firms		,339***	,000		

*: $p \leq 0.05$ **: $p \leq 0.01$ ***: $p \leq 0.001$

According to the 1. regression analysis results in Table 5.6.2, generative leadership for small-sized firms ($\beta = .671$; $p \leq 0.001$), medium-sized firms ($\beta = .758$; $p \leq 0.001$) and large-scale firms ($\beta = .827$; $p \leq 0.01$) affects digital maturity positively. Similarly, generative leadership for small-sized firms ($\beta = .747$; $p \leq 0.001$), medium-sized firms ($\beta = .830$; $p \leq 0.001$) and large-scale firms ($\beta = .742$; $p \leq 0.001$) affects digital literacy positively in 2. regression.

In 3. regression, top management team's digital literacy for small-sized firms ($\beta = .810$; $p \leq 0.001$), medium-sized firms ($\beta = .747$; $p \leq 0.001$) and large-scale firms ($\beta = .762$; $p \leq 0.001$) positively affects digital maturity.

In the 4th regression analysis, which examined the effect of generative leadership and digital literacy together as independent variables on digital maturity, the relationship between generative leadership and digital maturity was found to be insignificant ($p=0.109$; $\beta=.142$), which was significant before for small-sized firms. Meanwhile, digital literacy for small-sized firms preserved its significant relationship with digital maturity ($p=0.000$; $\beta=.703$). Therefore, the hypothesis of H3a is supported for small-sized firms. For medium-sized ($p=0.004$; $\beta=.448$) and large-scale firms ($p=0.000$; $\beta=.575$), the hypothesis was not supported, as generative leadership maintains its significant relationship on digital maturity.

Table 5.6.3. Between Generative Leadership and Digital Maturity Awareness on Benefits of Digitalization Mediator Regression Analyses

	Independent Variables	Dependent Variable	Standart β	Sig.	Adjusted R^2	F Value
1. Regression	Generative leadership for small-sized firms	Digital maturity	,671***	,000	,444***	84,197
	Generative leadership for middle-sized firms		,758***	,000	,568***	75,798
	Generative leadership for large-scale firms		,827**	,005	,679**	159,921
2. Regression	Generative leadership for small-sized firms	Awareness on Benefits of Digitalization	,458***	,000	,201***	23,126
	Generative leadership for middle-sized firms		,512***	,000	,249***	19,227
	Generative leadership for large-scale firms		,300**	,009	,077**	7,129

**Table 5.6.3. (Continued) Between Generative Leadership and Digital Maturity
Awareness on Benefits of Digitalization Mediator Regression Analyses**

3. Regression	Awareness on Benefits of Digitalization small-sized firms	Digital maturity	,628***	,000	,427***	28,526
	Awareness on Benefits of Digitalization middle-sized firms		,602***	,000	,571***	34,310
	Awareness on Benefits of Digitalization large-scale firms		,635***	,001	,161**	7,520
4. Regression	Generative leadership for small-sized firms	Digital maturity	,349***	,000	,521***	48,305
	Awareness on Benefits of Digitalization small-sized firms		,500***	,000		
	Generative leadership for middle-sized firms	Digital Maturity	,504***	,000	,661***	53,673
	Awareness on Benefits of Digitalization middle-sized firms		,439***	,000		
	Generative leadership for large-scale firms		,772***	,000	,6,694***	83,733
	Awareness on Benefits of Digitalization large-scale firms		,168*	,015		

*: $p \leq 0.05$ **: $p \leq 0.01$ ***: $p \leq 0.001$

According to the 1. regression analysis results in Table 5.6.3 generative leadership for small-sized firms ($\beta=,671$; $p \leq 0.001$), medium-sized firms ($\beta=,758$; $p \leq 0.001$) and large-scale firms ($\beta=,827$; $p \leq 0.01$) affects digital maturity positively. Similarly, generative leadership for small-sized firms ($\beta=,458$; $p \leq 0.001$), medium-sized firms ($\beta=,512$; $p \leq 0.001$) and large-scale firms ($\beta=,742$; $p \leq 0.01$) affects awareness on digital benefits positively in 2. regression.

In 3. regression, awareness on benefits of digitalization of top management for small-sized firms ($\beta=.628$; $p\leq 0.001$), medium-sized firms ($\beta=.602$; $p\leq 0.001$) and large-scale firms ($\beta=.635$; $p\leq 0.001$) positively affects digital maturity.

In the 4th regression analysis, which examined the effect of generative leadership and awareness on benefits of digitalization together as independent variables on digital maturity, the relationship between generative leadership and digital maturity was found to be significant for small-sized firms ($p=0.000$; $\beta=.349$), medium-sized ($p=0.000$; $\beta=.504$) and large-scale firms ($p=0.000$; $\beta=.772$). Therefore, the hypothesis of H3b is not supported as generative leadership maintains its significant relationship on digital maturity.

Furthermore, the examination of hypothesis H3c was not conducted due to the lack of a significant relationship between the awareness on costs of digitalization of top management and digital maturity. This aligns with the criteria established by Baron and Kenny, where a mediating variable must possess a significant relationship with the dependent variable.

