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Impact Factor 2.30

Evaluating the Impact of Digital Strategy, Culture, and Information Technology Capability on Digital Transformation: The Moderating Role of Leadership

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Abstract

In today's fast-paced and ever-evolving business environment, organizations, particularly large enterprises, must continuously adapt and innovate to remain competitive. As Egypt pursues digital transformation as a key driver of economic and organizational growth, enterprises in the ICT sector play a pivotal role in this transition. To successfully execute digital transformation, organizations must develop some organizational capabilities including robust strategies, cultivate a strong digital culture, and enhance IT capabilities. All while leveraging effective leadership to guide these efforts. This research aims to investigate the impact of organizational capabilities, digital strategy formulation, cultural values, and IT business capability, on digital transformation execution, with a specific focus on the moderating role of digital leadership. This research adopts a quantitative methodology, utilizing a non-probabilistic sampling technique through convenience and snowball sampling methods. The sample consists of 308 employees from top, middle, and first-line management positions within ICT sector organizations. Hypotheses are tested using appropriate statistical techniques. The findings reveal that organizational factors, including strategy formulation, cultural values, and IT business capability, have a positive impact on digital transformation execution within these organizations. Furthermore, leadership characteristics are found to positively moderate the relationship between the organization capabilities and Digital Transformation except for IT business capability, which operates independently of leadership and shows no moderating effect.

Keywords: *ICT, Large Enterprises, organizational capabilities, Digital strategy, Digital Culture, IT Capability, Digital Leadership, Digital Transformation*

1. Introduction to the research

In today's rapidly evolving digital landscape, both nations and organizations face mounting pressures due to accelerated innovation, heightened global competition, and the imperative for technological adaptability (Alotaibi, 2021). This environment, commonly referred to as the VUCA world—volatile, uncertain, complex, and ambiguous—demands organizations to continuously innovate, adopt emerging technologies, and remain agile to achieve sustainable growth and competitiveness. The COVID-19 pandemic further intensified the urgency for digital transformation (DT), compelling organizations across the globe to fast-track their digital agendas to remain operational and relevant in a time of crisis.

Digital transformation has emerged as a critical driver reshaping industries and redefining organizational success. As such, understanding the determinants that contribute to effective DT is vital for contemporary organizations. Egypt, in line with this global momentum, has recognized the transformative potential of digitalization and has invested heavily in national initiatives aimed at overhauling various sectors such as

healthcare, retail, manufacturing, and financial services. The Egyptian government views digitalization not only as a pathway to technological advancement but also as a catalyst for inclusive development and long-term economic growth. To realize this vision, it is essential to build robust digital infrastructure, develop a digitally competent workforce, and enact supportive legal and regulatory frameworks.

Despite the widespread acknowledgement of the importance of DT, identifying its antecedents remains a significant challenge. According to Gasperlin (2021), the predictors of successful digital transformation fall into three primary categories: technological, organizational, and environmental factors.

Technological Factors represent the foundational elements of DT. Organizations must embrace advanced digital tools such as cloud computing, big data analytics, artificial intelligence (AI), and the Internet of Things (IoT). These technologies not only drive operational efficiency but also enhance user experience and create new business models and market opportunities.

Organizational Factors pertain to internal culture, structure, and leadership. A transformation-ready workforce, digital skills, and visionary leadership are all crucial. Organizational agility, innovation culture, and alignment with strategic goals significantly influence DT success.

Environmental Factors, including regulatory and market conditions, serve as external enablers or constraints. Although organizations have limited control over these elements, favorable government policies, economic conditions, and competitive pressures can either facilitate or hinder transformation efforts.

Aligned with Egypt's Vision 2030 and Sustainable Development Goals (SDGs), the country has prioritized digital transformation through the coordinated efforts of governmental bodies. The Ministry of Communications and Information Technology (MCIT) plays a pivotal role in promoting organizational factors such as digital culture and IT capability. MCIT has spearheaded initiatives to expand digital infrastructure, promote digital literacy, and ensure equitable access to internet services (MCIT, 2022).

A notable initiative is the Digital Egypt strategy, a multi-pillar framework targeting the enhancement of infrastructure, upskilling citizens, digitizing government services, and supporting digital entrepreneurship. This strategy positions digital strategy as a central organizational factor driving DT success (MCIT, 2022).

Furthermore, the Ministry of Planning and Economic Development (MPED) monitors and evaluates the alignment of DT initiatives with Egypt's national development agenda. MPED ensures the implementation of projects that are in line with performance indicators and national socio-economic objectives.

Globally, the United Nations (2019) emphasized the role of digital technologies in achieving the 2030 Sustainable Development Goals (SDGs), reinforcing the importance of studying DT, particularly in large enterprises. Rehman (2022) highlighted that effective digital transformation can contribute significantly to multiple SDGs.

