Digital Maturity and Organizational Resilience: Examining the Mediating Role of Employee Resilience in Egypt's Medical Devices industry

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Abstract:

Purpose– This study examines the mediating role of employee resilience (ER) in the relationship between digital maturity (DM)

and organizational resilience (OR) in the Egyptian medical devices sector.

Design/Methodology– A cross-sectional survey was conducted to collect data from 168 employees working at four catheter manufacturers that dominate the catheter industry in Egypt. The hypothesized model was analyzed using the PLS-SEM technique.

Findings– The results indicate that DM dimensions, specifically Digital Intensity (DI) and Transformation Management Intensity (TMI), positively impact OR. Employee resilience (ER) explains variations in OR and mediates the relationship between DM and OR. While DI significantly influences ER, TMI does not, suggesting that this connection is complex and shaped by multiple factors.

Research limitations– Research on OR remains fragmented, lacking a comprehensive understanding of the interdependencies among OR, ER, and DM. This study addresses this gap by examining how ER influences the impact of key DM components—DI&TMI—in enhancing OR dimensions, specifically situational awareness (SA), market viability (MKV), and adaptive capacity (AC).

Originality/value– This study offers a novel integrated approach by combining basic assumptions of the Process Theory of Change with the Dynamic Capabilities Theory to examine OR within the context of digital maturity. It provides a

comprehensive understanding of how ER influences the DM-OR relationship, addressing a critical research gap.

Practical implications– This study emphasizes the critical shift in HR professionals' roles within the medical device industry from operational contributors to strategic partners, highlighting the importance of aligning digital strategies with resilience-building to ensure long-term sustainability.

Keywords – Organizational Resilience, Digital Maturity, Employee Resilience, Process Theory of Change, Dynamic Capabilities Theory, High-Tech Medical Devices Industry

النضج الرقمي ورشاقة المنظمات: اختبار الدور الوسيط لرشاقة العاملين بالتطبيق علي قطاع صناعة المستلزمات الطبية في مصر

الملخص:

الغرض –تهدف هذه الدراسة إلى اختبار الدور الوسيط لرشاقة العاملين (employees resilience)في تفسير العلاقة بين النضج الرقمي (digital maturity)ومدي قدرة المنظمه علي الصمود في مواجهة الازمات (organizational resilience) وذلك بالتطبيق علي قطاع صناعة المستلزمات الطبية عالية التقنية في مصر.

المنهجية –تم إجراء مسح ميداني لجمع البيانات من ١٦٨ موظفًا يعملون في أربع شركات متخصصة في تصنيع القسطرة، والتي تهيمن على هذه الصناعة في مصر. تم تحليل النموذج المفترض باستخدام تقنية نمذجة المعادلات الهيكلية (PLS-SEM).

النتائج –تشير النتائج إلى وجود تأثر ايجابي ذو دلاله احصائيه لأبعاد النضج الرقمي –تحديدًا درجة اعتماد المنظمه علي التكنولوجيا الرقميه في تنفيذ اعمالها (Digital Intensity)ودرجة استجابة الادارة لعملية التحول الرقمي (Transformation Management Intensity) – على قدرة المنظمة على الصمود في مواجهة الازمات. كما تفسر قدرات العاملين علي التكييف واستعدادهم للتعلم علي رشاقة المنظمات. حيث تلعب قدرات العاملين دورًا وسيطًا في تفسيرالعلاقة الغير مباشرة بين النضج الرقمي ورشاقة المنظمه. في حين أن درجة اعتماد المنظمه علي التكنولوجيا الرقميه في تنفيذ اعمالها يؤثر بشكل كبير على قدرات العاملين علي التكييف، لم تُظهرالنتائج تاثيرا ذو دلاله احصائيه لدرجة استجابة الادارة لعملية التحول الرقمي علي قدرات العاملين علي التكييف، مما يشير إلى أن هذه العلاقة معقدة وتتأثر بعوامل اخري متعددة.

الأصالة/القيمة –تقدم هذه الدراسة نهجًا تكامليًا جديدًا من خلال الجمع بين الفرضيات الأساسية لنظريتي عملية التغيير (Process Theory of Change) و القدرات الديناميكية (Dynamic Capabilities Theory) مما يحقق فهمًا شاملًا لكيفية تأثير قدرات العاملين على قدرة المنظمات علي التكيف في ظل الازمات.

التطبيقات العملية –تؤكد هذه الدراسة على التحول الجوهري في دور مديري الموارد البشرية في قطاع المستلزمات الطبية، حيث ينتقلون من كونهم مساهمين تشغيليين إلى شركاء استراتيجيين. حيث توفر النتائج إرشادات واضحة لمديري الموارد البشرية تمكنهم من بناء خطة استراتيجية تتماشي مع خطة المنظمه في تحقيق ميزة تنافسية مستدامة في ظل بيئات العمل الديناميكية.

الكلمات المفتاحية –النضج الرقمي، رشاقة المنظمه، رشاقة العاملين، صناعة المستلزمات الطبية عالية التقنية.

1. Introduction

Nodaway, environmental challenges such as globalization, sever competition, and the IT revolution have led to rapid and unpredictable changes in business environment, compelling organizations to identify new competitive advantages that enable them to navigate these challenges and ensure their survival and growth (Igwe, Akpan, Udoh, & Sylva, 2024). The concept of *Resilience* has thus emerged to recent organizational change literature as a framework for understanding an organization's ability to cope-with stress, adapt to environmental fluctuations, and recover from disturbances (Zhai, Zhu, & Zhang, 2023). *Resilient organizations are* shaped by their culture (Nkomo & Kalisz, 2023; Schiuma, Santarsiero, Carlucci, & Jarrar, 2024), leadership style (Madi Odeh, Obeidat, Jaradat, Masa'deh, & Alshurideh, 2023), and their capacity to learn from past experiences (Manzini, Oosthuizen, & Chikwanda, 2022).

He, Huang, Choi, & Bilgihan (2023) introduced the multidimensional Organizational Resilience (OR) framework, which identifies three stages for attaining resilience: *anticipation*, *reaction*, and *adaptation*. Each stage links to a specific organizational capability: *Situational Awareness* (SA), *Management of Keystone Vulnerabilities* (MKV), and *Adaptive Capacity* (AC). Based on this, SA involves monitoring the organizational environment to identify and interpret relevant information about business dilemmas (McManus, Seville, Vargo,

& Brunsdon, 2008). This capability enables organizations to navigate external crises effectively (Erhan, Uzunbacak, & Aydin, 2022), recognize potential threats (Purwanto, Setiawan, & Haryanti, 2021), and assess their potential impact on business operations (He et al., 2023). Nevertheless, MKV refers to "an organization's ability to manage key aspects that, if not effectively addressed, can significantly hinder organizational performance" (McManus et al., 2008, p. 83). Such vulnerabilities can be *managerial* or *operational* in nature (Prakasa, Raharjo, & Wiratama, 2020), and often include critical organizational components such as infrastructure, inventory, equipment, personnel, and management systems (Purwanto et al., 2021). AC, on the other hand, reflects an organization's ability to adjust its structures, strategies, and operations in response to internal and external changes (Huu, 2023). Organizations with high adaptive capacity are better positioned to leverage digital technology, foster innovative work behaviors, and ensure long-term continuity (Erhan, et al., 2022).

According to YahiaMarzouk & Jin (2023) and Sawalha (2024), OR studies that address the stages of achieving resilience often base their hypothesized framework on the *Process Theory of Change* (PTC). They assume that OR emerges through processes of *anticipation*, *reaction*, and *adaptation* to environmental changes (He et al., 2023). The PTC-based model proposed by Wufka & Ralph (2015) hypothesizes that

stakeholders are the primary drivers of change. Furthermore, PTC-based literature demonstrates that resilient organizations must minimize the "sense-response lag"—the time interval between identifying changes and responding to stakeholders' requirements (YahiaMarzouk, & Jin, 2023).

Meanwhile, a growing body of recent OR literature indicates that organizations can enhance their resilience by investing in the development of *employees'* competencies (Haryanti, Nur, & Huu, 2023; Schiuma et al., 2024; Liang, & Cao, 2021; Purwanto et al., 2021). Based on this, the term *Employee Resilience* (ER) indicates the ability of employees to tackle challenging situations and recover from obstacles (Liang & Cao, 2021). ER is essential for fostering a culture of resilience within organizations, as employees possessing this competency tends to positively impact organizational performance and long-term survival (Wei, Roberts, Strickler, & Corbett, 2019). Here, Liang & Cao (2021) and Wei et al. (2019) examine the relationship between employee resilience and organizational performance in healthcare industry, where employees frequently face stressful circumstances, making development of resilience crucial. Their findings indicate that employee resilience leads to creative workplace environment. Likewise, Anasori, Bayighomog, & Tanova (2020) demonstrated that organizations benefit from resilient employees who can anticipate changes, leverage opportunities, and overcome threats or challenges while

remaining calm, and organized under pressure. Additionally, employee resilience enhances mental well-being, enabling swift response to evolving opportunities or threats (Nassani, Al-Aiban, Rosak-Szyrocka, Yousaf, Isac, & Badshah, 2024).