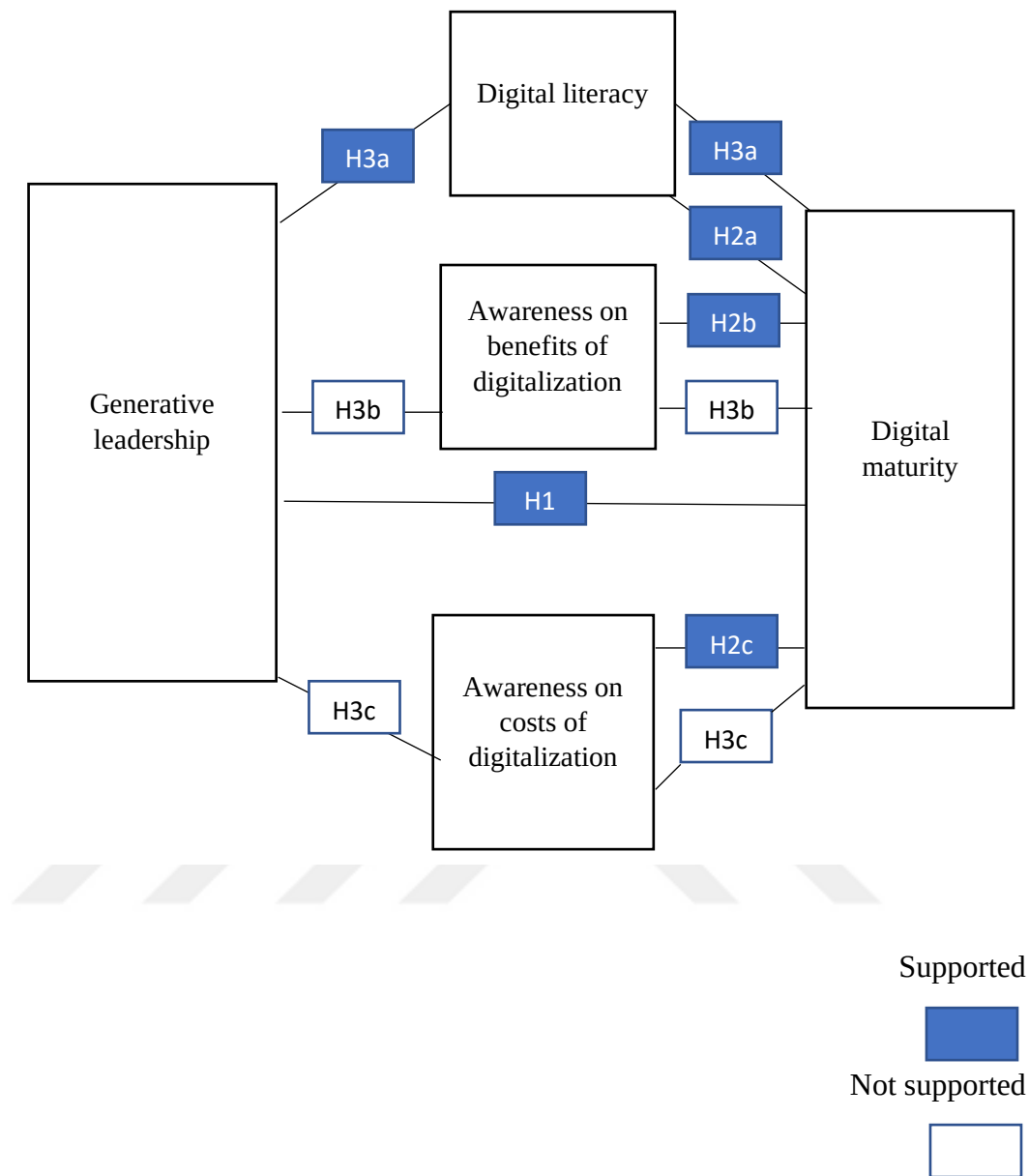


Figure 5.6.1 The Latest State of Research Model

5.7. Accept/Reject Status of Research Hypotheses

To test the research hypotheses, regression analyses were employed, and Table 5.7.1 presents the hypotheses that were supported and not supported based on the results of these regression analyses.

Table 5.7.1. Accept /Reject Status of Research Hypotheses

Hypotheses	Status
H1: Generative leadership has a positive effect on the digital maturity of organizations.	Accepted
H2a: Top management team's digital literacy has a positive effect on the digital maturity of organizations.	Accepted
H2b: Top management team's awareness on benefits of digitalization has a positive effect on the digital maturity of organizations.	Accepted
H2c: Top management team's awareness on costs of digitalization has a negative effect on the digital maturity of organizations.	Accepted
H3a: Top management team's digital literacy has a mediating effect on the relationship between generative leadership and the level of digital maturity of organizations.	Accepted
H3b: Top management team's awareness on benefits of digitalization has a mediating effect on the relationship between generative leadership and the level of digital maturity of organizations.	Rejected
H3c: Top management team's awareness on costs of digitalization has a mediating effect on the relationship between generative leadership and the level of digital maturity of organizations.	Rejected

6. CONCLUSION AND DISCUSSION

The utilization of information and communication technologies to effect significant changes in organizational processes and performance is known as digital transformation (Vial,2019). Driven by market disruptions and gaps in organizational requirements, this process has been increasingly adopted by both public and private organizations in recent years. The COVID-19 pandemic has further emphasized the importance of digital transformation for organizational survival and competitiveness impacted by the increased pressures and disruptions caused by the pandemic.

The data collected in this study, which employed the questionnaire method, were analyzed using SPSS software. To start with, factor analysis was performed on 365 questionnaire responses collected from company employees, and the 7 factors that emerged from the analysis were determined. The high reliability of these scales, adapted from the literature, was indicated by the Cronbach Alpha values, which were above 0.90. In order to examine the relationships between the variables, a correlation analysis was first conducted on the data obtained from the 365 questionnaire responses. Subsequently, the data were aggregated to the firm level, and a correlation analysis was conducted on 249 observation data. The results of both correlation analyses indicated a high degree of correlation among the 7 variables.

