Educational Technology Students
The role of Digital Transformation in accelerating Organizational Resilience in crisis times in Egypt

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Abstract

Purpose – This study aims to examine the impact of the digital transformation on organizational resilience in the Egyptian market during the crisis's times. **Design/methodology/approach** – The data for the analysis was obtained using a cross sectional design. Using a self-administered questionnaire, the data is collected from different industries in Egypt, including "communications and information technology, commercial, industrial, health, educational, and banking sectors." with a sample of 586 responders. The hypotheses were tested using statistical analysis by SPSS to measure and examine the correlation between the dependent variables and the independent variable to prove that there is a statistical correlation between them. **Findings** – Digital transformation positively affects organizational resilience in Egypt in crisis times. **Research limitations/implications** – The sample included only Egyptian market. The results in specific sectors and in other countries may differ. This study was cross-sectional, which was limited in its ability to trace the long-term effects of digital transformation on organizational resilience. **Practical implications** – Egyptian managers should experience digital transformation as a pathway to build organizational resilience. **Originality/value** – To the best of the researcher' knowledge, there is a lack in the previous studies which investigating the role of the digital transformation in building organizational resilience in the Egyptian market.

Keywords: Digital Transformation (DT), Organizational resilience (OR).

Paper type - Research paper

1 الجامعة البريطانية في مصر (BUE) ، القاهرة

2. الأكاديمية العربية للعلوم والتكنولوجيا والنقل البحريكلية الدراسات العليا للأعمال (AASTMT) ، القاهرة

Introduction

Today organizations globally are often surprised or shocked by unexpected drastic or incremental changes. These include extreme climatic conditions, terrorist attacks, international forces, globalization, global pandemics, change or shift in consumer preferences, which includes a broad spectrum of threats and sometimes opportunities for organizations (Karunaratne, 2022).

External disturbances such as natural disasters, financial crises, cyberattacks, epidemics political unrest, pandemics, and so on are inevitable and potentially devastating occurrences for organizations (with the recent coronavirus disease 2019 (COVID-19) pandemic acting as an example). Such adversity undermines the ability of organizations to operate efficiently, impairs their structures and performance, and even threatens their survival (Hepfer & Lawrence, 2022).

Moreover, greater complexity and interconnectedness of organizations have made adversity more frequent, intense, diverse, and potentially fateful and can be extremely dangerous to an organisation because they are often unpredictable and beyond the organization's control. The rising frequency of both man-made and natural disasters has focused organisations' attention on their ability to respond.

Therefore, Traditional management approaches and techniques are increasingly seen as inadequate to cope with unpredictable and fast changing environments. As a result, todays' organizations have an urgent need to find new strategies that can preserve their competitive advantage. In this vein, the literature suggests that changing product and process portfolios, being proactive and leveraging technological innovations to sustain a competitive advantage have become a priority for organizations (Marzouk & Jin, 2022).

Through the Covid-19 pandemic; isolation, lockdowns, and restricted movements threaten to hamper business and unravel the social fabric of the contemporary world. With widespread movement restrictions, human resilience is put to the test, manifesting through the digitalization of businesses, governments, and societies. Consequently, digital business transformation can be conceived as the single most important force to thrive in an exceptional time (Darshana Sedera, Feb-2022).

In view of this, organizations need to prepare for higher levels of volatility, uncertainty, complexity, and ambiguity; resilience can offer the capability to cope with these challenges (Schaffer, Pérez, & Weking, 2021). Resilience is important for organizations to survive in turbulent environments, therefore, researchers started to investigate how to build organizational resilience." (YahiaMarzouk & Jin, 2021).

According to (Kohn, 2023), The resilience core is the capacity to return to a stable state following an adverse event without turning into a qualitatively different state. It is connected to a number of related capabilities such as adoptability, agility and innovation and it has been applied in a broad range of disciplines, including individual and organizational psychology. (Oliveira, Ribeiro, Brito, & Fabiano, 2016) point out that an organization is resilient when it is able to build the future, rather than defending the past.

Over the past decade, organizational resilience has received increasing attention in academic and theoretical circles. Positive psychology, engineering, ecology, management, and other fields have been discussed extensively and the related literature is climbing year by year (Liu, Chen, Zhou, Zhang, & Wang, 2021). Therefore, organizational resilience has become a critical resource for optimal functioning and promoting effectiveness (Shani, 2020).

The concept of resilience has gained new momentum in organization studies. It is held to be a very promising concept to explain how organizations can survive and thrive amidst adversity or turbulence. However, findings from an earlier review about resilience in the organizational and business context show that, although empirical research on the concept has increased, there is still a need for more clarity (Hillmann & Guenther, 2021).

According to (Liu, Chen, Zhou, Zhang, & Wang, 2021), organizational resilience is the necessary ability for an organization to resist the interference of various risks and realize survival and development in a turbulent and changing environment. Moreover, (Dias, Cunha, Pereira, Costa, & Gonçalves, 2021) emphasized that companies that want to survive and foster success must develop their resilience capacity because it is crucial to achieve sustainability in the long term, when reacting to unexpected events. Moreover, this is a fast-growing industry that is becoming even more competitive. Therefore, companies must innovate and be more resilient during periods of economic turmoil.

Organizations need resilience in order to function well not only in times of crisis but also in daily life, since they do so in a challenging environment in which every crisis or organizational failure resonates broadly, and this, in turn, impacts organizational. Moreover, being resilient means being in a state of readiness in case of stressful situations that require improvement of the general ability of the organization to investigate, learn, and function. Readiness and alertness should be part of a resilient organization, without knowing exactly what they will be needed for (Shani, 2020).