According to Ramos, Patrucco, & Chavez (2023) and Ajgaonkar, Neelam, & Wiemann (2022, studies emphasizing the role of employee resilience (ER) in achieving organizational resilience (OR) often base their hypothesized frameworks on the *Dynamic Capabilities Theory* (DCT), which highlights the importance of identifying decision-makers' competencies required to effectively *anticipate*, *react*, and *adapt* to environmental changes. In this context, Arsawan, ssy De Hariyanti, Atmaja, Suhartanto, & Koval (2022) assert that strong and dynamic managerial capabilities, developed through a collaborative process, provide a solid foundation for organizations to build *resilience*. These capabilities enable organizations to sense, seize, and shape internal and external opportunities and threats, facilitating strategic decision-making and the effective reconfiguration and utilization of resources.

Based on Bharadwaj, El Sawy, Pavlou, & Venkatraman (2013), digitally matured organizations are more adoptive to market fluctuations and more competitive. They can proactively identify, assess and take risk, by utilizing digital tools and advanced technologies, thereby minimizing potential interruption during environmental changes and disruptions (Kumar, 2023).

Here, the term *digital maturity* refers to incorporating digital technology into business operations, strategy and culture (Bharadwaj et al., 2013; Westerman, Bonnet, & McAfee, 2014a). According to Miller (2024), digital maturity plays a crucial role in enhancing organizational resilience. In this context, Manzini et al., (2022) demonstrate that organizations holding digital capabilities are more likely to quickly adjust to surrounding environment and overcome challenges. Based on Westerman et al. (2012) and Weill & Woerner (2018), digital maturity includes *two* main components: *digital intensity* (DI) and *transformation management intensity* (TMI). Westerman et al. (2012, p. 2) define DI as "investment in technology-enabled initiatives to change how the company operates its customer engagements, internal operations, and even business models". Otherwise, TMI refers to "the leadership capabilities necessary to drive digital transformation in the organization" (Westerman et al., 2012, p. 2). This includes a revolutionary vision, organizational culture, and governance structures that align digital initiatives to achieve better business outcomes (Trieu et al., 2024). In this context, He et al. (2023) and Westerman, Bonnet, & McAfee (2014b) demonstrate that organizations with a high degree of DI and effective TMI are more likely to cope with challenges and adapt to market fluctuations. These organizations utilize digital technologies to enhance operational excellence, thereby strengthening their organizational resilience.

This study is limited to the *high-tech medical devices industry*, which specializes in producing and supplying advanced medical equipment and solutions, including diagnostic tools and surgical instruments. In this sector, digital maturity plays a crucial role in improving service delivery and enhancing the patient experience (Suez Canal Economic Zone, 2022; OECD, United Nations, & UNIDO, 2021). Medical devices providers prioritize upgrading digital maturity while simultaneously fostering resilience at all levels. This includes offering training opportunities to strengthen individual resilience, ensuring that *employees* and *managers* are well-prepared to adapt to rapid and unexpected changes in the business environment (OECD et al., 2021; Maalouf, Chahine, Abi Aad, & Kertechian, 2024). Therefore, the concepts of *digital maturity*, along with *organizational*, and *employee resilience*, have gathered significant attention from researchers in medical service industry, particularly in the wake of disruptions caused by the COVID-19 pandemic (Copestake, Estefania-Flores, & Furceri,2024; Maalouf et al., 2024).

Despite the growing recognition of digital maturity (DM) as a critical factor in fostering organizational resilience (OR), limited research has explored the influence of employee resilience (ER) on DM-OR interdependencies, particularly within the medical devices sector (da Paixão de Oliveira, Neves Guimarães, & Azevedo Ramos da Silva, 2023; Wei et al., 2019; Maalouf et al., 2024). Most DM studies addressing OR have been conducted from a relatively

narrow perspective, primarily focusing on resilience at organizational level (Maalouf et al., 2024; He et al., 2023; Holopainen, Saunila, & Ukko, 2024; Lin & Fan, 2024). However, limited attention has been given to how employees competencies affect the DM-OR relationship (Haryanti et al., 2023; Prakasa et al., 2020). As a result, research on OR remains fragmented, lacking a comprehensive understanding of the interdependencies among OR, ER, and DM. This study addresses this gap by examining how ER influences the impact of key DM components—digital infrastructure (DI) and technology management and innovation (TMI)—in enhancing OR dimensions, specifically situational awareness (SA), market viability (MKV), and adaptive capacity (AC). Furthermore, the study introduces a novel, integrated approach to managing change in disruptive markets by combining key assumptions of the Process Theory of Change (PTC) with the Dynamic Capabilities Theory (DCT). The study also examines managerial implications, highlighting the role of decision-makers in strengthening workforce competencies to sustain high performance and maintain a competitive advantage in dynamic environments.

Accordingly, this study investigates the central question: "*How does employee resilience mediate the relationship between digital maturity and organizational resilience?"*

The present study is structured as follows: The next section presents a literature review, examining the interdependencies among DM, OR, and ER, which form the basis of the

hypothesized framework. This is followed by a discussion of the research methodology. The empirical results are then presented and analyzed. Finally, the concluding section summarizes the study's theoretical contributions, practical implications, and research limitations, along with directions for future research.

2. Literature Review and Development of the hypothesized framework

2.1. Digital maturity (DM) and Organizational Resilience (OR) interdependencies

Digital maturity (DM) goes above and beyond an organization's investment in advanced technologies and tools (Westerman et al., 2012). It involves developing the necessary competencies and fostering a culture capable of adopting to change (Bharadwaj, et al., 2013). DM enables organizations to leverage technology to automate routine tasks, analyze complex data for more informed decision-making (Westerman et al., 2014a), and manage complex and uncertain situations effectively (Hilbert, 2009). Based on Maalouf et al. (2024), digital maturity refers to an organization's intensity and expertise in utilizing digital technologies and capabilities that enhance operational adaptability. He et al. (2023) argue that digitally mature organizations must exhibit both *digital intensity* (DI) and *transformation management intensity (TMI)*. Specifically, DI is defined as the "investment in technology-enabled initiatives to

change how the company operates its customer engagements, internal operations, and even business models" (Westerman et al., 2012, p. 2). Powell & Roberts (2017) demonstrate that organizations with high DI are characterized by extensive implementation and integration of digital technologies, enabling real-time data collection, analysis, and assimilation, which enhances their adaptability and *resilience*. Likewise, Raisch and Birkinshaw (2008) assert that organizations with higher level of DI are more proactive and better equipped to accommodate change, which enables organizations to access critical information, enhance collaboration, and make evidence-based decisions, thereby improving their ability to adopt to fluctuating environment and overcome challenges.

Otherwise, TMI refers to "the leadership capabilities necessary to drive digital transformation in the organization" (Westerman et al., 2012, p. 2). Limited attention has been given to examining the relationship between *transformation management intensity* (TMI) and organizational resilience (OR) (Cichosz, Wallenburg, & Knemeyer, 2020; He et al., 2023). In this context, Nkomo & Kalisz (2023) proposed a strategic framework for digitalization and OR. The findings highlighted the significance of digital transformation in enhancing OR, emphasizing *continuous learning* as key attribute of effective leadership. Similarly, Awad and Martín-Rojas (2024) adopted a mixed-method approach, combining quantitative surveys and

qualitative case studies, to investigate the impact of digital transformation on OR. Their study revealed a significant positive relationship between digital transformation and OR, mediated by *organizational learning* and *innovation*. Furthermore, He et al. (2023) proposed that increasing transformation management intensity (TMI) can enhance organizational resilience (OR) during uncertain times. They demonstrated that higher TMI encourages individuals to actively monitor a changing environment and develop innovative strategies, thereby enhancing individual contributions to key OR dimensions, such as situational awareness (SA) and adaptive capacity (AC).