In this study, an examination of the impact of generative leadership, digital literacy and digital awareness of top management team on digital maturity was conducted for small-sized, middle-sized and large-scale firms. The sample population consisted of 356 first-line, middle-level and upper-level managers and white-collar employees from 249 firms operating in Turkey. The theoretical framework utilized for this study was the Upper Echelon Theory. The study suggests that the generative leadership, digital literacy and digital awareness level of top management team exert an influence on the digital maturity level of the firms under examination.

In accordance with the hypotheses proposed (H1), the data collected from 356 first-line, middle-level and upper-level managers and white-collar employees from 249 firms operating in Turkey indicate that generative leadership has a statistically significant and positive relationship to the level of digital maturity in businesses for small-sized, middle-sized and large-scale firms.

Furthermore, upon further examination and analyses of the data, it was determined that digital literacy of top management team for small-sized, medium-sized and large-scale firms positively affects digital maturity (H2a). Additionally, digital maturity is positively affected by top management team's awareness on benefits of digitalization for small-sized, medium-sized and large-scale firms (H2b).

On the other hand, no significant relationship was found with the top management team's awareness on costs of digitalization for small-sized firms and large-scale firms. Top management team's awareness on costs of digitalization for medium-sized firms negatively affects digital maturity and, in this case, H2c is supported just for medium-sized firms.

Finally, the study investigated the mediation effect and provided more detailed analyses. The findings indicate that the mediating role of digital literacy of top management team is present in the relationship between the digital maturity for small-sized firms and generative leadership. The hypothesis of H3a is supported for small-sized firms. For medium-sized and large-scale firms, the hypothesis was not supported, as generative leadership maintains its significant relationship with digital maturity.

While the hypothesis of H3b is not supported, H3c was not conducted due to the lack of a significant relationship between the top management team's awareness on costs of digitalization and digital maturity.

Now, these results are discussed and interpreted in further detail in the following:

H1 was supported.

Results reveal that generative leadership has a positive and significant impact on the digital maturity level of firms. This aligns with prior literature, which suggests that generative leadership and the characteristics associated with leadership in the digital era provide a nurturing and supportive environment for digital transformation (Sullivan, 2017).

As identified by Klimek et al. (2008), generative leaders are characterized by a focus on fostering creativity and innovation within the organization. They view their organizations as dynamic and constantly evolving entities and prioritize the development and empowerment of team members to contribute to this process. This approach to leadership is particularly valuable in facilitating organizational change and

progress, as it encourages individuals within the organization to utilize their unique skills and perspectives to drive progress and growth. Additionally, generative leadership prioritizes creativity and innovation as key elements of organizational success and fosters a culture of commitment to the future of the organization among its members.

The concept of generative leadership, as posited by Surie and Hazy (2006), encompasses a leadership approach that prioritizes innovation and creativity in driving organizational change and progress. Generative leaders are characterized by their ability to serve as catalysts for dynamism and innovation within the organizations they lead and possess a mindset that emphasizes the importance of these elements in problem-solving and decision-making. As a result, generative leadership is seen as a valuable approach to fostering productivity and driving progress within an organization.

Digital maturity is a comprehensive construct that encompasses both technological and managerial elements. Attaining the highest level of digital maturity requires an organization to have a robust grasp of the digital infrastructure and the ability to utilize it to gain a competitive edge (Chanias and Hess, 2016). Previous literature has noted that generative leadership and associated attributes facilitate the process of digital transformation and promote a conducive setting for this advancement in the digital era (Sullivan, 2017).

H2a was supported.

H2b was supported.

H2c was supported for medium-sized firms.

The results of the study are congruent with prior literature (AlBar and Hoque, 2019; Hashim, 2015; Jeon et al., 2006). The literature on digital technology capabilities has employed a variety of terminology to describe the same concept, including information literacy, computer literacy, ICT literacy, technology literacy, digital literacy, and network literacy, digital awareness, among others. These terms are often used interchangeably (Ongardwanich et al., 2015). The digital literacy and awareness of top management team can have a direct impact on an organization's digital transformation and level of digital maturity. Top management team with a high level

of digital literacy and digital awareness can act as technology advocates and effectively guide their organizations through digital transformation efforts.

The successful implementation of digital technologies and the realization of their full potential in organizations necessitate a focus on the cultivation of digital literacy and digital awareness among the workforce. Empirical evidence from real-world digital transformation projects highlights the vital role that top management team with high levels of digital awareness and digital literacy play in driving the success of these efforts. To achieve this, organizations must foster a culture of ongoing learning and development and provide support and resources for the acquisition of digital skills. By assessing the organization's current level of digital literacy, managers can implement targeted strategies to enhance it, thus better equipping the workforce to effectively navigate digital transformation (Eden et al., 2019).

The digital mindset, digital awareness, attitudes, and behaviors of top management team are interrelated factors that play a crucial role in fostering the development of digital skills within an organization (Alma et al., 2022).

H3a was supported for small-sized firms.

Digital literacy, comprising computer, Internet, and information literacy, is a crucial element in the success of digital transformation within an organization. As Lau and Yuen (2014) have highlighted, this encompasses both technical and cognitive capabilities, with technical proficiency in the use of computers, the internet, and current information technologies being essential for effective utilization. Furthermore, cognitive skills, such as the ability to identify and leverage new opportunities presented by technological innovations and disruptive technologies, are also critical for organizational success. In this regard, the digital literacy of top management team plays a facilitating role in the digital transformation process.