In this digital era, organizations are increasingly dependent on Information Systems (IS) for both innovation and operations. Organizations of any type and

size increasingly rely on complex IS and digital platforms to manage their businesses, which require IS to operate dependably under a range of adverse circumstances. Previous research has addressed business continuity planning, contingency planning, emergency planning, disaster recovery, and other pertinent issues. Organizational research has included all of these issues in the concept of organizational resilience, which is commonly defined as the organization's ability to operate reliably under a range of adverse circumstances (Aldea & Sarkar, 2022). For organizations to remain successful and to survive in today's disruptive market environment, they must tackle the challenges that digital transformation, innovation, commitment, new skill sets, and other rapidly emerging new technologies pose (AlNuaimi, Singh, Ren, Budhwar, & Vorobyev, 2022).

Eventually, digital is the future. There has been an exponential growth in the rate at which technology is advancing. There is no industry that has not been impacted by it. It holds enormous potential for the business to create new opportunities and accelerate revenue growth. There has been continuous innovation in products and services by many companies. The smaller players are challenging the big organizations through their innovative offerings which are posing a threat to the relevance of bigger organizations in today's market scenario. Therefore, it becomes necessary for the traditional organization to adapt and embrace the change. Transforming digitally will not just help them hold their ground but also help them come up with new and improved business models. It will help create value for all the stakeholders (Shahi & Sinha, 2020).

Moreover, (Zhang, Long, & Schaewen, 2021) discussed that the rapid development of digital technologies, such as artificial intelligence, big data, cloud computing, blockchain, and the industrial internet, is transforming the traditional economy into the digital economy and intelligent economy, and digital transformation has become an integral mechanism for enterprises to achieve breakthrough innovation and sustainable development. Nevertheless, dysfunctional schools contemplate digital transformation as a threat to enterprises, and they believe it will lead to destructive consequences.

Digital transformation can be regarded as a process undertaken to realize major business improvements using new digital technologies, and it is a continuous process with the changes in the firm's strategy, organizational structure, and business model (Liu, Yang, & Liu, 2021). Moreover, Digital transformation has become a critical path for enterprises to improve organizational resilience and has been widely considered by both academia and business practice (Zhang, Long, & Schaewen, 2021).

(Zeya He; Huiling Huang; Hyeyoon Choi; Anil Bilgihan, 2021) discussed that during the recent COVID-19 pandemic, digitalization was proven to be very efficient in identifying ways to navigate hurdles and prevent future damage for organizations (Cybersecurity and Infrastructure Security Agency, 2020). While most service organizations were struggling, companies that provide digital services, such as Netflix, have remained stable and have been less affected by the ongoing COVID-19 pandemic. Furthermore, businesses and supply chains backed by digital technologies, such as Amazon's Whole Foods, have shown greater resilience in the face of adversity. However, digital transformation is not a new trend. It has been pursued by many organizations to a varying degree of success since the diffusion of the Internet at the turn of the millennium (Aldea & Sarkar, 2022).therefore, digital transformation has become a critical path for enterprises to improve organizational resilience and has been widely considered by both academia and business practice (Zhang, Long, & Schaewen, 2021).

Fewer studies to the best of the researcher knowledge, have attempted to unearth the link between organizational resilience and digital transformation. Therefore, this research fills this gap in literature by investigating the role of digital transformation in accelerating organizational resilience in Egypt. Results of this study, therefore, will help to develop a broader picture of how organizations could respond to the crisis and preserve their competitive advantages across Africa especial in Egypt.

Finally, this paper is organized in five parts: Part1 is intended to introduce the statement problem of the research and the hypotheses used for the research analysis. Part2 covers the review of the theoretical background. Part 3 describes the sample, analyzes the measurement scales' validity, and introduce the research methodologies. Part 4 introduces the research analysis by using the statistical analysis and present the research findings. Part 5 introduces the limitations of the study and the recommendation of future studies.

Research Statement

Egypt is a development country faces many difficulties and crisis times. Lately, Arabic spring and 2011 Egyptian revolution put the country in many economics' challenges. Moreover, by the starting of 2020, the country faced Covid-19 threat and till now it is still trying to overcome the effects of the lock-down and the economic recession.

Moreover, the fact that resilience becomes essential in times of crisis for organizations to sustain and survive and a variety of factors may influence the

development of resilience. For example, the digital transformation strategy. Hence, according to 2030 governmental strategy, there is a huge focusing on develop the digital transformation in all the business fields including the public and the private sector.

As a result, it is critical to investigate how enterprises remain resilient in the face of crisis, particularly given the public and private sectors' emphasis on digital transformation strategies. This study seeks to assist organizations' management levels in making the best decisions regarding their digital transformation plan and to increase firm resilience during times of crisis. To do this, we investigate the impact of the digital transformation in accelerating the organizational resilience in Egypt.

Research Gap

Fewer studies to the best of the researcher knowledge, have attempted to unearth the link between organizational resilience and digital transformation. Therefore, this research fills this gap in literature by investigating the role of digital transformation in accelerating organizational resilience in Egypt. Results of this study, therefore, will help to develop a broader picture of how organizations could respond to the crisis and preserve their competitive advantages across Africa especial in Egypt.

Research Objectives

The main objective of this research is to study and test the effect and the relationship of the variables identified:

- The digital transformation affects on organizational resilience.