Accordingly, an increasing number of recent studies demonstrate a significant positive relationship between digital maturity components—digital intensity (DI) and transformation management intensity (TMI)—and organizational resilience (OR) (Nkomo & Kalisz, 2023; Trieu et al., 2024; Cichosz et al., 2020; He et al., 2023). These findings highlight that organizations with higher digital maturity (DI and TMI) are better equipped to respond to disruptions, adapt to external fluctuations, and sustain operations during crises, thereby enhancing their resilience. Trieu et al. (2024) identified a significant positive relationship between IT capabilities, digital transformation policies, leadership, and OR. In this regard, Khurana, Dutta, & Singh Ghura (2022) conducted a study focusing on SMEs' dynamic capabilities during crisis situations,

which found that digital transformation significantly contributes to the development of resilience. Moreover, Holopainen et al. (2024) investigate the impact of digital strategy on organization's performance, the study revealed a positive relationship between digital maturity and organizational resilience mediated by both internal and external collaboration. Additionally, a stud by Lin & Fan (2024) revealed a significant positive relationship between supply chain integration, digital transformation, and improved organizational performance through resilience emphasizing that organizations utilizing digital transformation are better prepared to achieve sustainable performance through uncertain circumstances. Moreover, Maalouf et al. (2024) found a strong positive relationship between agility, digital transformation, environmental uncertainty, and organizational resilience during COVID-19 pandemic. The result indicates that digital capabilities provide tools that improve operational adaptability and allow faster decision-making, which are essential component of resilience. Furthermore, Miller (2024) found a strong positive relation between digital capabilities and supply chain performance, highlighting that digital technology adoption leads to improved supply chain responsiveness and resilience.

In summary, continuous advancements in digital maturity (DM) components—digital intensity (DI) and transformation management intensity (TMI)—enhance organizational resilience (OR) capabilities, leading to the following hypothesis:

H_1: Digital Maturity components positively affect Organization Resilience.

$H_{1.a}$: Digital Intensity (DI) positively affects OR

$H_{1.b}$: Transformation Management Intensity (TMI) positively affects OR.

2.2. Digital maturity (DM) and Employee Resilience (ER) interdependencies

Recent OR literature demonstrates that organizations can enhance resilience by investing in the improvement of employee competencies (Haryanti et al., 2023; Schiuma et al., 2024; Liang & Cao, 2021; Purwanto et al., 2021). In this context, *employee resilience* (ER) refers to employees' ability to navigate challenging situations and recover from obstacles (Liang & Cao, 2021). In this context, a growing body of literature demonstrates that digitally mature organizations foster innovation by equipping employees with digital technologies, such as digital platforms and other *digital intensity* (DI)-related competencies (Nassani et al., 2024; Huu, 2023), as well as leveraging leaders' *transformation management intensity* (TMI) to drive digital transformation process within the organization (Westerman et al., 2012).

Madi Odeh et al. (2023) argue that leadership and organization culture are critical factors in fostering resilience. Building on this, Willcocks & Lacity (2024) demonstrate that organizations investing in digital transformation are more likely

to develop a resilient workforce capable of thriving in uncertain circumstances. Likewise, Riedl, Stieninger, Muehlburger, Koch, & Hess (2024) proved that digitally mature organizations foster a culture of continuous learning, inspire leaders and employees to embrace change, and encourage innovation by promoting a collective vision, facilitating collaboration, and offering sufficient resources and encouragement. From this perspective, Erhan et al., (2022) introduced the concept of *digital leadership*, emphasizing its role in empowering employees to effectively navigate the challenges associated with digital transformation. Nkomo & Kalisz (2023) demonstrate the significance role of digital transformation in strengthening employee resilience, emphasizing continuous learning as key attribute for digital leadership. Likewise, Awad & Martín-Rojas (2024) found a significant positive relationship between digital transformation and organizational resilience (OR), mediated by organizational learning and employee innovative capabilities.

Nevertheless, Prakasa et al. (2020) and Aghazadeh, Zandi, Amoozad Mahdiraji, & Sadraei (2024) found a significant impact of transformational leadership on both organizational resilience and digital maturity. They demonstrated that digital maturity improves employee resilience by offering tools that enhance change management. Similarly, Liang & Cao (2021) found a positive relationship between digital maturity and employee resilience, as digital capabilities provide managers with superior

tools that improve decision-making during crises. Furthermore, Nassani et al. (2024) found that knowledge management structure, an essential element of digital maturity, foster innovative workplace performance and resilience amongst employees.

Based on the previous discussion, digital maturity (DM) components—digital intensity (DI) and transformation management intensity (TMI)—enhance employee resilience (ER) capabilities, leading to the following hypothesis:

H_2:Digital Maturity components positively affect Employee Resilience.

$H_{2.a}$: Digital Intensity (DI) positively affects ER

$H_{2.b}$: Transformation Management Intensity (TMI) positively affects ER

2.3. Organizational Resilience (OR), and Employee Resilience (ER) interdependencies

Resilient employees are critical in fostering organization's adaptability. Their ability to accommodate changes, overcome obstacles, and learn from mistakes, encourage a culture of innovation and development, which enable organizations' rapid adjustment and respond to fluctuating market conditions (Ramos et al., 2023; Ajgaonkar et al., 2022; Välikangas & Merlyn, 2005). Building on this perspective, He et al. (2023) identify three key competencies for attaining resilience: *Situational Awareness* (SA), *Management of Keystone Vulnerabilities* (MKV), and

Adaptive Capacity (AC). Specifically, SA refers to the ability to navigate external crises effectively (Erhan et al., 2022), recognize potential threats (Purwanto et al., 2021), and assess their potential impact on business operations (He et al., 2023). Meanwhile, MKV refers to the ability to manage key aspects that, if not effectively addressed, can significantly hinder organizational performance (McManus et al., 2008; Purwanto et al., 2021). AC, on the other hand, refers to the ability to adjust an organization structure, strategies, and operations in response to internal and external changes (Huu, 2023).

Huu (2023) reported that higher resilience levels among employees leads to better ability to cope with organizational challenges and improve situational awareness. The result indicates that employees with high resilience levels are more skilled at sensing and understanding surrounding environments, which is crucial for evidence based decision making. Likewise, Haryanti et al. (2023) explored how employee resilience enhances situational awareness in organizations. The findings indicated that resilient employees show positive behaviors including frequent communication and sharing of information with team members, such behavior enhance organizational situational awareness. In line with this, Erhan et al. (2022), proved a significant positive relationship between employee resilience and adaptive capacity, indicating that resilient employees improve adaptive capacity within organizations,

leading to improved adaptation to fluctuation and ambiguities of the surrounding environment. Similarly, Prakasa et al. (2020) examined the impact of employee resilience in improving adaptive capacity. The study indicated that resilient employees are more prepared to cope with changes and contribute to innovative outcomes, therefore enhance organization's ability to cope with challenges. Nevertheless, Prakasa et al. (2020) revealed a strong positive relationship between leaders' resilience and *managing keystone vulnerabilities*. They demonstrated that resilient leaders are skilled in recognizing and minimizing key challenges in their organizations. Another qualitative study by Purwanto et al. (2021) found that resilient managers are skilled in fostering collaboration and trust between team members which enable recognizing and managing keystone vulnerabilities.

Accordingly, resilience levels among employees leads to better organizational resilience (OR) capabilities, leading to the following hypothesis:

H_3:Employee Resilience (ER) positively affects Organization Resilience (OR)

2.4.The Mediating effect of ER on DM/OR relationship

The correlation between digital maturity and organizational resilience is multifaceted and can be influenced by employee resilience (Prayag, Muskat, & Dassanayake, 2023). Current research suggests that employee resilience can serve as a mediator in this

relationship, as resilient employees are more likely to adapt to digital transformation initiatives, thereby enhancing organizational adaptability (Nkomo & Kalisz, 2023). In this context, Liu, Feng, Lu, & Zhou (2024) proposed that employee resilience mediates the relationship between digital capabilities and organizational resilience. Likewise, Zhai et al. (2023) found strong evidence that employee resilience mediates the relationship between strategic human resource management (HRM) and organizational performance, highlighting the significant role of resilient employees in improving overall organizational outcomes. Additionally, managerial resilience can also be a critical mediator in this relationship. Resilient leaders influence their teams by providing confidence and direction during digital transformation, fostering a culture conducive to change (Lombardi, Pina e Cunha, & Giustiniano, 2021). Furthermore, Trieu et al. (2024) investigated the impact of IT capabilities and digital transformation related policies in improving organizational resilience through leadership. The result support strong positive mediating impact of employee resilience on the relationship between digital maturity and organizational resilience. Furthermore, Khurana et al. (2022) recognized resilience as an essential element of dynamic capability in an entrepreneurial environment. Results showed a strong positive mediating impact of employee resilience on the relationship between digital maturity and organizational resilience.

In summary, the literature suggests a strong positive relationship between digital maturity and organizational resilience, such relationship is mediated by employee and managerial resilience, highlighting the importance of resilience leadership in fostering a dynamic culture that enhance organizational resilience. Therefore, this study treats DM as an independent construct, hypothesizing that ER serve as a mediator (Figure 1). This approach aims to examine how DM affects OR by enhancing ER. Based on this, the following hypotheses are proposed.