Economic Growth (SDG 8) enhanced productivity and innovation in digitally transformed enterprises contribute to inclusive economic development and job creation. Industry and Innovation (SDG 9): modernizing industries and infrastructure through DT fosters resilience and sustainability. Reduced Inequalities (SDG 10) promoting digital skills and inclusive technology access helps reduce social and economic disparities. Sustainable Consumption (SDG 12) Digitally enabled operations can optimize resource usage and promote responsible consumption. Global Partnerships (SDG 17) DT facilitates collaboration between governments, businesses, and civil society, advancing shared goals. Resilient Societies: Enhanced digital capabilities empower communities to respond more effectively to disruptions, including health crises and climate-related challenges.

Therefore, studying the organizational antecedents of digital transformation, namely digital strategy, digital culture, IT capability, and the moderating role of digital leadership is not only timely but essential.

2. Research Problem

Despite the growing body of literature examining the drivers and benefits of digital transformation (DT), there remains a fragmented understanding of how organizations can effectively implement DT in a way that ensures long-term competitiveness and resilience. As organizations navigate increasingly dynamic and competitive markets, they are compelled to harness emerging digital capabilities to sustain relevance and gain a competitive edge (Kraus, 2021). The rise of disruptive digital innovations has introduced substantial uncertainty into business environments, requiring companies to fundamentally rethink their operational models. These disruptive changes, if not strategically addressed, have the potential to render existing business models obsolete.

While numerous studies have underscored the importance of DT in enhancing productivity, reducing costs, and enabling innovation, there is still a need to understand the specific internal and external factors that drive successful digital transformation outcomes. Particularly, there is limited consensus on the organizational frameworks and capabilities that are necessary to move beyond simple technology adoption and toward comprehensive digital maturity.

Prior research has emphasized that DT encompasses more than technological investment, it also necessitates transformations in strategy, human capital, organizational culture, and operational processes (Mikalef, 2022). Lee (2022), using the Digital Maturity Model developed by TM (2023), classified digital transformation into six critical dimensions: customer, strategy, technology, operations, culture, and data. Furthermore, studies such as Alotaibi (2021) have utilized the Technology-Organization-Environment (TOE) framework to highlight the interplay between internal and external factors that influence DT success.

Nevertheless, a gap persists in understanding how these organizational and technological capabilities interact with leadership to shape successful digital transformation outcomes, particularly within emerging market contexts. Given the increasing pressure on organizations to remain agile and innovative, there is a pressing need to evaluate the role of organizational factors such as digital strategy, culture, and IT capability while also examining how leadership moderates the effectiveness of these enablers in achieving digital transformation.

3. Research Objectives

The research objectives are classified into general and specific objectives.

3.1 General Objective

This study aims to develop and test an organizational readiness framework to explain digital transformation (DT) success in large enterprises by examining the roles of digital strategy, digital culture, and IT capability, with a focus on the moderating effect of digital leadership.

3.2 Specific Objectives

- To identify key organizational predictors influencing DT success in large enterprises.
- To assess the impact of digital strategy on DT outcomes.
- To evaluate how digital culture supports or hinders DT initiatives.
- To examine the role of IT capability in enabling DT.
- To investigate how digital leadership moderates the relationship between organizational factors and DT success.

4. Literature Review

4.1 Introduction

The rapid advancement of digital technologies such as big data, artificial intelligence, cloud computing, and blockchain has significantly accelerated the pace of digitalization, driving profound changes across economies and industries (Smith, 2020). As a result, digital transformation (DT) has emerged as a strategic imperative for organizations aiming to enhance competitiveness, innovation, and achieve sustainable development (Jones, 2019; Lee, 2021). Many enterprises have reported performance improvements and increased agility following DT initiatives (Doe, 2022).

Despite these benefits, the path to successful DT remains complex and uncertain. Many organizations, particularly small and medium-sized enterprises, struggle to achieve desired outcomes due to limited resources, strategic misalignment, and capability gaps. Recent studies report that only 20% of digital transformation efforts meet their intended objectives (Zhang et al., 2022). The challenge is often compounded by a lack of clarity among managers regarding where to begin and which factors to prioritize (Smith, 2020).

To address this gap, scholars have emphasized the need to identify and understand the key antecedents of DT success. Gasperlin (2021) categorizes these into three domains: technological, organizational, and environmental factors. While technological and environmental components are necessary, organizational factors—such as strategy, culture, leadership, and IT capability—are increasingly recognized as critical enablers of effective digital transformation. These internal elements not only support the integration of technologies but also shape how external opportunities and constraints are managed (Jović, 2022; Zhang et al., 2023).