The current study has yielded an interesting finding that contributes to the existing literature on digital maturity and leadership. Analyses and findings have revealed that the inclusion of digital literacy in the regression analyses in the 4th step has resulted in the disappearance of the significant effect of generative leadership on digital maturity for small-sized firms. This suggests that digital literacy serves as a mediator in the relationship between generative leadership and digital maturity of organizations. The data thus indicate that generative leaders with high levels of digital

literacy are able to significantly contribute to a small-sized firm's digital maturity. The significance of leaders in small firms is highlighted by their elevated impact on decision-making and resource allocation, as they often serve as the primary or only key decision-makers. This has broad ramifications for various aspects of the firm, including its employees (Alma et al., 2022)

The current study's results suggest that generative leadership plays a significant role in promoting digital maturity within businesses. The findings indicate that businesses characterized by generative leadership styles are more likely to successfully implement digital transformation initiatives. Furthermore, the study's results indicate that the impact of generative leadership on digital maturity is further enhanced when paired with digital literacy among top management team, as evidenced by the mediation effect observed in the regression analyses.

Research posits that leaders who possess a strong digital mentality and exhibit characteristics associated with generative leadership are more likely to effectively cultivate digital competencies among their workforce (Alma et al., 2022).

Previous studies have also supported the findings of this research. A review of the literature, as presented by Promsri (2019), identifies 64 characteristics of leaders who enable digital transformation, which are grouped into six main categories: digital knowledge and literacy, vision, customer focus, agility, risk-taking, and collaboration. Therefore, digital literacy is identified as a key characteristic that empowers leaders to implement digital transformation, which aligns with the conclusions of this study. Additionally, Henderikx and Stoffers (2022) argue that managers, particularly top managers, must possess the knowledge and skills to effectively utilize technological resources, including digital know-how, in order to successfully lead digital transformations. This is consistent with the conclusion of this study, which establishes that digital literacy is important for generative leaders in promoting digital maturity.

There is evidence to suggest that the level of top management team involvement in the digital transformation process varies according to the size of the firm. In a study by Klos et al. (2021) on digital transformation in small-sized enterprises, the authors found that smaller firms tend to have more active and hands-on leaders who are more involved in the process. This is because, in smaller firms, the top management team

and their competencies including digital literacy often play a more central role in all aspects of the business, including digital transformation.

On the other hand, in larger firms, the top management teams delegate responsibility to other members of the management team. This is supported by research by Kagermann (2015), who found that, in large organizations, often require a dedicated team of individuals with the necessary skills and expertise, and that this team is often led by other management teams, rather than the top management team.

Overall, these studies suggest that the level of top management team involvement in the digital transformation process may vary based on the size of the firm, with smaller firms tending to have more hands-on leaders, while larger firms may delegate responsibility to other management members.

H3b was not supported.

Contrary to the initial hypothesis, the results of the regression analysis did not demonstrate a mediating effect of top management team's awareness on benefits of digitalization. This outcome may be attributed to the direct impact of both independent variables on the dependent variable, digital maturity.

Prior research has found direct relationships between leadership and digital maturity. For example, in a study by Kokot et al. (2021), the authors identified leadership as a critical factor for digital transformation and found that it directly influenced the digital maturity of organizations. Similarly, a study by Porfirio et al. (2019) found that leadership capabilities, including the ability to innovate and embrace digital technologies, were directly related to the level of digital transformation in organizations.

Therefore, it can be concluded that while top management team's awareness on benefits of digitalization may be important, it is not a necessary mediator for the relationship between generative leadership and digital maturity. The direct impact of generative leadership on digital maturity suggests that organizations should focus on developing leadership capabilities to promote digital transformation.

Furthermore, the examination of hypothesis H3c was not conducted due to the absence of a meaningful association between the top management team's costs on benefits of digitalization and digital maturity. This finding is consistent with the

criteria put forth by Baron and Kenny, who stipulated that a mediating variable must exhibit a significant association with the dependent variable.

6.1. Suggestions for Further Studies

Further studies incorporating a larger sample size of organizations are suggested in order to enhance the generalizability of the results and to potentially uncover additional influential factors impacting the digital maturity of organizations.

The results of this study indicate that there are differences between small-sized, medium-sized and large-scale firms in terms of factors affecting digital maturity. As a result, future research could investigate the specific factors that contribute to the differences in digital maturity among small-sized, medium-sized and large-scale firms. This approach would provide a more nuanced and accurate understanding of digital maturity in various types of organizations and could help to inform the development of more effective strategies for promoting digital transformation in these businesses.

In conclusion, this study suggests that the generative leadership style is a contributing factor to successful digital transformation efforts. As digital transformation is becoming increasingly important, further research is needed to delve deeper into this subject. The results of this study indicate that, in general, generative leadership and, more specifically, generative leaders with high digital literacy for small-sized firms are among the most appropriate leadership styles and types for achieving high levels of digital maturity and a more positive digital transformation experience.

Moreover, the findings of this study indicate that top management team's digital awareness and digital literacy have a positive and significant impact on the digital maturity of organizations. This highlights the importance of developing and fostering these skills in top management team to drive digital transformation efforts. It is recommended that future studies further explore other factors that contribute to digital maturity so that companies can have a more comprehensive understanding of the subject and implement effective strategies for digital maturity.

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BIOGRAPHY

Ahmet Rıfat ARIK completed his secondary education at Adana Anatolian High School, following which he graduated from Kocaeli University with a degree in Political Science and Public Administration in 2019. He went on to complete his master's degree in Business Administration at Gebze Technical University. Currently, he serves as an Assistant Expert in the State Incentives Branch of the Aegean Exporters' Associations.