H_4:Employee Resilience (ER) mediates the relationship between Digital Maturity (DM) and Organization Resilience (OR).

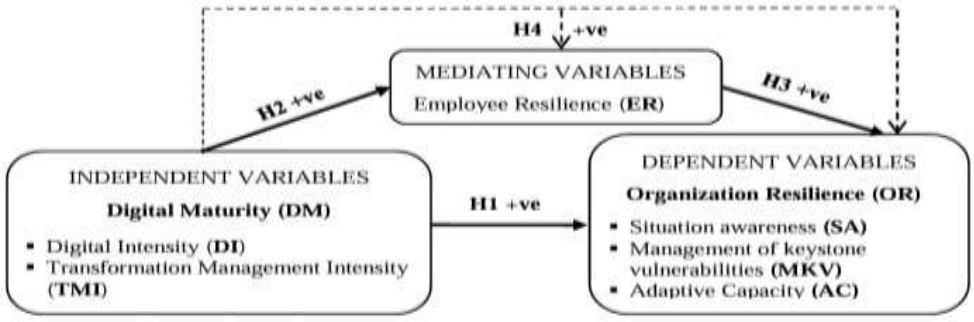

Figure 1: The Hypothesized Framework
Source: *created by authors*

3. Research Methodology

3.1 Research population

The importance of resilience is particularly evident during times of crisis, such as the COVID-19 pandemic, when organizations—especially those in the healthcare industry—must demonstrate

resilience to survive in a highly volatile environment (Steen, Haug, & Patriarca, 2024; Maalouf et al., 2024). From this perspective, this study is limited to a segment of the Egyptian healthcare industry, specifically medical devices manufacturers, which are among the fastest-growing in the region. By the end of 2021, the medical devices market was valued at $606 million and is projected to grow at a high single-digit rate of 7–9% between 2021 and 2026. (Suez Canal Economic Zone, 2022). Egypt's increasing urbanization and rising disposable income, combined with an aging population, are driving substantial demand for high-tech medical devices of varying complexity, including cardiac pacemakers, and catheters (OECD et al., 2021). As a result, medical devices manufacturers in Egypt have faced significant challenges during and after the pandemic, highlighting the critical need for resilience. This necessity has driven medical devices providers to progressively adopt digital technologies, making it increasingly important to understand the intersection of digital maturity, organizational resilience, and individual resilience (Suez Canal Economic Zone, 2022).

This study gives a special emphasis on the *catheter industry* as a key segment of the medical devices sector. The catheter industry in Egypt is experiencing significant growth, driven by rising demand for healthcare services, a high prevalence of chronic diseases, and government-led healthcare reforms (Youssef, Shepherd, Best, Hagen, Mackay, Waddell, & El Sebaee, 2023). Catheter industry growth and competitiveness relies heavily on organizations' ability to

innovate and adapt to rapidly evolving market conditions. Innovation is crucial for developing and implementing new technologies, products, and services that enhance patient outcomes and drive business success (Youssef et al., 2023).

This study's population includes four catheter manufacturers—AMECO GROUP (comprising Amecath, Q-Medical, Kimal, and Wellex)—which dominate the catheter industry in Egypt. While Amecath holds a substantial share of the Egyptian catheter market, the combined presence of Q-Medical, Kimal, and Wellex fosters a competitive landscape. This collective dominance indicates an oligopoly rather than a monopoly, with these companies playing pivotal roles in shaping the industry's dynamics (TVM-Capital Healthcare, 2014). AMECO GROUP is the only manufacturing entity of its kind in the Middle East and among the first globally to receive Medical Devices Regulation (MDR) certification—a distinction achieved by only 20% of medical device manufacturers worldwide. (TVM-Capital Healthcare, 2014). It is recognized as a leading manufacturer of catheters, particularly intensive care catheters, dialysis catheters, and specific types of urological catheters, with certifications from the FDA. Established in 1991, the group has grown into a global manufacturer and distributor of medical devices. It operates a production facility in Egypt and maintains offices in Singapore and the UAE. The group produces over one million catheters annually, with a market share of 79% in Egypt, while its

international market share ranges from 4% to 10% across Europe, the USA, Asia, and North Africa (TVM-Capital Healthcare, 2022).

3.2 Sampling methods and data collection techniques

This study utilized a *disproportionate stratified random sampling method* (Berndt, 2020). A total of 200 employees were randomly selected from Egypt's four leading catheter manufacturers—AMECO GROUP (Amecath, Q-Medical, Kimal, and Wellex). The sample size was calculated based on a total workforce of 414 employees, assuming an equal distribution between managerial and non-managerial positions and a 95% confidence level (Berndt, 2020). After excluding incomplete responses, the final sample comprised 168 participants, yielding a response rate of 84% (Mellahi & Harris, 2016). Table 1 presents an overview of the sample distribution within AMECO GROUP workforce.

Table 1: Descriptive Statistics of Research Respondents (N = 168)

Headcount	Population	%	Sample	Responses	Response %
Top Management	9	2.2%	5	5	
CEO	1		1		
General Directors	8		4		
Med Management	27	6.5%	13	11	
Division Chief	15		7		
Section Head	12		6		
Operational Management	378	91%	182	152	
Supervisors	44		21		
Operators	334		161		
Grand Total	414		200	168	84%

Source: Amico group HR department, FY October 2024.

Data collection occurred in September and October 2024 using a structured questionnaire available in both Arabic and English via Google Form. The survey link was disseminated through multiple media platforms, and participation was encouraged through pre-notification emails, invitation emails, and follow-up reminders. The estimated completion time for the survey ranged from 15 to 20 minutes. To ensure equal selection probability, a *circular systematic* sampling technique was employed (Mostafa & Ahmed, 2018; Subramani, Gupta, & Prabavathy, 2014). Employees within various workgroups were assigned serial codes to facilitate data synthesis and analysis. The first participant was randomly selected, with subsequent participants chosen systematically based on a predetermined sampling interval.

3.3 Research variables and measurement instruments

Digital Maturity (DM) (Independent Variable): DM refers to the incorporation of digital technology into business operations, strategy, and culture (Westerman et al., 2014a) to enable organizations to adapt quickly to surrounding environmental challenges (Manzini et al., 2022), thereby enhancing organizational resilience (Miller, 2024). This study adopts the DM measurement developed by Westerman et al. (2012), which includes two dimensions: digital intensity (DI) (10 items) and transformation management intensity (TMI) (10 items). The questionnaire assesses the extent of investment in

technology-enabled initiatives and the leadership capabilities required for digital transformation using a seven-point Likert scale ranging from (1) "strongly disagree" to (7) "strongly agree." According to Westerman et al. (2012), the Cronbach's alpha values for DI and TMI were 0.924 and 0.955, respectively.

Organizational Resilience (OR) (Dependent Variable): OR refers to an organization's ability to cope with stress, adapt to environmental fluctuations, and recover from disturbances (Zhai et al., 2023). The OR measurement instrument is based on the research of He et al. (2023), who introduced a multidimensional OR framework identifying three key organizational capabilities: Situational Awareness (6 items), Management of Keystone Vulnerabilities (4 items), and Adaptive Capacity (4 items). The questionnaire assesses an organization's ability to accommodate change, overcome obstacles, learn from mistakes, and foster a culture of innovation and development using a five-point Likert scale ranging from (1) "not at all" to (5) "completely." According to He et al. (2023), the Cronbach's alpha value for the overall OR measure was 0.955.

Employee Resilience (ER) (*Mediating Variable*): ER refers to employees' ability to navigate challenging situations and recover from obstacles (Liang & Cao, 2021). This study adopts the ER measurement developed by Luthans et al. (2007), which assesses the competencies employees need to overcome

challenges and cope with obstacles. Sample items include: “When I have a setback at work, I have no trouble recovering from it and moving on,” “I usually take stressful things at work in stride,” and “I believe that I can analyze long-term problems and find solutions”. Responses were recorded on a five-point Likert scale ranging from (1) "strongly disagree" to (5) "strongly agree." Based on Luthans et al. (2007), the Cronbach alpha value for the overall ER measure was 0.940.