Research Questions

- What is organizational Resilience?
- What is digital transformation?
- What is the relationship between organizational resilience and digital transformation?

Research Significance

The purpose of this study is to help close the research gap in studies and research on the idea of organizational resilience, specifically in relation to digital transformation. The study also serves as a response to many earlier studies that called for more research on this subject due to their significant value to sustain in crisis times. This study might also give researchers and academics a database to use when they do more research in this area.

Moreover, the study is significant because more businesses are becoming interested in organizational resilience as a critical value for overcoming obstacles and sustaining the business. The study's significance also stems from the fact that it addresses a crucial topic that is essential in the digital era which depends on the digital transformation strategy as a fundamental plan for the business operation with no other choices.

Theoretical background

Organizational Resilience

Organizational resilience has been considered a key element in adapting and coping with an uncertain and challenging crisis such as a pandemic. Consequently, in their desire to adapt and survive the pandemic, many companies make strategies to achieve adequate organizational resilience due to their resources and capabilities. Indeed, the definition of resilience is controversial due to its multidimensional and multilevel nature. However, an essential aspect of resilience is that organizations adapt to strategic processes to find alternative solutions in this "new normal" (Heredia, Rubiños, Vega, Heredia, & Flores, 2022).

The ability to cope well with turbulence and challenges is known as resilience. Thus, resilient companies have the ability to deal constructively with crises through flexibility and stability, for example. There are different hazardous situations for companies that may require the presence of resilience: for example, natural disasters and monetary and economic crises, or poor decisions and conflicts (Peschl & Schüth, 2022). recently, the COVID-19 pandemic has highlighted over the past few months, is that there is a strong need for enterprise-wide resilience (Aldea & Sarkar, 2022).

The word resilience is traced back to the Latin word resilire, which means, "to jump back." (Holling, 1973) paper in ecology introduced the concept of

resilience for the first time, in which he defined resilience as "a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables." (YahiaMarzouk & Jin, 2021).

(Fraga, 2019) highlighted that the historical evolution of the term can be highlighted in four moments: **in 1807**, with Young, who introduced the concept of elasticity in physics, referring to the resistance capacity of materials; **in 1966**, with Flatch, who applied the term to describe the psychological forces needed by individuals to overcome adversity and changes in life; **in the 1970s,** when Holling applied the concept in the field of ecology, referring to the ability of a system to face the risks in its environment; and **in 1998**, when Mallak explains organizational resilience, which is a positive reinforcement mindset with reward for desired behaviors.

In management science, the concept of resilience was initially used in research on risk management and highly reliable organizations and then extended to other organizational aspects (collective dynamics, performance, learning, etc.) and inter-organizational aspects (relationships between actors within a system). From this perspective, definitions of "resilience" vary across different approaches. Generally, there are two movements: one that consists in defending oneself to ensure continuity, and another that would concern the change necessary to bounce back (Mokline & Abdallah, 2021).

As there are different disruptive events, (Karunaratne, 2022) stated that resilience is required for organizations to be able to cope with any event which can be incremental, continuous, repetitive or extraordinary as organizations cannot predict all the risk in future and to face never ending type of risk and also due to the possibility of failure of emergency response or crisis management systems.

Resilience is the organization's capability to predict major future events from gradually unfolding trends, constantly adapting to change, and rapidly bouncing back from disaster. The business environment is quickly becoming more connected, unpredictable, and very volatile and the impacts of external events are more substantial (Williams, C., & Anyanwu, 2017). Hence, many companies undoubtedly want to be resilient, continue functioning, and constantly adjust to the risks exposed, but inherent and institutional limitations exist (Khalil, Abdelli, & Mogaji, 2022).

Resilience is both a positive and negative organizational attribute. Resilience could be interpreted as a negative tendency, when referring to organizations, which stubbornly maintain structure and control mechanisms, without adaptation

to the changing environment. However, the most formative definitions view organizational resilience as a positive attribute, indicating robustness or the organizational capacity for damage absorption, alongside adaptation to the external environment (Oana, Christian, & KaiIngo, 2015).

According to (Protogerou, Kontolaimou, & Caloghirou, 2022), Resilience can be broadly defined in terms of both the individual and organizational responses to turbulence and discontinuities. At the individual level, the term refers to "the capability to cope successfully in the face of significant change, adversity, or risk", and accordingly, it has been used to characterize the organizational members who have "the ability to bounce back, and even succeed, in the face of problems and adversity". At the organizational level, resilience is commonly used to describe "the inherent characteristics of those organizations that are able to respond quicker, recover faster, or develop more unusual ways of doing business under duress than others". Other related studies in the business context link resilience not only to survival but also to growth, defining enterprise resilience as "the capacity for an enterprise to survive, adapt, and grow in the face of turbulent change".

According to (Andersson, Cäker, Tengblad, & Wickelgren, 2018) , The many different origins and areas of application of organizational resilience may explain the concept's lack of clarity. (Linnenluecke, 2017) identified five different research streams regarding resilience in the business and management literature: (1) organizational responses to external threats, (2) organizational reliability, (3) employee strengths, (4) the adaptability of business models, and (5) resilient supply chains.

In an organizational context, researchers distinguish between resilience and related constructs, such as strategic flexibility and agility. While strategic flexibility and agility play a role in developing resilience, the concepts are less comprehensive than the resilience construct itself (Oana, Christian, & KaiIngo, 2015).