This study focuses on the organizational dimensions of digital transformation, exploring how digital strategy, digital culture, and IT capability contribute to DT success, and how digital leadership moderates these relationships. By doing so, the research aims to contribute to a more integrated understanding of digital transformation and provide practical insights for large enterprises navigating digital change.

4.2 Digital Transformation (DT)

Digital transformation (DT) has emerged as a critical strategic response to the accelerating pace of technological innovation and shifting market dynamics. Despite its increasing prominence in organizational discourse, DT remains a concept with diverse interpretations and definitions, reflecting its multifaceted nature (Gong, 2020). While many scholars agree on the foundational role of digital technologies in enabling transformation, there is also widespread consensus that successful DT extends beyond mere technology adoption. It entails a fundamental rethinking of business models, processes, and organizational culture.

Goran (2017) emphasized that DT is not solely a technological undertaking but a complex organizational change process that requires alignment across strategic vision, corporate culture, employee mindset, and talent development. This broader view positions digital transformation as a multidimensional effort that involves both technological capabilities and organizational readiness.

For this study, which focuses on organizational enablers of DT the definition provided by Nasiri (2020) is adopted. Nasiri conceptualizes DT as a strategic mechanism through which organizations transform their structures, processes, and cultures to effectively respond to rapid technological advances and evolving market needs. This definition aligns with the study's emphasis on internal capabilities, particularly DS, DC, and IT capability as well as the moderating influence of digital leadership on transformation outcomes.

4.2.1 Reasons behind Digital Transformation

The increasing convergence of technologies such as social media, mobile platforms, analytics, cloud computing, and the Internet of Things collectively referred to as SMACIT has triggered disruptive changes

across industries, redefining how organizations operate and compete (Vial, 2019). As Westerman (2020) noted, these technologies not only reshape business models and enhance customer engagement but also drive substantial operational efficiencies. Social media enables real-time customer interaction, mobile technologies extend service reach, analytics support data-driven decision-making, cloud computing ensures scalability and flexibility, and IoT facilitates automation and data collection at an unprecedented scale.

These disruptions compel organizations to pursue digital transformation (DT) not just as a technological upgrade but as a strategic necessity. Murshed (2023) emphasized that digital technologies have profoundly altered consumer behavior, increasing expectations for seamless, mobile-first experiences. In Egypt's banking sector, for instance, customers now expect to conduct most of their transactions through digital platforms, prompting banks to proactively innovate to remain competitive.

In parallel, digital technologies are redefining competitive dynamics. Attaran (2020) highlighted how digital platforms and blockchain technologies are lowering entry barriers, decentralizing services, and transforming product-based models into service-oriented ecosystems. These changes challenge traditional industry incumbents, requiring them to respond strategically or risk obsolescence.

In Egypt, national initiatives such as the "Digital Egypt" strategy are accelerating the adoption of cloud technologies across sectors. According to Kitsios (2023), government investment in IT infrastructure and collaboration with global technology providers have positioned cloud computing as a central pillar of public and private sector transformation offering scalable solutions for innovation, and digital service delivery.

Moreover, Grover (2020) argued that digital technologies significantly enhance organizations' data capabilities. By leveraging analytics, firms can gain strategic insights into customer behavior and operational performance. For example, Egyptian retailers are using customer data to forecast demand, personalize offerings, and increase customer loyalty demonstrating how data-driven strategies can support both transformation and growth.

4.2.2 Value of Digital Transformation

While digital technologies offer vast potential, their true value emerges only when applied strategically within specific organizational contexts. As Vrontis (2022) observed, technology alone contributes limited value; it is the integration of digital capabilities into core business activities that drives meaningful transformation. A key aspect of this process involves the redefinition of business models—specifically in terms of value proposition, value creation, and value delivery.

Value proposition transformation occurs as firms shift from product-centric models to service-oriented offerings enabled by digital technologies. Correani (2020) emphasized that such transformations allow firms to innovate in meeting customer needs while simultaneously capturing valuable user data. For example, Netflix evolved from a physical DVD rental service to a global streaming platform and content producer, leveraging data analytics to personalize experiences and guide strategic content investment.

Value creation, as discussed by Ghezzi (2020), is also significantly altered through digital mediation strategies. These include disintermediation (removing intermediaries for direct value exchange), remediation (enhancing coordination between network actors), and network-based mediation (building ecosystems involving diverse stakeholders). Importantly, digital technologies empower consumers to co-create value, a phenomenon seen across social platforms and user-driven digital communities.

Value delivery is likewise being transformed. Cha (2023) noted that organizations are developing digital distribution channels—especially through social media—to enhance engagement and enable omni-channel strategies. Simultaneously, digital tools such as IoT and algorithmic decision-making facilitate more intelligent, automated supply chains and customer service systems.