4. Presentation and analysis of the results

4.1 Procedural and statistical remedies

This section presents the statistical analysis results for the collected data, conducted using SPSS version 27 and Smart PLS 4.1. The analysis employed a bootstrapping approach with 5,000 subsamples for Partial Least Squares Structural Equation Modeling (PLS-SEM) (Chin, 1998; Hair, Risher, Sarstedt, & Ringle, 2019; Sarstedt, Ringle, & Hair, 2021). As shown in Figure 2, a two-step analysis was performed: (1) screening measurement instruments using SPSS and Smart PLS to assess validity and reliability, and (2) assessing the structural model, including direct hypothesis testing via PLS-SEM and mediation effect testing via PLS-PROCESS. To evaluate how well the items explained specific variables (Hair, Anderson, Babin, & Black, 2010), construct validity was assessed through convergent and discriminant validity. For convergent validity, exploratory factor analysis (EFA) was conducted using

SPSS, followed by confirmatory factor analysis (CFA) with Smart PLS-SEM version 4.1. Construct validity was measured using average variance extracted (AVE) scores, as recommended by (Fornell & Larcker 1981). Internal consistency was evaluated through Cronbach's alpha, composite reliability, and rho-A values in PLS-SEM, with a threshold of ≥ 0.7 to confirm reliability (Hair et al., 2019).

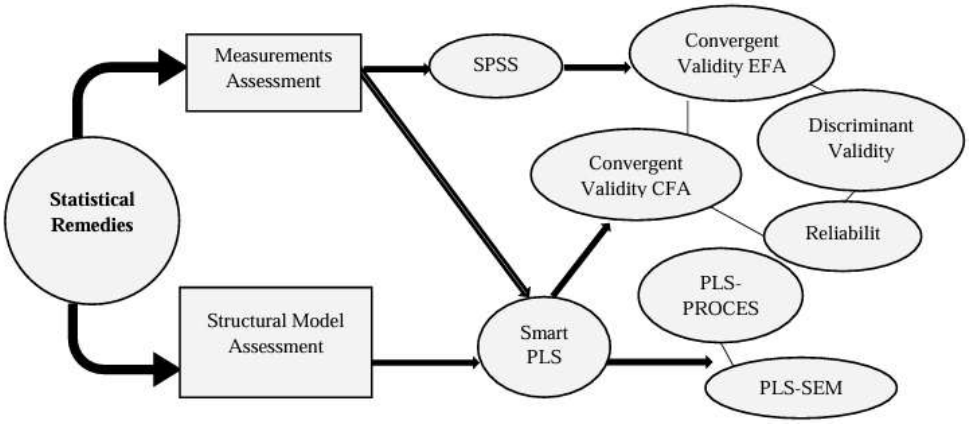

Figure 2: Procedural and statistical remedies

Source: created by authors

4.2 *Sample Profile*

The researchers run descriptive analysis- frequencies via SPSS to classify the survey participants according to their age, gender, current position, and work years in their organization (Table 2). The results in Table (2) reported that, the majority of the research participants work in Amecath company with

percentage 56.5%. 19.6% of participants work in Q Medical, 16.7 % work in Kimal, while 7.1% work in WELLEX. The results also reported that the majority of the participants with percentage 92.3% their work directly related to IT.

Table 2: Descriptive Statistics of Research Respondents (N = 168)

Demographic Variables		N	%
Company Name	Amecath	95	56.5%
	Q Medical	33	19.6%
	Kimal	28	16.7%
	WELLEX	12	7.1%
Gender	Male	145	86.3%
	Female	23	13.7%
Age	25-30	45	26.8%
	30-35	45	26.8%
	35-40	40	23.8%
	40-45	24	14.3%
	+50	6	3.6%
	20-25	4	2.4%
	45-50	4	2.4%
Work related IT	Yes	155	92.3%
	No	13	7.7%
Job Position	Specialist	42	25.0%
	Section Head	29	17.3%
	Senior	28	16.7%
	Manager	24	14.3%
	Supervisor	18	10.7%
	Team Lead	11	6.5%
	Junior	10	6.0%
	Managing Director	6	3.6%
Work Years	3-5 Years	57	33.9%
	1- 3 Years	48	28.6%
	5-10 Years	44	26.2%
	More than 11 Years	19	11.3%
Total		**168**	**100%**

4.3. Descriptive and correlation analysis

Descriptive statistics and Pearson correlation were computed by SPSS. The results are reported in Table 3. The researcher examined participant responses to a questionnaire that used a 5-point Likert scale to measure the study variables. Concerning the descriptive statistics results, the analysis show that all the research variables reported high means > 4 (DM, DI, and OR), and very high mean > 4.20 (TMI and ER), which indicate the respondent agreement to the research constructs at acceptable standard deviation and standard error values.

Table 3: Descriptive Statistics

		Mean		Std. Deviation	
		Statistic	Std. Error	Statistic	
Digital Maturity	DI	4.08	.053	.687	.613
	TMI	4.25	4.17 .048	.047 .622	
Organization Resilience		4.08	.049	.634	
Employee Resilience		4.57	.037	.474	

Notes: *N*= 168; All constructs (5-point scale)

The results in Table 4 represents that, all the correlations among the research variables were significant at p-value < 0.001, and in the expected direction.

Table 4: Pearson Correlation

Correlations						
		DM	DI	TMI	OR	ER
DM	Pearson Correlation	1	.938**	.939**	.780**	.365**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	168	168	168	168	168
DI	Pearson Correlation	.938**	1	.761**	.723**	.405**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	168	168	168	168	168
TMI	Pearson Correlation	.939**	.761**	1	.740**	.279**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	168	168	168	168	168
OR	Pearson Correlation	.780**	.723**	.740**	1	.461**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	168	168	168	168	168
ER	Pearson Correlation	.365**	.405**	.279**	.461**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	168	168	168	168	168

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

4.4. Measurement Assessment (validity and reliability tests)

For the constructs` assessment, the convergent validity was tested through running factor analysis (EFA and CFA) via SPSS v.27 and SEM-PLS 4.1. respectively. Factor analysis was conducted using VARIMAX rotation and principal component analysis (PCA). Factor loadings that less than 0.5 should be ignored (Kaiser, 1974). Further, the acceptable eigenvalue value should be = 1 or > 1, at the acceptable cumulative variance equal to, or more than 60% (Hair et al., 2010). In the current research, the Kaiser–Meyer–Olkin (KMO) (Kaiser, 1974) was conducted to assess the suitability of the sample size of the current study.

The acceptable criteria of the KMO test are 0- 1. As, the acceptable value of the KMO to be higher than 0.5 (Kaiser, 1974). Hence, Bartlett (1954) stated that, the significant level (< 0.05) of the Bartlett`s test indicates the correlation matrix of population is significantly different from an identity matrix.

Based on the statistical results presented in Table 5, all factor loadings are above .628. Moreover, the cumulative variances for the measurements of digital maturity, organization resilience, and employee resilience explain 66.11 %, 72.104 %, and 67.450 %, respectively. Thus, the value of cumulative variance is accepted (Hair et al., 2010). The extracted factors have eigenvalues > 1 which are accepted (Kaiser, 1974). Furthermore, the values of KMO for digital maturity, organization resilience, and employee resilience are; .923, .919, and .883, respectively, which are > 0.5. Further, the significant level of Bartlett's Test of digital maturity, organization resilience, and employee resilience are; < 0.0001, < 0.0001, and < 0.001, respectively. Thus, the sample size of the current study is suitable (Bartlett, 1954; Kaiser, 1974), and the population`s correlation matrix is significantly different from an identity matrix.

Table 5: EFA for the study constructs via SPSS

Items	Digital Maturity		Organization Resilience	Employee Resilience
	DI	TMI		
DI1	.655			
DI2	.785			
DI3	.695			
DI4	.804			
DI5	.751			

DI6	.670			
DI7	.698			
DI8	.783			
DI9	.679			
DI10	.628			
TMI1		.631		
TMI2		.668		
TMI3		.653		
TMI4		.819		
TMI5		.814		
TMI6		.775		
TMI7		.886		
TMI8		.779		
TMI9		.749		
TMI10		.655		
SA1			.792	
SA2			.658	
SA3			.778	
SA4			.858	
SA5			.695	
SA6			.596	
MKV1			.696	
MKV2			.737	
MKV3			.658	
MKV4			.636	
AC1			.846	
AC2			.838	
AC3			.793	
AC4			.865	
ER1				.785
ER2				.819
ER3				.824
ER4				.871
ER5				.849
ER6				.776
KMO	**.923**		**.919**	**.883**
Bartlett's Test	**<.0001**		**<.0001**	**<.001**
Eigen value- Cumulative variance	**66.11%**		**72.104%**	**67.450%**

Note: Digital Intensity = DI, Transformation Management Intensity= TMI, Situation awareness= SA, Management of keystone vulnerabilities= MKV, Adaptive Capacity= AC

In integration with the convergent validity, the researchers run Smart PLS 4.1 to perform the structural equation modeling (SEM) via Smart PLS to confirm the EFA results. Based on the results in Table 6, and figure 3 related CFA test via SEM-PLS, all factor loading values for the research constructs` items are > 0.4 (Hair, Anderson, Tatham, & Black, 1998), which confirm EFA results