(Burnard & Bhamra, 2019) stated that within the resilience literature, three dominant levels of resilience have emerged: the individual human level, the organizational level, and the infrastructural/network level. Across these levels, resilience may be defined through either "active" or "passive" forms. While some definitions promote a proactive engagement and adjustment of a system in relation to change (active resilience), others highlight the ability to withstand or absorb disturbances (passive resilience). The notion of passive resilience emphasizes resistance to impacts and developing robustness within system elements.

Although scholars have not yet reached an agreement on defining organizational resilience, most agree that it is the ability of organizations to successfully absorb, adapt to, and ultimately capitalize on disruptive events that may endanger their survival (Yasmine & Jiafei, 2022).

Corroborating this discussion, (Andersson, Cäker, Tengblad, & Wickelgren, 2018) pointed out that organizational resilience has developed from several angles: organization theory, information technology, industrial relations, HRM, engineering, business strategy, culture, organizational learning, supply chain management, and from a broader social science perspective.

Organizational resilience is a complex, multifaceted, and multidimensional construct, according to recent research. The many facets model developed by Madni and Jackson (2009) can be applied to view organizational resilience which is one of the most comprehensive perspectives of the concept (Karunaratne, 2022).

(Hepfer & Lawrence, 2022) illustrated that the literature led them to extend this basic definition in three main ways. First, organizational resilience and adversity are intertwined phenomena. Second, the definition of organizational resilience includes the ability of organizations to anticipate and learn from adversity, as well as respond to it. Third, organizational resilience is distinct from other types of resilience, such as individual resilience, ecological resilience, institutional resilience, urban resilience, and cyber resilience. Thus, our definition and review are focused on the resilience of organizations, rather than other collective actors or social systems, as we believe its foundations, dynamics, and outcomes are likely to be distinctive. And this study agrees with this approach and focuses on organizational resilience in general.

Taking an organizational perspective, organizational resilience refers to a firm's ability to operate, and even thrive, through an impairment by adapting quickly and effectively to the situation. Indeed, resilient organizations are successful in coping with crises. Organizational resilience is a complex construct, which, by definition, is characterized by different elements or attributes (Schaffer, Pérez, & Weking, 2021). In this regard, the literature recommends new approaches and capabilities to address future environmental uncertainties. For example, to survive, organizations can resist, absorb and respond to disturbances through organizational resilience (YahiaMarzouk & Jin, 2021).

According to (Robertson, Botha, Walker, Wordsworth, & Balzarova, 2022) organizational resilience, which refers to an organization's ability to build and use "its capability endowments to interact with the environment in a way that positively adjusts and maintains functioning prior to, during, and following

adversity". Thus, organizational resilience helps explain the ability of some organizations to better cope with, and rapidly learn from, unexpected disruptions. (Hepfer & Lawrence, 2022) suggested that organizational resilience is a heterogeneous concept comprising three forms: functional, operational, and strategic resilience. Each form describes the ability of an organization to respond positively to a specific kind of adversity, and is associated with distinct foundations, dynamics and outcomes.

Despite the increased interest in organizational resilience and the different dimensions developed that have been for it, there is no universally accepted measure of it. For example, (Oana, Christian, & KaiIngo, 2015) in their research claimed that Resilience consists in general of two main integral parts, commonly stated as fundamental characteristics: robustness and adaptability. Robustness is a term derived from physics and describes a system which promptly returns to its initial state after perturbation. The concept can easily be translated into an organizational context: robustness is an organization's ability to withstand stress and thus avoid loss of function. Adaptability, as a second integral part of resilience, has gained momentum in organizational theory since the late 1980s. Adaptability implies, on the one hand, effective and fast action during crises. More importantly, it involves, on the other hand, the development of mechanisms for learning and innovation, which in turn expands the range of positive organizational response mechanisms.

(Do, Budhwar, Shipton, Nguyen, & Nguyen, 2021) pointed out that when disruptive events occur, organizational resilience generates the instruments to deal with stressful problems for which solutions need to be created. This is because resilience means that organizations possess abilities such as agility, robustness and integrity and will allow their members to promptly generate solutions or create new products and/or processes. These new innovations would be the answer to a challenging situation and help to sustain overall organizational performance.

This research will use the dimensioned developed by (Kantur & Iseri-Say, 2015), organizational resilience includes the following three main dimensions. First, robustness reflects "the ability of elements, systems and other unit of analysis to withstand stresses and demands without suffering damage, degradation or loss of function". Second, agility is "the capacity of an organization to quickly recognize, utilize opportunities and tackle threats in an unstable environment". And third, integrity reflects the high level of engagement and sense of involvement/cohesion of organizational staff when facing unfavorable events/situations.

There are various opinions in the scientific literature regarding the influence of digital transformation on business resilience (FOGOROȘ, Teodora Elena; OLARU, Marieta; ILIE, Cristian; GAVRIL, Roxana Maria, 2022). For example, (Zhang, Long, & Schaewen, 2021) discussed that one of the most prominent and consensual views is that digitalization is an effective way for organizations to achieve organizational resilience. Moreover, (Zhang, Long, & Schaewen, 2021) explained that according to the functional school, digitalization is an effective way for enterprises to resist risks and facilitates the enterprise's ability to comprehend and adapt to changing environmental contexts. For instance, big data form the basis for the analysis and processing of data. In addition, AI and other digital technologies are able to assist enterprises to form intelligent decisions in a crisis and promote enterprise supply chain resilience and platform ecosystem resilience. In turn, (Zhang, Long, & Schaewen, 2021) stated that in the process of digital transformation, companies can implement different types of innovations in different business units based on organizational design, such as dividing exploitative and exploratory activities within different organizational units.