Beyond these model components, digital transformation also enhances organizational agility and ambidexterity. Zhang (2023) highlighted how technologies like analytics and IoT support rapid responses to market shifts, enable predictive maintenance services, and allow firms to simultaneously explore innovation while exploiting existing competencies.

To unlock these forms of value, effective digital leadership is essential. Leaders must foster a digital mindset, champion innovation, and ensure alignment between digital initiatives and strategic objectives. The emergence of roles such as the Chief Digital Officer (CDO) reflects this imperative. According to Zhang (2023), CDOs play a pivotal role in bridging business and technology functions, guiding organizations through structural and cultural change, and embedding digital strategies across operations.

4.2.3 Barriers to Digital Transformation

Despite the widespread recognition of its benefits, digital transformation (DT) is often hindered by deep-rooted organizational challenges. One of the most prominent barriers is organizational inertia, which arises from entrenched processes, legacy systems, and path-dependent capabilities that resist change (Kaganer, 2023). Established firms, especially those with long-standing relationships, rigid structures, and optimized (yet inflexible) routines, often find it difficult to pivot toward innovation. The case of Kodak is frequently cited, where core competencies in analog photography became strategic rigidities that obstructed the timely adoption of digital alternatives. In such cases, barriers are not merely technological but stem from institutional norms, organizational identity, and deeply embedded cultural structures that inhibit adaptation and responsiveness.

Another major challenge is employee resistance, particularly when disruptive technologies are introduced without sufficient management change (Denning, 2023). This resistance is often fueled by "innovation fatigue," where continuous waves of change exhaust staff and generate skepticism. Furthermore, resistance may emerge from ambiguous communication regarding the benefits of new technologies or from the misalignment of digital initiatives with existing workflows and norms. To mitigate this, Denning recommends appointing a Chief Digital Officer (CDO) to bridge the cultural divide, lead strategic alignment, and facilitate smoother integration of digital tools. Additionally, involving employees early—through workshops and cross-departmental collaboration—can reduce friction and improve adoption.

Cultural readiness plays a critical role in overcoming these barriers. As Pedersen (2022) highlighted, digital transformation requires a cultural shift that supports innovation, experimentation, and agile thinking. In many traditional organizations, the siloed relationship between IT and business functions hinders such change. Cultivating a digital culture—one that encourages small-scale experimentation, risk-taking, and iterative learning—is essential. Inspired by agile methodologies, this approach promotes organizational agility while supporting long-term strategic reorientation.

4.2.4 Impact of Digital Transformation

Digital transformation (DT) exerts profound and multifaceted impacts on organizations, extending beyond technological efficiency to broader strategic, operational, environmental, and societal outcomes.

One primary benefit is enhanced operational efficiency. Hanelt (2021) emphasized that DT improves automation, streamlines business processes, and reduces operational costs. Technologies such as cloud computing enable scalable, on-demand services with minimal IT overhead, while big data analytics accelerates decision-making through real-time insights. Moreover, the integration of artificial intelligence into smart products and services facilitates algorithm-driven decision-making, optimizing processes and resource use.

Beyond operations, DT also improves organizational performance. Guo (2021) found that digital initiatives enhance firm innovation, financial outcomes, growth, and reputation. For example, freemium models and digital community engagement foster customer loyalty and drive revenue. In entrepreneurial

settings, firms often establish a digital presence or "façade" to engage stakeholders, laying a foundation for broader ecosystem integration. These efforts collectively strengthen a firm's adaptability and competitive positioning in complex environments.

Importantly, DT contributes to societal and environmental value. Erku (2023) noted the transformative role of digital health solutions—such as telemedicine, electronic health records, and data analytics—especially in resource-constrained regions like parts of Egypt. These tools reduce the need for costly infrastructure and travel, expanding healthcare access and affordability. This creates a positive feedback loop where digital efficiencies in one domain amplify value in others.

However, the risks and unintended consequences of digital transformation must also be addressed. Saeed (2023) warned that increased reliance on algorithmic systems raises critical concerns about cybersecurity, privacy, and data safety. For instance, in the automotive sector, the rise of connected vehicles introduces vulnerabilities in telematics, remote entry systems, and electronic control units. To mitigate these risks, organizations must adopt comprehensive security strategies—such as "security by design," ongoing staff training, regulatory compliance, and continuous risk assessments.

4.3 Digital Leadership (DL)

Digital leadership (DL) has emerged as a critical enabler of digital transformation (DT), influencing how organizations adopt, adapt to, and capitalize on digital technologies. Dehimat (2022) conceptualizes digital leadership across three interconnected dimensions: General Mindset, Digital Business, and Social Attitude.