Table 6: CFA test for the measurments` items via SEM-PLS

Variables		Items	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	AVE	
Digital Maturity	DI	DI1 < DI	0.769	0.044	16.810	0.000	0.618	**0.580**
		DI2 < DI	0.804	0.035	23.090	0.000		
		DI3 < DI	0.778	0.027	28.481	0.000		
		DI4 < DI	0.823	0.030	27.212	0.000		
		DI5 < DI	0.756	0.045	16.610	0.000		
		DI6 < DI	0.787	0.034	23.493	0.000		
		DI7 < DI	0.793	0.040	19.944	0.000		
		DI8 < DI	0.852	0.026	33.387	0.000		
		DI9 < DI	0.816	0.030	27.322	0.000		
		DI10 < DI	0.670	0.056	11.974	0.000		
	TMI	TMI1 < TMI	0.760	0.054	14.149	0.000	0.681	
		TMI2 < TMI	0.804	0.042	19.041	0.000		
		TMI3 < TMI	0.796	0.032	24.753	0.000		
		TMI4 < TMI	0.874	0.024	35.800	0.000		
		TMI5 < TMI	0.899	0.022	41.500	0.000		
		TMI6 < TMI	0.829	0.035	23.738	0.000		
		TMI7 < TMI	0.874	0.022	39.343	0.000		
		TMI8 < TMI	0.836	0.037	22.613	0.000		
		TMI9 < TMI	0.813	0.034	23.761	0.000		
		TMI10 < TMI	0.752	0.047	15.944	0.000		
Organization Resilience		SA1 < Organization Resilience	0.786	0.034	23.436	0.000	**0.641**	
		SA2 < Organization Resilience	0.818	0.022	36.872	0.000		
		SA3 < Organization Resilience	0.707	0.041	17.392	0.000		
		SA4 < Organization Resilience	0.800	0.032	25.076	0.000		
		SA5 < Organization Resilience	0.781	0.041	19.225	0.000		
		SA6 < Organization Resilience	0.764	0.045	17.138	0.000		
		MKV1 < Organization Resilience	0.840	0.027	31.146	0.000		
		MKV2 < Organization Resilience	0.846	0.024	35.150	0.000		
		MKV3 < Organization Resilience	0.815	0.033	24.850	0.000		
		MKV4 < Organization Resilience	0.745	0.051	14.634	0.000		

	AC1 < Organization Resilience	0.791	0.036	21.875	0.000	
	AC2 < Organization Resilience	0.796	0.030	26.449	0.000	
	AC3 < Organization Resilience	0.849	0.026	32.584	0.000	
	AC4 < Organization Resilience	0.856	0.023	37.444	0.000	
Employee Resilience	ER1 < Employee Resilience	0.820	0.027	30.450	0.000	**0.670**
	ER2 < Employee Resilience	0.838	0.026	32.474	0.000	
	ER3 < Employee Resilience	0.815	0.039	21.015	0.000	
	ER4 < Employee Resilience	0.859	0.031	28.044	0.000	
	ER5 < Employee Resilience	0.846	0.028	29.943	0.000	
	ER6 < Employee Resilience	0.729	0.065	11.290	0.000	

Note: Note: Digital Intensity = DI, Transformation Management Intensity= TMI, Situation awareness= SA, Management of keystone vulnerabilities= MKV, Adaptive

Additionally, values of AVE of the constructs were computed via SEM-PLS. According to Hair et al (2010), the value of AVE should be > 0.5. As, AVE indicates the degree the construct explains the variance out of its measurement error (Hair et al., 2010). Based on results illustrated in Figure 3 & presented in Table 6, all constructs have high AVE values >0.5. Moreover, T-statistics for all constructs are significant at p-values < 0.00, which displays a strong convergent validity. Thus, based on the results of EFA & CFA tests, the convergent validity for the constructs of the current study is supported.

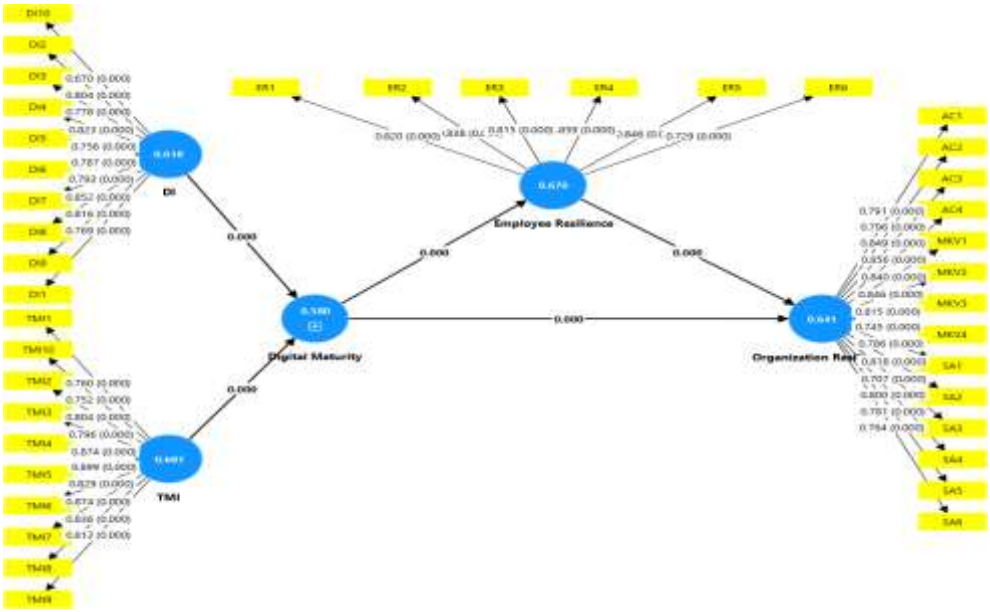

Figure 3: *Measurement model- Factor Analysis with AVE Values, Factor-loadings and P- values*

Regarding the discriminant validity, the researcher computed the square roots for the AVE values for all variables which are represented Table 7 (bold numbers). According to Fornell & Larcker (1981) the discriminant validity is achieved if the squared root of AVE exceeds the correlation among the study variables. Refer to Table 7, the discriminant validity is established.

Table 7: Discriminant Validity- Fornell-Larcker criterion

	Digital Maturity	Employee Resilience	Organization Resilience
Digital Maturity	**0.762**		
Employee Resilience	0.369	**0.819**	
Organization Resilience	0.761	0.475	**0.801**

To assess the reliability of the constructs, Cronbach's alpha, composite reliability, and rho-A values were calculated using Smart PLS 4.1. According to Hair et al. (2010), these values should exceed 0.7 to confirm reliability. Referring to Table 8, the Cronbach's alpha, composite reliability, and rho-A values for the constructs were greater than 0.9, meeting the criterion established by Nunnally & Bernstein (1994). This indicates satisfactory reliability for the study constructs. Thus, the validity and reliability of the constructs are supported.

Table 8: Reliability test via SEM-PLS for the constructs

	Cronbach's alpha	Composite reliability	Composite reliability (rho_A)
Digital Maturity	0.962	0.963	0.965
DI	0.931	0.937	0.941
TMI	0.947	0.948	0.955
Employee Resilience	0.903	0.920	0.924
Organization Resilience	0.957	0.957	0.961

4.5. The Goodness of the Model Fit & Testing Hypotheses

This section presents the statistical results computed by Smart-PLS 4.1. relying on the PLS method, 500 resamples- bootstrapping approach. Specifically, the study employed SEM-PLS to test the direct hypothetical relationships, while using PROCESS-PLS to examine the indirect relationships, considering statistical conditions, such as; R^2 (the coefficient of determination) values for path models in PLS-SEM are 0.67, 0.33, and 0.19, indicating strong, moderate, and weak values, respectively (Chin, 1998). the p-values and t- test are used to detect the significance of the path coefficients and to examine the research hypotheses. the goodness of the research model was evaluated based on the Stone-Geisser (Q^2) indicator that measures the accuracy of the model prediction, and the indicator of Cohen's Indicator (f^2) that measure the effect size to examine the usefulness of each construct for the adjustment model. Finally, SRMR value is used (extracted from SEM- PLS) (Table 9)

Table 9: Stone-Geisser and Cohen indicators- Model fit assessment criteria

Indicators	Criteria
Q^2	> 0
F^2	0.02, 0.15 and 0.35 are small, moderate and large
SRMR	< 0.08