Digital Transformation

Recently, Crisis has accelerated the adoption of digital technologies by approximately 5 years in 8 weeks. Butt (2020) states that this pandemic has highlighted DT (digital transformation) in such a way that organizations now feel the adversities of not having embraced it earlier (Klein & Todesco, 2021).

Moreover, digital transformation has become a global trend across all industries, including the service industry. According to the IDC Worldwide Semiannual Digital Transformation Guide, global spending on digital transformation is expected to reach $2.1 trillion by 2022. In 2020, Dell surveyed around 4,000 business leaders globally and found that 80% of organizations fast-tracked digital transformation initiatives. Additionally, the COVID-19 pandemic has dramatically accelerated the pace of digital transformation. Based on a McKinsey global survey of executives (including those in service organizations) in 2020, 85% of respondents indicated their businesses have speeded up the adoption of digital technologies since the outbreak of the COVID-19 pandemic (He, Huang, Choi, & Bilgihan, 2021).

Furthermore, the adoption of digital technologies influences almost all areas of modern firms, including, but not limited to, production, organizational hierarchies, and relationships with partners, suppliers, and customers (Plekhanov,

Franke, & Netland, 2022).Moreover, As digital technologies and business models become more pervasive, they disrupt older legacy technologies, business models, operational processes, and partner relationships, leading to both new opportunities and challenges for the firm (Khurana, Dutta, & Ghura, 2022).

Additionally, the rapid development of digital technologies, such as artificial intelligence, big data, cloud computing, blockchain, and the industrial internet, is transforming the traditional economy into the digital economy and intelligent economy, and digital transformation has become an integral mechanism for enterprises to achieve breakthrough innovation and sustainable development (Zhang, Long, & Schaewen, 2021).

According to (Liu, Yang, & Liu, 2021), The research on digital transformation is derived from information system (IS) studies, especially from the organizational strategic change triggered by digital technology in the IS field. Moreover, (Plekhanov, Franke, & Netland, 2022) highlighted that When firms use digital technologies to create new or modify existing business models and processes or to support the transformation of organizational structures, resources, or relationships with internal and external actors, scholars refer to this as digital transformation (DT).

According to (Plekhanov, Franke, & Netland, 2022), Digital transformation roots can be traced back to the 1980s and early 1990s, when researchers examined the effects of adopting information technology (IT) on organizational structures and hierarchies, and on innovation and performance. With the commoditization of computer technology and the proliferation of the Internet, IT-enabled business transformation gained prominence in the 1990s.

(Verhoef, et al., 2019) illustrated three phases of digital transformation: digitization, digitalization, and digital transformation. digitization to describe the action to convert analog information into digital information. Typically, digitization mainly digitalizes internal and external documentation processes, but does not change value creation activities. Digitalization describes how IT or digital technologies can be used to alter existing business processes. digitalization is not only focused on cost savings, but also includes process improvements that may enhance customer experiences. Therefore, digital transformation introduces a new business model by implementing a new business logic to create and capture value. Therefore, digital transformation is inherently linked to strategic changes in the business model as a result of the implementation of digital technologies.

Corroborating this discussion, (Plekhanov, Franke, & Netland, 2022) highlighted that Digitalization refers to "the manifold sociotechnical phenomena and

processes of adopting and using [digital] technologies in broader individual, organizational, and societal contexts". With digitization, one can understand the transition from analog to digital information. Digital transformation can be defined as "strategic transformations targeting organizational changes implemented through digitalization projects, with the goal of enabling major business improvements". All three concepts are interlinked tightly and often used interchangeably.

(Agostino & Costantini, 2021) stated that digital transformation is the "Combined effects of several digital innovations bringing about novel actors (and actor constellations), structures, practices, values and beliefs that change, threaten, replace or complement existing rules of the game within organisations, ecosystems, industries or fields". Moreover, digital transformation strategies focus on products, processes, and organisational aspects within a business.

(Vial, 2019) proposed that digital technologies can help firms rapidly adapt to changes in environmental conditions by contributing to organizational agility, defined as a firm's "ability to detect opportunities for innovation and seize those competitive market opportunities by assembling requisite assets, knowledge, and relationships with speed and surprise" , and in the context of digital transformation, organizational leaders must work to ensure that their organizations develop a digital mindset while being capable of responding to the disruptions associated with the use of digital technologies.

(Verhoef, et al., 2019) identified three major external factors driving the need for digital transformation; First, already since the coming of the World Wide Web and its worldwide adoption, an increasing number of accompanying technologies (For example, broadband internet, smartphones, Web 2.0, SEO, cloud computing, speech recognition, online payment systems, and crypto currencies) have risen that have strengthened the development of e-commerce. Second, due to these new digital technologies, competition is changing dramatically. Not only the competition become more global, but the intensity has also increased as big, information-rich firms from the U.S. (For example, Amazon, Alphabet, Apple, and Facebook) and China (For example, Alibaba, and JD) start to dominate numerous industries. Third, consumer behavior is changing as a response to the digital revolution. Market figures show that consumers are shifting their purchases to online stores, and digital touchpoints have an important role in the customer journey affecting both online and offline sales.