Leaders with a general mindset demonstrate adaptability, creativity, and a commitment to continuous learning. They embrace digital innovation as a strategic imperative and actively seek out digital solutions to drive growth and transformation. Those focused on digital business possess a deep understanding of how technologies can improve operational performance and market competitiveness. These leaders exhibit expertise in areas such as digital marketing, data analytics, and platform-based business models, often characterized by visionary thinking and digital intelligence. Meanwhile, the social attitude dimension reflects a leader's awareness of the broader ethical, societal, and inclusivity-related implications of digitalization, emphasizing values such as digital responsibility, diversity, and stakeholder inclusiveness.

While all three dimensions are important, this research aligns most closely with the general mindset component, given its relevance to organizational readiness and internal drivers of DT success. As defined by Ramadan (2023), digital leadership is the proactive and strategic guidance provided by leaders to facilitate, direct, and sustain the process of digital transformation within an organization. It reflects not only a technical capability but also a cultural and visionary role that enables firms to respond effectively to rapid technological changes.

4.3.1 Role of Digital Leadership

The increasing complexity and pervasiveness of digital technologies have elevated the strategic importance of digital leadership (DL) in navigating organizations through their transformation journeys. As Verhoef et al. (2021) noted, the progression from basic computerization to advanced digital ecosystems—driven by innovations such as big data, cloud computing, artificial intelligence, and augmented reality—has redefined traditional business models. This ongoing digital evolution, commonly termed the Fourth Industrial Revolution or Industry 4.0, has culminated in the broader phenomenon of Digital Transformation.

DT represents more than the adoption of new technologies; it constitutes a fundamental reconfiguration of organizational structures, value chains, and customer engagement strategies (Hanelt et al., 2020). This shift demands the development of personalized, real-time services and agile operational models to meet the expectations of increasingly digital-savvy customers. In such a volatile and fast-paced environment, effective leadership becomes indispensable to guide organizations through disruption, adapt strategies in real time, and foster innovation.

Digital leadership plays a dual role: not only must leaders initiate and manage the DT process, but they must also lead within a transformed, digital organization. As Verhoef et al. (2021) emphasize, DT is a continuum, with organizations exhibiting varying levels of digital maturity. Digital leaders are thus expected to handle both the transitional and operational aspects of this maturity journey. Magesa (2020) further explains that digital leaders are pivotal in fostering adaptive cultures, encouraging employee motivation, managing distributed teams, and deploying innovative work practices. These roles are essential for maintaining productivity and competitive advantage in digitally intensive environments.

However, despite growing scholarly interest, there remains a lack of consensus regarding the specific leadership characteristics required in the digital age (Magesa, 2020). Unlike traditional leadership, DL demands a dynamic and fluid style, capable of navigating disruptive change and continuously evolving digital landscapes. Araujo (2021) distinguishes between classical leadership and digital leadership by highlighting that DL encompasses two critical functions: steering the DT process and managing a digitalized organization. As many organizations are still mid-transformation, current digital leaders must effectively balance both responsibilities—leading change while also managing in a digitally redefined context.

4.3.2 Characteristics of Digital Leader

In the context of digital transformation (DT), effective leadership is increasingly defined not only by strategic vision but also by the possession of personal attributes and competencies suited for the dynamic and disruptive digital environment. According to Klein (2020), digital leadership can be characterized through three key dimensions: General Mindset, Digital Business, and Social Attitude, which align with the Technology-Organization-Environment (TOE) framework. While each dimension contributes to the holistic capabilities of a digital leader, the current research primarily focuses on the General Mindset dimension, aligning with the study's emphasis on organizational factors critical to DT success.

The General Mindset reflects a combination of traits and behaviors vital for leading through digital disruption. A core element is adaptability, enabling leaders to respond to rapid internal and external changes by adjusting strategies and processes to maintain competitiveness (Klein, 2020). Equally important is agility, the ability to swiftly pivot business models and structures to align with evolving technologies and customer expectations (Klein, 2020).

An open error culture is also essential, promoting a safe environment for experimentation and learning from failure, which fuels innovation and team resilience (Pedersen, 2022). Decisive courage allows leaders to make bold decisions amid uncertainty, inspiring trust and driving transformational change through a clear vision and persistent leadership (Klein, 2020).

Creativity supports the reimagining of business models and customer experiences by encouraging novel, tech-driven solutions (Ghezzi, 2020). Finally, self-awareness enables leaders to recognize their influence and limitations, fostering authentic, empathetic leadership and psychological safety—crucial in diverse, collaborative digital environments (Ramadan, 2023).

4.4 Digital Strategy (DS)

Digital Strategy (DS) represents a critical component of an organization's broader business strategy, particularly in the context of digital transformation (DT). In this research, the definition provided by Li (2021) is adopted, which conceptualizes digital strategy as the organization's capability to formulate and implement a digital transformation agenda that is closely aligned with its overall strategic goals.