Source: **Hair, Hult, Ringle, & Sarstedt, 2014**

As reported in Table (10), the Q^2 values of the model are > 0, thus the predictive power of the model is satisfied (HAIR et al., 2014). Furthermore, the value of SRMR of the model is 0.079 < 0.08 (Hooper, Coughlan, & Mullen, 2008), indicating satisfactory SRMR value. Moreover, all the values of the effect size (f2) for the main hypotheses are significant and meaningful, indicating moderate to large effect size (Hair et al., 2014)

Table 10: Structural Model Assessments- (PLS-SEM)

H	Structure path	Path coefficient	SD	t-test	P-value	R^2	Q^2	F^2	Decision
H1	DM > OR	**0.702**	**0.058**	**12.096**	**0.000*****			**1.200**	**Accepted**
$H1_a$	DI > OR	0.272	0.069	3.928	0.000***			0.074	Accepted
$H1_b$	TMI > OR	0.465	0.071	6.583	0.000***			0.240	Accepted
H2	DM > ER	**0.375**	**0.077**	**4.857**	**0.000*****	0.141	**0.116**	**0.164**	**Accepted**
$H2_a$	DI > ER	0.488	0.107	4.576	0.000***			0.113	Accepted
$H2_b$	TMI > ER	-0.088	0.127	0.692	0.489			0.004	Rejected
H3	ER > OR	**0.211**	**0.053**	**3.988**	**0.000*****			**0.108**	**Accepted**
H4	DM > ER > OR	**0.079**	**0.030**	**2.629**	**0.009****	0.647	**0.606**		**Accepted**

SRMR= 0.079 < 0.08

t value is significant at 1.96, * Significant at p < 0.05, ** Significant at p < 0.01, * Significant at p < 0.00**

In the same line, referring to Figure (4 and 5), the whole DM explains 14 % of the variance in ER. Furthermore, DM explains 64.7 % of the variance in OR via ER. Thus, digital maturity (in terms of DI and TMI) are direct predictors of changes in organization resilience (see Table 10). Moreover, DM affect ER in terms of (digital intensity), however the effect of TMI on ER is not significant. Accordingly, the findings support the main and sub-hypotheses H1, H1a, H1b; H2, H2a & H3, and H4. However,

the sub-hypothesis H2a is rejected. Concerning the 4th hypothesis related the indirect effect of DM on OR via ER, the findings of PLS-SEM reveal that DM indirectly influence OR via ER at p-value < 0.009. (See Figures 4, 5 and Tables 10)

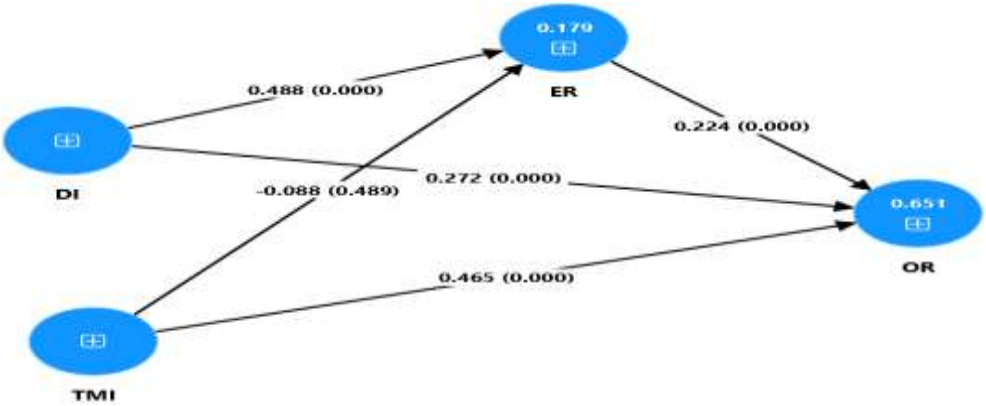

Figure 4*:The Structured Model- PLS-SEM (the main hypotheses)*

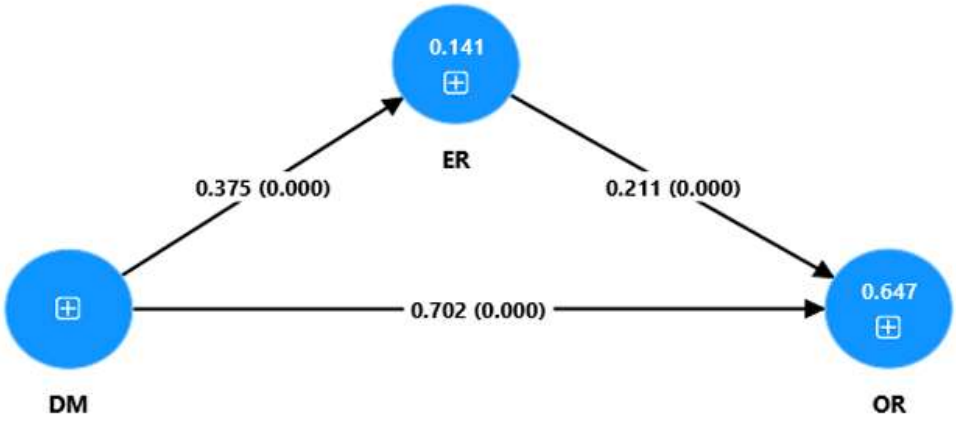

Figure 5: *The Structured Model- PLS-SEM (the sub-hypotheses)*

The PLS-PROCESS has been used to test the mediation effect, as it is the most flexible and effective tool in testing the indirect effect (the mediation effect) (MacKinnon, Fairchild, & Fritz, 2007; Hayes, 2009). The results in Table 11 and Figure 6 show that, the construct of employee resilience partially mediate the effect of DM on OR (Baron & Kenny, 1986). As, the direct effect (0.699) and indirect effect (0.075) of DM on OR are significant at p- value < 0.001 and 0.05. Accordingly, hypothesis four is supported.

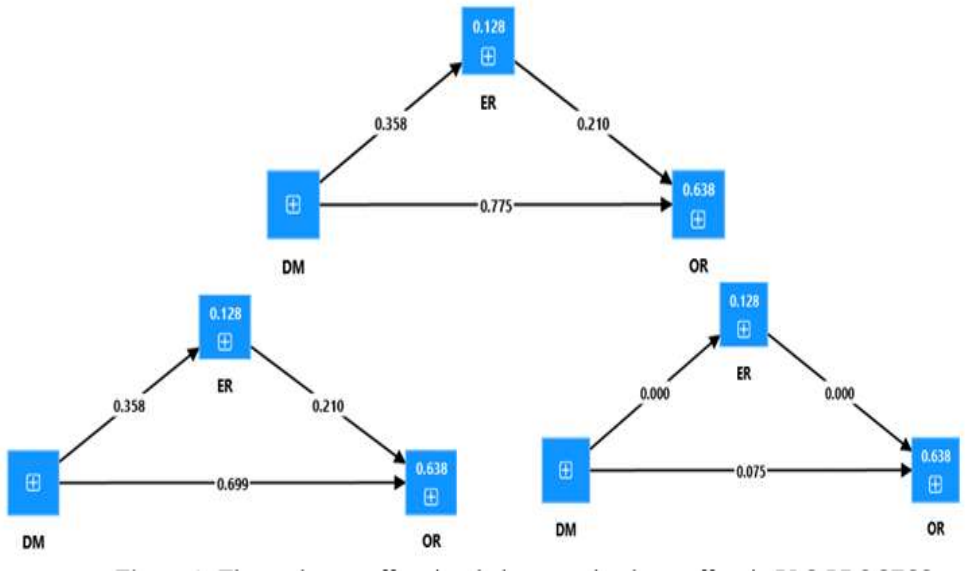

Figure 6: The mediation effect (total, direct, and indirect effects)- PLS-PROCESS

Table 11: The Mediating Effect of ER- (PLS- PROCESS)

H4, H4a, H4b	Total effect (direct +indirect)		Direct effect		Indirect effect via ER		Type of mediation
	Path coef.	*P* value	Path coef.	*P* value	Path coef.	*P* value	
DM > ER > OR	0.775	0.000***	0.699	0.000***	0.075	0.013*	Partial mediation

*** Significant at $p < 0.05$, ** Significant at $p < 0.01$, *** Significant at $p < 0.001$**

5. Discussion

5.1 Reflection on outcomes

The current research demonstrates a significant, positive, and direct effect of Digital Maturity (DM) on Organizational Resilience (OR). The strength of this effect is robust, suggesting that Organizations that establish higher degrees of digital maturity are better prepared to navigate disturbances, adjust to external variabilities and maintain operations during disasters. This finding is consistent with the results obtained by Nkomo & Kalisz (2023) who declared that digital transformation notably improves organizational resilience through promoting a culture of constant learning. Additionally, Trieu et al. (2024) asserted that higher digital maturity fosters resilience, as it gives organizations the ability to sustain operations during crisis. Moreover, He et al. (2023) discovered that both DI and TM positively affect Organizational Resilience. Conversely, Khurana et al. (2022) suggested that investment in digital transformation alone may not always lead to employee engagement, if organizations don’t give priority to employees’ engagement and

support. This suggests the need for a comprehensive approach balancing digital transformation with employee engagement to gain the greatest benefits.