APPENDIX- SURVEY FORM

Sayın Katılımcı,

Bu anket formu, akademik olarak yürütülen “**Dijital Olgunluk ve Üretken Liderlik**” isimli araştırmanın uygulama kısmı ile ilgilidir ve araştırma bulguları **tamamen bilimsel amaçlı** kullanılacaktır. Uygulamanın kapsadığı soruları cevaplandırmak, hiç kuşkusuz zamanınızın bir kısmını alacaktır. Ancak, Üniversite – İş hayatı arasındaki ilişkileri güçlendirmek ve elde edilen sonuçlarda ortaklaşa yararlanmak düşüncesi ile bize yardımcı olacağınızı kuvvetle ümit etmekteyiz. Gönderilecek cevaplar mutlaka gizli tutulacak ve elde edilen sonuçlar işletme adı belirtilmeksizin genel ve ortalama özellikler şeklinde talep edilmesi durumunda araştırmamıza katılan işletmelere gönderilecektir. İlginiz, desteğiniz ve zaman ayırdığınız için teşekkürlerimizi sunar işlerinizde başarılar dileriz.

Saygılarımızla

Doç. Dr. Mehtap Özşahin
Ahmet Rıfat Arık

İşletme Hakkında Genel Bilgiler			
1. İşletmenin Adı (İsteğe Bağlı) :	Metin girmek içinuraya tıklayın veya dokununuz.		
2. Faaliyet Alanı :	☐ Bölgesel	☐ Ulusal	☐ Uluslararası / Global
3. Bulunduğu İl :	Bir öge seçin.		
4. Faaliyet Gösterdiği Sektör :	☐ Üretim	☐ Hizmet	☐ Ticaret
İşletmesi			
5. Sermaye Sahipliğine Göre Sektör :	☐ Kamu	☐ Özel	☐ Karma
Yabancı sermayeli			
6. İşletmenin Yıllık Net Satış Hasılatı:	☐ 0-5 milyon TL	☐ 5-50 milyon TL	☐ 50-250 milyon TL
	☐ 250-500 milyon TL	☐ 500-1000 milyon TL	☐ 1000 milyon TL üzeri
7. Çalışan Sayısı :	☐ 1-9	☐ 10-49	☐ 50-99
	☐ 250-499	☐ 500-999	☐ 1000 ve üzeri
8. İşletmenin Yaşı :	☐ 1-4 yıl	☐ 5-9 yıl	☐ 10-14 yıl
yıl	☐ 20-29 yıl	☐ 30-49 yıl	☐ 50 yıl ve üzeri
Formu Dolduran Kisi Hakkında Genel Bilgiler			
1. Statünüz :	☐ İşl. Sahibi/Ortağı	☐ Üst düzey yönetici	☐ Orta düzey yönetici
	☐ Alt düzey yönetici	☐ Beyaz yaka çalışan	
2. Görev Unvanınız :	Metin girmek için buraya tıklayın veya dokununuz.		
3. Eğitim Durumunuz :	☐ İlköğretim	☐ Lise	
☐ Meslek Yüksek Okulu	☐ Üniversite	☐ Yüksek Lisans	☐ Doktora
4. Yaşınız :	☐ 20 yaş ve altı	☐ 21-30 yaş	☐ 31-40 yaş
	☐ 41-50 yaş	☐ 51-60 yaş	☐ 61 yaş ve üzeri

5. Cinsiyetiniz	: ☐ Kadın	☐ Erkek
6. Bu İş Yerinde Çalışma Süreniz	: ☐ 1 yıldan az	☐ 1-4 yıl
	☐ 10-14yıl	☐ 15-19 yıl
ve üzeri		☐ 5-9 yıl
		☐ 20 yıl
1. Pandemi öncesinde işletmenizin dijitalleşme düzeyini 1 en düşük 10 en yüksek olmak üzere 10'lu skalada değerlendirdiğinizde hangi skoru verirsiniz?:		
2. Su anda işletmenizin dijitalleşme düzeyini 1 en düşük 10 en yüksek olmak üzere 10'lu skalada değerlendirdiğinizde hangi skoru verirsiniz?:		
3. Sizce işletmeniz için dijital dönüşüm bir tercih miydi yoksa zorunluluk mu?		
☐ Tercihti (Yöneticiler tarafından teşvik edildi) ☐ Zorunluluktan dolayı zorunlu oldu		

Pandemi öncesi dijitalleşmeyi teşvik eden aşağıda listelenmiş unsurlardan en önemli olduğunu düşündüğünüz 5 unsuru önem sırasına göre (1) en önemliden, (5) en az önemliye doğru sıralayınız	
☐ Dijital dönüşüm bizim için önemli değildi ve ciddi bir faaliyet yoktu	☐ Yöneticilerimizin inisiyatif kullanması ve teşviki
☐ Müşterilerin ve rekabetin dijitalleşmeyi talep etmesi	☐ Sektörümüzde lider firma olma arzumuz
☐ Maliyet azaltma zorunluluğu	☐ Büyüme stratejimiz
☐ Gelir artırma fırsatları	☐ Etkinlik ve verimliliğin artırılması ihtiyacı
Pandemi SÜRECİ VE SU ANDA dijitalleşmeyi teşvik eden aşağıda listelenmiş unsurlar arasından en önemli olduğunu düşündüğünüz 5 unsuru önem sırasına göre (1) en önemliden, (5) en az önemliye doğru sıralayınız	
☐ Dijital dönüşüm bizim için önemli değil ve bu alanda ciddi bir faaliyet yok	☐ Kısıtlamalar nedeniyle işyerinin faaliyet gösterememesi
☐ Gelir artırma fırsatları	☐ Etkinlik ve verimliliğin artması ihtiyacı
☐ Çalışanların Covid olması	☐ Sektörümüzde lider firma olma arzumuz
☐ Hiç iş yapamaz hale gelmemiz dolayısı ile hayatta kalmak için zorunluluk	☐ Büyüme stratejimiz
☐ Müşteri talepleri	☐ COVID sırasında ortaya çıkan yeni iş fırsatları
☐ Maliyet azaltma zorunluluğu	☐ Yöneticilerimizin inisiyatif kullanması ve teşviki