(Aldea & Sarkar, 2022) discussed that digital transformation is not only about implementing new digital technologies. It facilitates a complete change of an organization from multiple perspectives, such as vision, strategy, organizational

structure, processes, capabilities, culture, and so forth. Thus, several stakeholders need to be involved in prioritizing investments and managing this transformation. For this purpose, several digital maturity models to help assess the state of the organization's digital initiatives have been formulated over the years. Teichert performed a systematic literature review that analyzed several maturity models both from academia and practice and identified the maturity areas that are assessed by them. These areas cover the following aspects: digital culture, technology, operations and processes, digital strategy, organization, digital skills, innovation and so forth.

According to (AlNuaimi, Singh, Ren, Budhwar, & Vorobyev, 2022), Digital transformation can be described as an organizational shift to big data, analytics, the cloud, mobile communication technologies, and social media platforms to provide goods and services also described digital transformation as a tool for transforming business processes, cultures, and organizational aspects to meet changing market requirements brought about by digital technologies. Digital transformation is characterized by three elements: (1) reexamining and redefining firm boundaries; (2) the opening up of products and services to community input, as well as reducing property rights; and (3) reshaping organizational and product identities.

(Piepponen, Ritala, Keranen, & Maijanen, 2022) discussed that recent reviews suggest that they are better understood as subsequent phases, where digitization describes the transition from analog to digital information; digitalization refers to how digital technologies change business processes, and digital transformation denotes the broader organizational change triggered by digital technologies, leading in turn to new or revised business models and value propositions.

(Vial, 2019) defined the digital transformation as "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies", and proposed the concept of digital transformation strategy (Digital Transformation) to "focus on the transformation of products, processes and organizational aspects owing to new technologies".

(Vial, 2019) proposed that at a high level, Digital transformation encompasses the profound changes taking place in society and industries through the use of digital technologies, and at the organizational level, it has been argued that firms must find ways to innovate with these technologies by devising "strategies that embrace the implications of digital transformation and drive better operational performance".

According to (Khalil, Abdelli, & Mogaji, 2022), firms can use digital technologies to help them to enhance their resilience capacity. Moreover, companies equipped with information technologies were found to demonstrate stronger resilience during the COVID-19 pandemic than those without. Based on such evidence, we propose that digital transformation may contribute to OR against external risks (He, Huang, Choi, & Bilgihan, 2021).

From another prospective, (Robertson, Botha, Walker, Wordsworth, & Balzarova, 2022) defined Digital maturity as a capability that enables an organization to align its "people, culture, structure and tasks to compete effectively by taking advantage of opportunities enabled by technological infrastructure". Hence, digitally mature organizations can more effectively affect and respond to change, and are therefore more likely to be agile, collaborative, experimental and risk tolerant.

Moreover, digital maturity provides a clear lens to track an organization's digital transformation. At its core, digital maturity focuses on better serving customers and the market by applying digital technology to promote efficiency and innovation. Digitally mature organizations also invest significant time and resources in developing digital capabilities and digital leadership.

Generally, there is a variation in the scales used to measure the digital maturity. For example, (He, Huang, Choi, & Bilgihan, 2021) uses a two-dimensional scale developed by the MIT Center for Digital Business and Capgemini Consulting stands out. The scale consists of two dimensions: digital intensity (DI) and transformation management intensity (TMI). While, (Robertson, Botha, Walker, Wordsworth, & Balzarova, 2022) uses another scale which focuses on a firm's digital maturity as a measure of both its digital capabilities (or its potential to derive business value from digital technologies) and its digital leadership (or the leadership culture within an organization for supporting and initiating digital change and transformation). The former focuses on digital capabilities and technology infrastructure; the latter focuses on a firm's digital strategy, leadership, and vision. The current study chooses to follow (He, Huang, Choi, & Bilgihan, 2021) in its measuring to cover the two dimensions digital intensity and transformation measurement intensity.

According to (Westerman & McAfee, 2012), digital intensity (DI) refers to the "investment in technology-enabled initiatives to change how the company operates its customer engagements, internal operations, and even business models.". Thus, increasing DI motivates organizations to explore digital opportunities, trying to engage customers and run the business through digital technologies (He, Huang, Choi, & Bilgihan, 2021). While transformation

management intensity (TMI) refers to "the leadership capabilities necessary to drive digital transformation in the organization". Thus, Organizations with high TMI often include a transformative vision, governance and culture that intends to coordinate digital initiatives to maximize business benefits (He, Huang, Choi, & Bilgihan, 2021).

Moreover, (Jardak & Hamad, 2021) in their study pointed out that digital intensity (DI) is the level of investment in new technology. While transformation management intensity (TMI) is the level of investment in the leadership capabilities needed to create digital transformation within an organization. Thus, increasing digital intensity encourages organizations to investigate digital opportunities, attempting to engage customers and run businesses using digital technologies. Moreover, Organizations with a high transformation management intensity frequently have a transformative vision, governance, and culture in place, with the goal of coordinating digital initiatives to maximize business benefits.

Evidence from many existing research and industrial practices suggests a theoretical connection between digital maturity and organizational resilience. For instance, previous risk management research demonstrated that the sector of information and communication in the service industry was less affected by and recovered faster against external risks (For example, natural disasters). Additionally, companies equipped with information technologies were found to demonstrate stronger resilience during the COVID-19 pandemic than those without (He, Huang, Choi, & Bilgihan, 2021).

Although (Li, Wang, Ye, Chen, & Zhan, 2022) highlights that many firms are aggressively deploying diverse digital technologies (DTs) at inter- and intraorganizational levels, not all firms have achieved the anticipated resilience, especially in the face of supply chain disruptions caused by "black swan" events such as the COVID-19 pandemic. Therefore, this research supports the claims of digital transformation may help organizations to be more resilient to external risks.