The current research indicates a significant, positive effect of Digital Intensity (DI) on Organizational Resilience (OR). The recent literature supports this effect, demonstrating that organizations with significant digital capabilities exhibit greater adaptability and resilience during crises (Holopainen et al., 2024; Cichosz et al.; 2020). On the other hand, other researchers emphasized the indirect relationships between DI and OR. In this context, Prakasa et al. (2020) discovered that organizational capabilities and culture plays a mediating role in DI/OR relationship.

This study demonstrates a significant, positive, and direct effect of Transformation Management Intensity (TMI) on Organizational Resilience (OR). The current literature supports this effect, demonstrating that organizations capable of managing transformations have improved adaptability and resilience, particularly during crisis situations like COVID-19 pandemic (Liu et al., 2024; Miller; 2024). However, Cichosz et al. (2020) emphasized that weak management practices can create uncertainties and conflicts among employees, diminishing their positive impact on Transformation Management Intensity.

This study highlights the interdependency between Digital Maturity (DM), Employee Resilience (ER), and Organizational Resilience (OR). This finding aligns with Nassani et al. (2024),

who observed that organizations fostering digital maturity equip employees with technological proficiencies, enhancing their adaptability and overall job satisfaction. In the same line, Schiuma et al. (2024) found that such organizations foster an innovative culture that empowers employees, thereby enhancing resilience. However, Hokmabadi, Rezvani, & de Matos (2024) have warned that organizations relying solely on digital transformation—while neglecting employee skill development and appropriate training opportunities—may contribute to increased stress levels among employees, ultimately reducing resilience.

The current research demonstrates a significant, positive, and direct effect of DI on ER. Bughin, Catlin, Hirt, & Willmott (2018) support this finding revealing that digital platforms such as video conference and cooperatives tools may inspire employees, enhancing their adaptability and resilience. Similarly, Maalouf et al. (2024) highlighted that greater investment in DI leads to higher employee enablement and engagement. However, some qualitative studies argued that DI without appropriate context might lead to employees' disappointment, suggesting that such relationship is nuanced and can be shaped by other factors.

Nevertheless, this study demonstrates an insignificant effect of TMI on ER, suggesting that this connection is complex and influenced by multiple factors. Building on this, the effectiveness of transformation management in enhancing employee resilience depends on elements such as individual

employee ambidexterity (Hanu & Khumalo, 2024), alignment with organizational culture (Muadzah & Suryanto, 2024), and psychological empowerment (Blaique, Ismail, Corbin, & Aldabbas, 2025). Without addressing these factors, increased transformation management intensity alone may not significantly improve employee resilience.

The current research demonstrates a significant, positive, and direct effect of ER on OR. This relationship is consistent with Liu et al. (2024) who found that employee's resilience has a direct effect on organizational resilience, especially during disrupting fluctuations. Likewise, vein, Zhai et al. (2023) asserted that employee's resilience improves employees' ability to navigate crisis situations and address challenges. The strength of this effect suggests that employee's resilience leads to improved organization's capacity to quickly adapt to the surrounding environment. However, Holopainen et al. (2024) propose that employee resilience may not directly lead to organizational resilience if there is a shortage of support from top management. They revealed that organizational culture and leadership-style mediate the relationship between ER and OR.

The current research demonstrates a significant, positive, effect of ER on the indirect relationship between DM and OR. This finding is supported by Prayag et al. (2023), who found that organizations investing in employee resilience through upskilling and support are more likely to achieve greater overall

organizational resilience, strengthened by digital maturity. Similarly, Khurana et al. (2022) found a strong positive mediating impact of employee and managerial resilience; an essential element of dynamic capability on the relationship between digital maturity and organizational resilience. This suggests that digital maturity enhances employees' skills and resilience, which, in-turn, strengthens an organization's ability to adapt to and manage change more proactively. However, Thordsen and Bick (2023) identified contextual barriers, such as employee resistance to change, which can undermine the potential benefits of high digital maturity and weaken the mediating effect of employee resilience. This suggests that the mediating role of employee resilience (ER) in the relationship between digital maturity (DM) and organizational resilience (OR) is multidimensional and requires consideration of various factors that may influence resilience.

5.2 Theoretical and Practical implications

Research on organizational resilience (OR) remains fragmented, lacking a comprehensive understanding of its interdependencies with employee resilience (ER) and digital maturity (DM). This study addresses this gap by providing significant theoretical and practical insights into these complex relationships within Egypt's medical device sector. It contributes to the existing literature by integrating the Process Theory of

Change (PTC) with the Dynamic Capabilities Theory (DCT), offering an innovative framework for understanding how organizations navigate change in disruptive environments. This framework establishes a foundation for examining how ER influences the role of key DM components—digital infrastructure (DI) and technology management and innovation (TMI)—in strengthening OR dimensions, specifically situational awareness (SA), market viability (MKV), and adaptive capacity (AC). Additionally, this study identifies key components of digital maturity—Digital Intensity (DI) and Technology Management and Innovation (TMI)—which directly influence employee resilience. These findings highlight the need for further research on how these elements can be leveraged to enhance both individual and organizational resilience. By examining the mediating role of employee resilience in the relationship between digital maturity and organizational resilience, this study addresses a critical gap in the existing OR literature. It advances discussions on the extent to which employee competencies shape organizational capabilities during periods of disruption, encouraging further scholarly exploration into individual-level resilience mechanisms and their broader organizational impact (Haryanti et al., 2023; Khurana et al., 2022).

From a practical perspective, this research provides an in-depth understanding that enriches existing resilience frameworks, particularly in light of the post-COVID-19 pandemic, which has

highlighted the need for organizations to adapt and thrive amid disruptions (Maalouf et al., 2024; Copestake et al., 2024). The findings have significant practical implications for practitioners in the medical device industry, emphasizing the importance of investing in digital technologies that not only enhance operational efficiency but also strengthen employee resilience. This dual focus is crucial for organizations to succeed in a rapidly evolving environment.

Moreover, the research findings underscore the importance of fostering a supportive organizational culture as a key factor in developing resilience (Zhai et al., 2023). They provide new insights into a transformative shift in the role of HR professionals, who must move beyond traditional functions to become strategic partners in resilience-building efforts. This transition necessitates targeted training and development programs to equip HR practitioners with the skills required to drive cultural change and embed resilience as a core organizational competency (Madi Odeh et al., 2023). Accordingly, practitioners are encouraged to adopt HRM practices that enhance employee engagement and adaptability. Initiatives such as team-based training, motivational strategies, and performance incentives can significantly strengthen workforce resilience. These practices align employee capabilities with organizational objectives, fostering a culture that embraces change (Thordsen & Bick, 2023).

5.3 Direction for Future Research

This study identifies several avenues for future research to further explore the complexities of resilience in organizational contexts, enabling businesses to develop adaptive and sustainable frameworks that effectively respond to evolving challenges. *First*, future research should consider longitudinal studies to systematically track changes in employee and organizational resilience over time, particularly in relation to varying levels of digital maturity. This approach would provide a dynamic perspective on how resilience evolves as organizations navigate ongoing challenges within their operational environments. *Second*, expanding research beyond the healthcare sector could yield comparative insights into the impact of digital maturity on resilience across different industries, each of which may face unique challenges and develop distinct resilience strategies warranting in-depth examination. *Third*, future research could explore individual characteristics that contribute to employee resilience, such as personality traits, prior experiences, and support systems. Understanding these factors would enable organizations to design targeted interventions aimed at fostering a more resilient workforce, thereby strengthening overall organizational resilience. *Fourth*, exploring the impact of leadership styles on team resilience could provide valuable insights. Given the critical role of leadership in fostering a culture of resilience, investigating the emerging role of digital

leaders may reveal strategies that enhance both employee and organizational resilience (Erhan et al., 2022). *Fifth*, while this study examines the relationship between digital maturity and resilience, future research could delve deeper into how specific AI-based technological tools and platforms influence employee engagement. Assessing the effectiveness of collaboration platforms, digital communication methods, and project management systems would help identify which technological interventions most significantly enhance engagement, resilience, and overall workforce performance. *Finally*, exploring factors that contribute to employees' resistance to change, particularly in the context of digital transformation, would support the development of strategies to overcome resistance and facilitate the adoption of new technologies. This, in turn, would help foster a resilient organizational culture (Thordsen & Bick, 2023).

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