Aşağıda belirtilen durumları işletmede temel ve stratejik kararların verilmesinde etkin olan yönetim ekibini düşünerek cevaplayınız.					
Bu işletmede üst yönetim ekibindeki yöneticilerin çoğunluğu:	Hiçbir zaman	Nadiren	Bazen	Sık sık	Her zaman
ÜRETKEN LİDERLİK	1	2	3	4	5
1. Çalışanların potansiyellerini gerçekleştirmeleri için çaba sarf ederler	☐	☐	☐	☐	☐
2. Kurumdaki kişilerin enerjisini doğru bir şekilde kullanırlar	☐	☐	☐	☐	☐
3. Çalışanların keşfetme sürecini harekete geçirirler	☐	☐	☐	☐	☐
4. Çalışanların bireysel kapasitelerini arttırmalarını teşvik ederler	☐	☐	☐	☐	☐
5. Araştırma odaklıdır	☐	☐	☐	☐	☐

6.Çalışanların ortak aklını kullanırlar	☐	☐	☐	☐	☐
7.Çalışanların bireysel yeteneklerini tanımaya özen gösterirler	☐	☐	☐	☐	☐
8.Yeniliklere açıktırlar	☐	☐	☐	☐	☐
9. Kurumdaki yaratıcı süreçleri harekete geçirirler	☐	☐	☐	☐	☐
10.Kendilerini yenilerler	☐	☐	☐	☐	☐
11.Kurumda harekete geçme isteği yaratırlar	☐	☐	☐	☐	☐
12.Kurumun kapasitesini arttırmak için çalışırlar	☐	☐	☐	☐	☐
13.Çalışanlarla üretken bir diyalog kurarlar	☐	☐	☐	☐	☐
14.Yeni şeyler keşfetmeye dair merakla sahiptirler	☐	☐	☐	☐	☐
15.Öğrenmeye isteklidirler	☐	☐	☐	☐	☐
16.Rutin uygulamalar dışında kuruma yenilik katmak için gayret gösterirler	☐	☐	☐	☐	☐
17. Çalışanların yeni şeyler öğrenmesi için ortam hazırlarlar	☐	☐	☐	☐	☐
18.Çalışanlara yaratıcılıklarını ortaya çıkaracak ortamlar oluştururlar	☐	☐	☐	☐	☐
19.Yeni şeyler öğrenmek için çaba gösterirler	☐	☐	☐	☐	☐
20.Çalışanların kendilerini ifade etmeleri için gerekli ortamı sağlarlar	☐	☐	☐	☐	☐
21.Birimler arası etkileşimi teşvik ederler	☐	☐	☐	☐	☐
22.Mevcut düşünce kalıplarının dışına çıkmak için çaba gösterirler	☐	☐	☐	☐	☐
23.Çalışanları keşfetmeye özendirirler	☐	☐	☐	☐	☐
24.Kuruma katkı sağlayan yeniliklerin savunucusudurlar	☐	☐	☐	☐	☐
25.Çalışanların üretkenliğini sağlamak için onları motive ederler	☐	☐	☐	☐	☐
26.Kurumda olumlu anlamda farklılık yaratırlar	☐	☐	☐	☐	☐
27.Çalışanların fikirleriyle kuruma katkı sağlaması için uğraşırlar	☐	☐	☐	☐	☐
DİJİTAL OKURYAZARLIK VE FARKINDALIK	1	2	3	4	5
1. Kullandığımız bilişim teknolojileri ile ilgili karşılaşılan teknik problemlerin nasıl çözüleceğini bilirler	☐	☐	☐	☐	☐
2. Genel olarak yeni teknolojileri kolayca öğrenirler	☐	☐	☐	☐	☐
3. İşimizle ilgili önemli yeni teknolojileri takip ederler	☐	☐	☐	☐	☐
4. İşimizle ilgili farklı teknolojiler hakkında bilgi sahibidirler	☐	☐	☐	☐	☐
5. Bilgi ve iletişim teknolojilerini çalışanların öğrenmesi ve kullanabilmesi amaçlı dijital öğretim materyallerini (Örneğin: Sunumlar, dijital hikâyeler, wikiler, bloglar) geliştirmek için gereken teknik becerilere sahiptirler	☐	☐	☐	☐	☐
6. Bilgi ve iletişim teknolojileri konusunda sahip oldukları beceriler yeterlidir.	☐	☐	☐	☐	☐
7. İnternette bilgi edinmek için yapılan arama ve değerlendirmelerde yeterlidirler	☐	☐	☐	☐	☐
8. Siber güvenlik, webde arama ve internette sahtecilik vb. internet etkinlikleri ile ilgili konulara aşinadırlar	☐	☐	☐	☐	☐
9. Bilgi ve iletişim teknolojilerini, proje çalışmalarında ve diğer öğrenme faaliyetlerinde işbirliği yapmak için etkin bir şekilde kullanırlar	☐	☐	☐	☐	☐
10.Kurumdaki çalışmalarında, çalışanlarla internet üzerinden (ör. Skype, Facebook, Bloglar aracılığıyla) sıklıkla iletişim kurarlar	☐	☐	☐	☐	☐
İşletmemizde, Bilgi iletişim teknolojileri (BİT) yeterince KULLANILMAKTADIR.	☐	☐	☐	☐	☐
Çünkü üst düzey yöneticilerimizin çoğunluğu BİT'in:	1	2	3	4	5
1. İşletmemizde genel olarak maliyetleri azalttığını düşünmektedir	☐	☐	☐	☐	☐
2. İş ile ilgili iletişim ve haberleşme maliyetlerimizi azalttığını düşünmektedir	☐	☐	☐	☐	☐
3. İşletme içi ve dışı iletişimimizin hızını ve güvenilirliğini artırdığını düşünmektedir	☐	☐	☐	☐	☐
4. İş yaptığımız firmalarla ve paydaşlarımızla olan ilişkilerimizde, koordinasyon eksikliğinden kaynaklanan verimsizlikleri azalttığını düşünmektedir	☐	☐	☐	☐	☐