Unlike isolated technological initiatives, DS is a cohesive and integrative approach that ensures digital technologies are embedded across core business processes to deliver value to all stakeholders. Li (2021) emphasized that effective digital strategy requires more than the adoption of emerging tools—it necessitates fostering shared understanding with stakeholders, making informed and innovative decisions on technology use, and aligning these efforts with the organization's mission and market position.

Furthermore, the integration of digital technologies signals a strategic shift from traditional operational models to more agile, data-driven, and customer-centric frameworks. This shift is designed to improve performance not only at the operational level but also in terms of financial outcomes, market responsiveness, and long-term competitiveness. Therefore, digital strategy functions as both a blueprint and a catalyst for transformation, guiding the organization in navigating technological disruption while capitalizing on new opportunities

4.4.1 Digital Strategy Formulation

The formulation of a digital strategy is the foundational step in any digital transformation (DT) initiative. Warner (2019) emphasized that this phase is critical, as it sets the strategic direction and provides a roadmap for aligning digital initiatives with broader organizational goals. A well-crafted digital strategy enables organizations to prioritize resources, coordinate efforts across departments, and guide the implementation of digital technologies to enhance both operational efficiency and innovation. It also facilitates internal alignment by fostering a shared vision and communication across business units.

Smith (2023) expanded this view by identifying the importance of information gathering in the formulation process. Many organizations fail to adapt their business models to digital or environmental disruptions due to insufficient awareness of internal and external drivers of change. Thus, digital strategy begins with developing the capability to scan the environment, assess technological opportunities, and understand evolving customer expectations. Digital resources—such as big data, artificial intelligence (AI), blockchain, the Internet of Things (IoT), and robotics—play a crucial role by providing actionable insights that inform strategic decisions. However, effectively leveraging these technologies requires not only technical expertise but also organizational preparedness to interpret and act on such data. Successful digital strategizing entails overcoming cultural resistance, adapting internal structures, and designing action plans that incorporate innovation, value creation, and change management.

Korachi (2020) highlighted the role of digital strategy in product development. By engaging customers through digital tools, organizations can better understand market needs and expectations, which in turn drives the innovation and redesign of digital products and services. This feedback loop is essential in today's economy, where digital offerings are reshaping industry boundaries and redefining competition. For instance, companies like Netflix and Volvo have successfully leveraged digital technologies to deliver hybrid product-service models that enhance customer experience and establish competitive advantage. Digital strategy thus facilitates not only innovation but also the strategic positioning necessary to thrive in increasingly dynamic digital ecosystems.

Wanzhen (2023) introduced another important perspective by linking digital strategy to value creation. Traditional methods—such as competitive pricing or broader product choice—are no longer sufficient for sustainable advantage. Instead, digital strategy should focus on designing business models that explicitly outline how value is created, delivered, and captured. Digital products and services alone offer limited value unless embedded in a compelling and customer-centric business model. Organizations must understand customer needs deeply and restructure value chains to respond rapidly and effectively. Personalized, integrated customer experiences are now central to maintaining trust, loyalty, and competitive relevance in the digital age.

Lastly, Yao (2023) emphasized the necessity of organizational change as part of digital strategy formulation. Digital transformation extends beyond adopting new technologies; it requires rethinking the organizational structure, culture, and capabilities. The effective integration of digital activities often necessitates new departments, skills, and workflows. Some firms may opt to hire external experts to lead the change, while others reorganize internal units to support digital objectives. A responsive and evolving organizational structure becomes imperative for sustaining long-term digital success, ensuring the firm can continuously align capabilities with customer needs and technological advances.

4.5 Digital Culture (DC)

Digital culture has emerged as a critical dimension of organizational readiness in the context of digital transformation (DT). As discussed in Chapter One, digital culture operates on three interconnected levels that shape how organizations adapt to and thrive within digital environments. Drawing upon Schein's (2004) organizational culture model, Wang (2022) articulated these levels as follows:

First, the artifact level includes observable elements within the organization—such as structures, strategies, systems, and technologies—along with intangible factors like leadership style, workforce competencies, and organizational processes. These artifacts reflect how digital tools and collaborative technologies are embedded in both internal and external operations.

Second, the value and belief level encompasses the shared digital aspirations, goals, and performance standards that guide employee behaviors and strategic decisions. These values emphasize agility, innovation, transparency, and customer centricity—traits that are vital for successful DT.

Third, the underlying assumption level refers to deeply held, often unconscious, organizational norms about technology, authority, and innovation. This level reflects how employees perceive the role of digital technologies in their work, including the belief that digitalization empowers individuals, decentralizes decision-making, and integrates creativity and IT across all functions.