Proposed Research Model
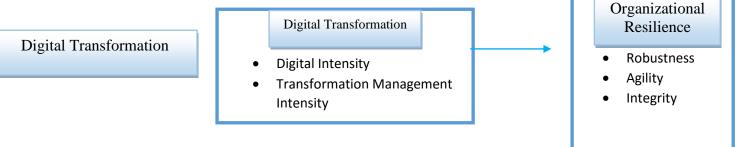
The research model is presented below (Figure 1).

Figure 1: The research Model

Research Hypothesis

In the light of the above, the present study attempts to investigate the effect of digital transformation on organizational resilience, the research hypothesis as below:

- H1: Digital transformation has a positive impact on Organizational Resilience
- H_{1a}: Digital Intensity has a Positive impact on Organizational Resilience
- H_{1b}: Transformation Management Intensity has a positive impact on Organizational Resilience

RESEARCH METHODOLOGY

Population and Sample

The study sample concentrated on some industries in Egypt, including "communications and information technology, commercial, industrial, health, educational, and banking sectors."

the Sample size represents the population calculated by the following formula: N (Population Size) = 2,000,000; the Confidence Level is **95%,** a Confidence interval is **5%,** and the sample size will be **385**.

Research Strategy

The purpose of the study is to examine the impact of digital transformation on organizational resilience and how the resilience could be a reliable solution in crises times for companies. Hence the methodology used for this research is a "**deductive approach**". Moreover, a quantitative approach was selected as the research methodology. Furthermore, the investigation is classified as "cross-

sectional research" as it is at a certain point in time and a primary data collection was used through a questionnaire.

The survey was electronically via an online questionnaire designed on google form and published through many online platforms like LinkedIn, Facebook, Twitter. Beside that the researcher used the relationships on the professional work and send the link of the survey to many people on WhatsApp, Facebook messenger and E-Mail.

The survey procedure

Developing the Data Collection Instrument

The questionnaire used in the research consists of three sections: demographics, digital transformation, and organizational resilience.

Demographics

This section includes questions regarding gender, age, educational degree, years of experience, Functional level, Field of work, Sector Type, and No. Of company's employees.

Dependent Variable

Organization resilience is the dependent variable of the study. There are many different scales in measuring organizational resilience. we follow (Marzouk & Jin, 2022) study in measuring this variable and it was assessed using a nine-item scale adopted from (Kantur & Iseri-Say, 2015). This scale is further divided into three dimensions of robustness (measures the resistance and recovery capacities of firms; four items), agility (assesses how easily and rapidly firms adapt to changing circumstances; three items) and integrity (measures the extent to which employees are knit together in the firm; two items) (Marzouk & Jin, 2022).

Independent Variable

Digital Transformation is the mediator of the study. The digital transformation construct was assessed through scale adopted from (He, Huang, Choi, & Bilgihan, 2021). The scale was adopted because it is most parsimonious and applies to a wide range of contexts. The scale consists of two dimensions: digital intensity (DI) (10 Items) and transformation management intensity (TMI) (9 Items) (Westerman & McAfee, 2012).

Questionnaire

The researcher disseminated the survey electronically via an online questionnaire. The study used a multi-item approach in the survey's design, using 5-point Likert scales, ranging from 1 strongly disagree to 5 strongly agree. To enhance the reliability and validity of the study.

The two variables were assessed through the following questions illustrated in Table 1.

Variables	Dimension	Questions
Organizational Resilience	Robustness	1- Our company stands straight and preserves its position
		2- Our company is successful in generating diverse solutions
		3- Our company shows resistance to the end in order not to lose
		4- Our company does not give up and continues its path
	Agility	5- Our company rapidly takes action
		6- Our company develops alternatives to benefit from negative circumstances
		7- Our company is agile in taking required action when needed
	Integrity	8- Our company is a place where all the employees engaged to do what is required from them
		9- Our company is successful in acting as a whole with all of its employees
Digital Transformation	Digital Intensity	1. We are using digital technologies (such as analytics, social media, mobile and embedded devices) to understand our customers better
		2. We use digital channels (such as online, social media and mobile) to market and distribute products and services
		3. We sell our products and services through digital channels
		4. We use digital channels to provide customer service
		5. Technology is allowing us to support customers and to improve operational processes in new ways
		6. Our core processes are automated
		7. We have an integrated system to support key operational and customer information
		8. We use analytics to make better operational decisions
		9. We use digital technologies to increase the performance or added value of our existing products and services
		10. We have launched new business models based on digital technologies
	Transformation Management Intensity	11. Senior executives have a transformative vision of the digital future of our company
		12. Senior executives and middle managers share a common vision of digital transformation
		13. There are possibilities for everyone in the company to take part in the conversation around digital transformation
		14. The company is promoting the necessary culture changes for digital transformation
		15. The company is investing in the necessary digital skills
		16. Roles and responsibilities for governing digital initiatives are clearly defined
		17. Digital initiatives are assessed through a common set of key performance indicators
		18. IT and business leaders work together as partners
		19. The IT unit's performance meets the needs of the company

Table 1: The questionnaire

Statistics and Results

Demographic analysis

The Study sample characteristics according to the Gender are higher for male with a percentage of (67.7%). While its lower for female categories with a percentage of (32.3%). Moreover, According to the sample response data for " Field of work " most of the response (Communication and Information technology) with a percentage of (27.60%), then response (Commercial), with a percentage of (20%), then (Banking) with a percentage of (19.9%) And finally response (Industrial),(Health), (Educational), with a percentage of (13.8%), (9.70%), (9%), (2.70%), respectively.