5. Ticari iş ortaklarımızla daha yakın iletişim kurmamızı sağladığını düşünmektedir	☐	☐	☐	☐	☐
6. Müşterilerimizle daha iyi iletişim kurmamıza imkân verdiğini düşünmektedir	☐	☐	☐	☐	☐
7. Yeni iş fırsatları yarattığını düşünmektedir	☐	☐	☐	☐	☐
8. İşletmemizde genel olarak gelirleri arttırdığını düşünmektedir	☐	☐	☐	☐	☐
9. Piyasa ve pazar bilgisine erişimimizi arttırdığını düşünmektedir	☐	☐	☐	☐	☐
10. İşletmemizin yönetim ve kontrolünde yeni imkânlar ve olumlu katkılar sağladığını düşünmektedir	☐	☐	☐	☐	☐
İşletmemizde, Bilgi iletişim teknolojileri (BİT) istenilen seviyede <u>KULLANILMAMAKTADIR</u>. Çünkü üst düzey yöneticilerimizin çoğunluğu:	1	2	3	4	5
1. Bizim iş alanımızda ve faaliyetlerimizde BİT'in kullanımının çok mümkün ve uygun olmadığını düşünmektedir	☐	☐	☐	☐	☐
2. İşletmemizde, BİT yetkinliğine sahip personelimizin mevcut ve/veya yeterli olmadığını düşünmektedir	☐	☐	☐	☐	☐
3. İşletmemizde donanım, yazılım ve ağ altyapısının yetersiz olduğunu düşünmektedir	☐	☐	☐	☐	☐
4. Donanım ve internetin işletmemiz için çok pahalı olduğunu düşünmektedir	☐	☐	☐	☐	☐
5. Yazılımın çok pahalı olduğunu düşünmektedir	☐	☐	☐	☐	☐
6. BİT'e yapılan yatırımın karşılığının alınamaması riskinin yüksek olduğunu düşünmektedir	☐	☐	☐	☐	☐
7. Bilişim alanında yasal düzenleme ve kanunlarla ilgili belirsizliklerin olduğunu düşünmektedir	☐	☐	☐	☐	☐
8. BİT güvenliği konusundaki endişe ve kaygıları yüksektir	☐	☐	☐	☐	☐

İşletmenizin DİJİTAL OLGUNLUK DÜZEYİNİ aşağıdaki ifadeler bağlamında değerlendirerek bu ifadelerin işletmenize uygunluk düzeyini belirtiniz.	Kesinlikle Uygun Değil	Uygun Değil	Kısmen Uygun Değil	Kısmen Uygun	Uygun	Kesinlikle Uygun
STRATEJİK OLGUNLUK	1	2	3	4	5	6
1. İşletmemizin son beş yıl içerisinde yürüttüğü stratejik plan çalışmalarında dijitalleşme kavramı kullanılmaktadır	☐	☐	☐	☐	☐	☐
2. İşletmemiz dijital stratejisini ve dijital dönüşüm vizyonunu, tüm ilgili çalışanlarıyla ve paydaşları ile paylaşmaktadır	☐	☐	☐	☐	☐	☐
3. İşletmemizin iş planı ve stratejisi için uygulanan faaliyetler, dijital dönüşüm hedefleri doğrultusunda yürütülmektedir	☐	☐	☐	☐	☐	☐
4. İşletmemiz, dijital dönüşüm stratejisine uygun performans göstergeleri kullanmaktadır	☐	☐	☐	☐	☐	☐
5. Üst yönetim, dijital strateji ve sonuçlarını, performans göstergeleri (verimlilik değerleri, dönüştürülen süreç sayısı, maliyet indirimi, hedeflerindeki değişim vb.) ile izleyebilmektedir	☐	☐	☐	☐	☐	☐
6. İşletmemizin dijital dönüşüm stratejisi, performans hedeflerine göre şekillendirilmektedir	☐	☐	☐	☐	☐	☐
7. İşletmemizin öngördüğü dijital dönüşüm stratejisinin performans hedeflerine ulaşma derecesine göre, yatırım planları revize edilmekte ve geliştirici veya düzeltici yatırım bütçeleri oluşturulmaktadır	☐	☐	☐	☐	☐	☐