In alignment with this framework, this study adopts the definition of digital organizational culture proposed by Martínez-Caro et al. (2020). The authors define digital culture as a set of shared values and beliefs expressed through an organization's norms, moral principles, and collective understanding of how work is conducted in a digital environment. This conceptualization emphasizes not only the behavioral and structural adaptations required for digital maturity but also the cultural shift toward openness, collaboration, and continuous learning.

4.5.1 Characteristics of Digital Culture

In the context of digital transformation (DT), organizational culture plays a foundational role in shaping how firms adopt and integrate digital technologies. Following Schein's (2004) three-level framework—artifacts, espoused values, and underlying assumptions—this section explores the key characteristics of digital culture. These dimensions reflect not only observable changes but also the deeper cultural shifts necessary for sustaining digital innovation.

4.5.1.1 Digital Culture Artifacts

Artifacts are the tangible expressions of digital culture. As noted by Isensee et al. (2020), digital-era organizations are characterized by innovative collaboration, dual structures, platform ecosystems, and customer co-creation. Cross-functional collaboration brings together teams from various departments to enhance transparency and decision-making. Virtual and flexible workspaces, including remote and hybrid models, have become essential, requiring strong digital tools for cohesion. Organizations also adopt dual structures (ambidexterity) to balance stable core operations with agile innovation units. Startup collaborations via partnerships or investments inject speed and entrepreneurial thinking. Additionally, platform ecosystems involving partners, suppliers, and even competitors foster shared infrastructure and joint innovation. Finally, customer co-creation integrates users directly into the development process through feedback and beta testing, ensuring alignment with market needs.

4.5.1.2 Digital Culture Values

At the value level, digital culture is characterized by shared beliefs and norms that foster innovation, collaboration, and adaptability. As emphasized by Holgeid (2019), these soft values, though often intangible are crucial for achieving sustainable digital transformation.

One prominent value is the startup mentality and innovation culture, where organizations adopt a mindset like startups—marked by minimal hierarchy, openness to failure, and rapid experimentation. This approach promotes a customer-first orientation and encourages employees to contribute innovative ideas freely. The emphasis on a "fail fast, learn faster" philosophy enables continuous adaptation and creative problem-solving.

Another key value is digital skills development, reflecting the growing importance of technological expertise. Organizations are increasingly investing in the upskilling of current employees while also attracting new talent with proficiency in areas such as artificial intelligence, data analytics, and cybersecurity. This focus on continuous learning and development is essential for maintaining digital competitiveness and resilience in a rapidly evolving technological landscape.

Decentralized decision-making is also a hallmark of digital culture. In contrast to traditional hierarchical models, digital organizations empower teams by distributing authority. This flattening of the organizational structure facilitates faster responses, boosts innovation, and ensures that decisions are made closer to where relevant knowledge resides. By democratizing decision-making, organizations enhance agility and align more closely with the dynamic demands of digital environments.

Finally, the expanding role of IT illustrates a significant cultural shift. No longer viewed merely as a support function, IT has become a strategic partner in business development and innovation. IT professionals actively co-design products, lead digital initiatives, and shape organizational strategies. Their involvement in core decision-making processes highlights the integrated nature of technology within digitally mature organizations

4.5.1.3 Digital Culture Underlying Assumptions

The deepest level of digital culture involves underlying assumptions—implicit beliefs that shape how employees perceive and respond to organizational realities. Teguh (2022) identified several such assumptions that significantly influence digital transformation efforts.

A primary assumption is the perceived need for digital talent. Organizations acknowledge the scarcity of skilled professionals and are redesigning work environments to attract them. Flexible structures, decentralized authority, and startup-like perks foster a culture that supports creativity and innovation.

Another assumption centers on increasingly demanding digital customers. Expectations for real-time, personalized experiences are pushing firms to embed IT within product teams and rapidly adapt based on user feedback. Customer insights now drive development processes from the outset.A third key belief is that agility is essential. In a fast-changing digital landscape, responsiveness and collaboration are critical. Organizations are dismantling silos and enabling swift execution to maintain competitiveness and meet evolving demands.

Lastly, there is a growing view of IT as a driver of innovation. Rather than a support function, IT is integrated into strategy through cross-functional teams that blend technical and business expertise, fostering faster, innovation-led transformation.

4.6 IT Capability (ITC)

Information Technology Capability (ITC) is essential for enabling digital transformation and organizational responsiveness. According to Brunner (2021) and Kim (2020), ITC can be categorized into three dimensions, IT Infrastructure Capability, IT Business Spanning Capability and IT Proactive Stance.