Internal Consistency Reliability

The researcher checked the reliability coefficient Cronbach Alpha, to measure the stability of the content variables of the study. **Cronbach Alpha Coefficient** for Measuring Stability of the Independent variable (**Digital transformation**) & the dependent variable (**Organizational Resilience**).

Variables and dimensions	Cronbach Alpha	Composite Reliability
Independent variable: Digital transformation		
Digital Intensity (DI) X1	.938	.880
Transformation Management Intensity (TMI) X2	.907	.824
Total	**.914**	**.837**
Dependent variable: Organizational resilience		
Robustness Y1	.890	.793
Agility Y2	.901	.811
Integrity Y3	.908	.825
Total	**.899**	**.809**

Table 2: Reliability Analysis

The Cronbach Alpha coefficient values of all dimensions are greater than (70%), which means a high degree of internal stability for all questionnaire paragraphs.

Path	β	t-value	P-Value	r	R^2	Remark
H1: Digital transformation -> Organizational resilience	.787	30.822	***	.787	61.9%	Support
H1a: Digital intensity -> Organizational resilience	0.156	3.664	***	.8	64%	support
H1b: Transformation Management Intensity -> Organizational resilience	0.667	15.634	***			support

***P < 0.001

Table 3: Results of Hypothesis testing

The results of hypothesis testing in Table 3 showed that the digital transformation construct yielded a significant direct positive effect on organizational resilience since (β=0.787, t=30.822, P<0.001), consequently, the first hypothesis is confirmed. Moreover, digital transformation first dimension "Digital intensity" yielded a positive effect on organizational resilience *(β=0.156, P<0.001)*, and the second dimension "Transformation Management Intensity" (*β=0.667, P<0.001*), consequently, the sub-hypotheses (H1a, H1b) of the hypothesis were also supported.

Conclusion: the results shows that there is a positive effect of " Digital transformation" on "Organizational Resilience ".

Discussion and Recommendations

Results of the Relationship between digital transformation and organizational resilience.

In keeping with the goal of this article, hypothesis testing revealed that digital transformation significantly affects organizational resilience. The analysis was performed on 586 survey respondents from various industries.

Conclusion

In crisis times companies need to keep standing, overcome and bounce back from these difficult times. Therefor, this study contributes to investigating the relationships between two main pillars in current digital and crisis era: digital transformation and organizational resilience. Moreover, this study is amongst the first studies to investigate the factors contributed to Egyptian companies fight against many difficult circumstances like COVID-19 pandemic, since studies in this regard are still largely lacking.

This study is in the agreement with most of the previous studies that showed that there is an effect for the digital transformation on organizational resilience as in (Afef Khalil, 2022) study, where the result implies that digital technologies positively impacted the SMEs' resilience over the COVID-19 crisis. Moreover, (Zhang, Long, & Schaewen, 2021) study results show that the digital transformation of enterprises helps to improve organizational resilience. Furthermore, (Zhang, Long, & Schaewen, 2021) depend on the study results recommended that enterprises should accelerate their digital transformation pace to become more resilient. Transformation to digital technology is essentially an innovation process that helps organizations deal with uncertainty and change

proactively and resist adversity. Additionally, (Robertson, Botha, Walker, Wordsworth, & Balzarova, 2022) study fully supported the significant relationship between the DT and OR.

Recommendations

The researcher made the following recommendations based on the study for organizations to sustain in crisis times. The researcher advises a greater understanding of the company's goals and the methods used by firms to set priorities based on the study's findings. Businesses must define flexible, realistic, and achievable objectives that are structured, controlled, and prioritized within the business in accordance with their importance. Based on the findings of the preceding investigation, the paper makes numerous recommendations for crisis management at the organisational level. **First**, managers must focus on promoting organisational resilience, which will provide the organisation with a significant possibility to return and seize existing possibilities rather than being frozen and rigid. **Second**, there are numerous strategies to improve organisational resilience, and managers should prioritise the digital transformation, which is now considered a prerequisite to increase the business resilience. **Third**, management should think about promoting digital maturity at all levels by focusing on an effective training and development plan. **Finally**, in order to overcome the challenges of uncertainty and sustain the business, businesses should prepare qualified leaders who understand the importance of organisational resilience and its relationship with digital transformation in order to effectively lead organisations in crisis times.

Limitation and future research

This study is subject to several limitations and opens up several future research directions. **First**, the research findings are based on the analysis of cross-sectional data, meaning it looked at the associations between study variables just once at a specific point of time. Due to the limitation of the methodology, this research adopted the deductive process and only demonstrated the linear associations among the constructs. Furthermore, this study acknowledges that, in real-world scenarios, the actual relationships among constructs are much more complicated than what this study proposed. Therefore, Future research could collect longitudinal data to further validate the causal relationships proposed in this research and adopt latent growth modeling to test the non-linear or reciprocal

relationships among variables. **Second**, the sample of the research comprised only limited sectors. Future research might adopt the views of other sectors to investigate and validate the proposed theoretical relationships. **Third**, this study was explored in Egypt. Accordingly, future studies can explore the relationship between study variables in various nations to confirm the results obtained in this study. **Finally**, we used a survey to collect the required data. However, the survey design methodology is viewed as a means in which a bias occurs towards the organizational members, thereby underscoring the significance of the organizational reality.

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