8.İşletmemizin genel çoğunluğu, işletmenin dijital stratejisine inanarak desteklemekte ve bireysel değerini katarak dijital dönüşümün gelişimine katkı sağlamaktadır	☐	☐	☐	☐	☐	☐
SÜREÇLERDE OLGUNLUK	1	2	3	4	5	6
1.İşletmemiz süreç ve faaliyetlerinde dijital içerik ve araçları kullanmaktadır	☐	☐	☐	☐	☐	☐
2.Dijital dönüşüm programları işletme içinde koordine edilmiştir	☐	☐	☐	☐	☐	☐
3.İşletmemizin iş süreçleri dijital dönüşüm hedefleri ile uyumlu hale getirilmiştir	☐	☐	☐	☐	☐	☐
4.Dijital dönüşüm, işletme süreçlerimizi iyileştirerek bizi rakiplerden daha üstün hale getirmiştir	☐	☐	☐	☐	☐	☐
5.İşletmemiz, dijital teknolojileri, mevcut ve yeni oluşturulacak iş süreçlerini desteklemek ve dönüştürmek için kullanır	☐	☐	☐	☐	☐	☐
7.İşletmemiz, iş süreçlerinde “müşteri deneyimi”ni dijital kanallarla kullanılabilir hale getirmektedir	☐	☐	☐	☐	☐	☐
KÜLTÜREL OLGUNLUK	1	2	3	4	5	6
1.İşletme yönetimi, iş süreçlerinin dijital dönüşümüne maddi manevi tam destek vermektedir	☐	☐	☐	☐	☐	☐
2.İşletmemizde dijitalleşmenin ölçütlerinden biri, müşterilerle olan ilişkilerin mümkün olduğunca dijital ortamlarda yürütülmesidir	☐	☐	☐	☐	☐	☐
3.İşletmemiz çalışanlarının dijital yeteneklerini arttırmak için sürekli yatırımlar yapmakta, eğitim programları düzenlemektedir	☐	☐	☐	☐	☐	☐
4.İşletmemiz iş yapma biçimini geliştirmek için dış paydaşlarla dijital ortamda olan etkileşimini sürekli değerlendirmektedir	☐	☐	☐	☐	☐	☐
5.İşletmemizin kurumsal kimliğine ilişkin bilgiler dijital platformlarda da (web sayfası sosyal medya, vs.) mevcuttur	☐	☐	☐	☐	☐	☐
TEKNOLOJİK OLGUNLUK	1	2	3	4	5	6
1.İşletmemiz, dijital iş uygulamaları için gerekli teknolojilere sahiptir	☐	☐	☐	☐	☐	☐
2.İşletmemiz, dijital veri toplama teknolojilerini kullanmaktadır	☐	☐	☐	☐	☐	☐
3.İşletmemiz, dijital iş uygulamalarında sosyal medyayı kullanmaktadır	☐	☐	☐	☐	☐	☐
4.İşletmemiz, dijital iş uygulamalarında mobil uygulamaları kullanmaktadır	☐	☐	☐	☐	☐	☐
5.İşletmemiz, dijital iş uygulamalarında iş analitiği/iş zekâsı teknik ve yöntemlerini kullanmaktadır	☐	☐	☐	☐	☐	☐
6.İşletmemiz, dijital iş uygulamalarında bulut teknolojileri kullanmaktadır	☐	☐	☐	☐	☐	☐
7.İşletmemizin bilgi ve iletişim olanakları, dijital hizmetlerin sunumu (müşterilerle iletişimin tamamen online sağlanması gibi) için sürekli geliştirilmektedir	☐	☐	☐	☐	☐	☐
8.İşletmemiz, dijital dönüşüm hedeflerinde yer alan teknolojik yetkinlik seviyesine uygun yazılım ve donanım altyapısına sahiptir.	☐	☐	☐	☐	☐	☐
9. İşletmemiz, ürün ve hizmetlerinin üretimi, geliştirilmesi, teslimatı gibi farklı aşamaları için mümkün olması durumunda dijital ve teknolojik imkânlardan yararlanmaktadır (online sipariş alma, online teslimat, online ödeme vb.	☐	☐	☐	☐	☐	☐
10.İşletmemizin iş süreç ve hizmetlerinde ve karar verme süreçlerinde veri bilimi, veri analitiği, iş zekası gibi bilişim çözümleriyle optimizasyon sağlanmaktadır	☐	☐	☐	☐	☐	☐
11.İşletme olarak kullandığımız teknolojileri tasarlayıp, geliştirirken ya da satın alırken dijital dönüşüm hedeflerimiz belirleyici olmaktadır	☐	☐	☐	☐	☐	☐
YÖNETSEL OLGUNLUK	1	2	3	4	5	6
1.İşletme yönetimi, dijital dönüşümü başarı için kritik bir faktör olarak görmektedir	☐	☐	☐	☐	☐	☐
2. İşletmemizin yönetim anlayışı, iş modellerini yeniden düşünme, tasarlama ve uygulama aşamalarında çalışan ve müşterilerin dijital deneyimini temel almaktadır	☐	☐	☐	☐	☐	☐

3.İşletmemizin yönetim anlayışı, dijital dönüşüm için gerekli kurum içi davranışları ve programları dönüştürmeyi teşvik etmektedir	☐	☐	☐	☐	☐	☐
4.İşletmemizin yönetim anlayışı, farklı iş birimlerinde yer alan kişileri dijital iletişim kanalları kullanarak bir araya getirmektedir	☐	☐	☐	☐	☐	☐
6.İşletmemizin yönetim anlayışı, kurumsal inovasyonu hedeflemekte ve kurumsal yöntemler geliştirmek için planlama ve uygulama aktiviteleri gerçekleştirmektedir	☐	☐	☐	☐	☐	☐
7. Dijital etkinliği artırmak için işletme yönetimi, diğer firma ve çözüm ortakları ile iş birliği yapmakta ve birlikte çalışmaktadır	☐	☐	☐	☐	☐	☐
UZMAN YETENEK GELİŞTİRME	1	2	3	4	5	6
1.İşletmemiz bünyesinde, temel dijital konularda yeterli sayıda uzman bulunmaktadır	☐	☐	☐	☐	☐	☐
2.İşletmemiz bünyesinde, temel dijital konular için ileri eğitim fırsatları mevcuttur	☐	☐	☐	☐	☐	☐
3. İşletmemiz bünyesinde, dijital okuryazarlık gelişimini güçlendirmek için kapsamlı önlemler uygulanmaktadır	☐	☐	☐	☐	☐	☐
4.İşletmemiz bünyesinde, dijital temel konularda uzmanlığa sahip çalışanlar için yeni iş profilleri oluşturulmuştur	☐	☐	☐	☐	☐	☐