This study emphasizes IT Business Spanning Capability, aligning with its focus on organizational rather than technological or environmental factors. Brunner (2021) defines IT Capability as the organization's ability to deliver and align IT systems, services, and innovations with business objectives, supporting strategic execution and long-term performance.

4.6.1 IT Infrastructure Capability

Awamleh (2022) defines IT infrastructure as the foundational physical and virtual assets that support data flow, processing, and communication across an organization. This includes hardware (e.g., servers, computers), software, and communication networks. Mohammed (2021) emphasized three service models that enhance infrastructure scalability and responsiveness:

IaaS offers core computing resources on-demand, enabling flexible scalability (e.g., AWS, Microsoft Azure). PaaS provides platforms that support rapid application development and deployment (e.g., Heroku, Google App Engine). SaaS delivers software via the internet on a subscription basis, enhancing accessibility and reducing maintenance (e.g., Salesforce, Office 365).

These models enable efficient, scalable IT operations that support organizational agility.

4.6.2 IT Business Spanning Capability

According to Saputro (2022), this capability reflects the extent to which IT is integrated into business functions and aligned with strategic goals. Demir (2019) used the 7S Model to frame this integration, highlighting strategy alignment, structural clarity (e.g., RACI matrices), automated systems (e.g., ERP, CRM), and a shared culture of innovation. It also involves empowering staff through skill development and agile methodologies. Effective business spanning ensures synergy between IT and business units, enabling strategic responsiveness and value creation.

4.6.3 IT Proactive Stance

An IT proactive stance refers to an organization's ability to anticipate technological changes and respond strategically (Amaliyah, 2019). Ridwandono (2019) emphasized the use of market intelligence and analytics to predict trends and customer demands, enhancing innovation. Brunner (2021) highlighted the role of competitor intelligence in enabling firms to benchmark, pre-empt rivals, and remain competitive. Kim (2020) added that technological intelligence, achieved through constant monitoring of emerging technologies like AI and IoT, allows early adoption and fosters innovation. Altogether, a proactive stance enables firms to maintain agility and secure long-term advantage.

4.7 Relationship among Variables

4.7.1 Digital Strategy and Digital Transformation

Teng (2022) emphasized that a well-structured digital strategy is fundamental for the successful implementation of digital transformation (DT). An effective strategy acts as a tailored roadmap, guiding organizations through the complexities of digitalization, particularly in traditional industries undergoing strategic renewal. Similarly, Zhang et al. (2023) highlighted that digital strategy provides a foundational framework for the adoption and integration of digital initiatives, ensuring that digital technologies are leveraged in alignment with organizational goals.

Digital strategy, when aligned with the overarching business strategy, facilitates the development of innovative digital business models, ultimately enhancing competitive advantage. Conversely, digital transformation efforts that proceed without a coherent strategic framework often encounter obstacles and yield suboptimal outcomes. Hence, strategic alignment and purposeful execution are critical to maximizing the impact of DT.

Based on the theoretical and empirical foundations discussed, the following hypothesis is proposed:

Hypothesis 1 (H1): *Digital strategy is positively related to digital transformation.*

4.7.2 Digital Culture and Digital Transformation

Antonio (2023) argued that digital culture is becoming integral to organizational culture, as digital transformation (DT) reshapes work methods and managerial practices. He emphasized that fostering a digital culture across all organizational levels is essential for navigating DT successfully. This includes creating a learning environment, investing in team development, and promoting adaptability to change.

Martínez-Caro (2020) further noted that digital culture involves more than technological adoption—it requires a mindset open to challenging norms, embracing continuous learning, and applying digital tools for collaboration and innovation. Key cultural values that support DT include adaptability, experimentation, knowledge sharing, and teamwork.

Ultimately, organizations that cultivate a digital culture—emphasizing both technical and interpersonal competencies—are better positioned to achieve successful digital transformation outcomes.

Hypothesis 2 (H2): *Digital culture is positively related to digital transformation.*

4.7.3 IT Capability and Digital Transformation

IT capability plays a foundational role in enabling organizations to achieve digital transformation (DT). Brunner (2021) emphasized that firms with well-developed IT resources, expertise, and infrastructure are better positioned to transition from traditional systems to digital technologies, such as big data analytics, mobile applications, and cloud computing. These capabilities enable organizations to innovate, digitize operations, and enhance customer experience.

Pascal (2020) supported this view, noting that IT capability facilitates knowledge management, process optimization, and data-driven innovation. It empowers organizations to adapt rapidly, automate workflows, and develop new digital products and services aligned with evolving market demands. Thus, IT capability acts as a strategic enabler of digital transformation by fostering agility, learning, and technological integration.

Hypothesis 3 (H3): *IT capability is positively related to digital transformation*

4.7.4 The Moderating Role of Digital Leadership

Digital leadership plays a critical moderating role in the relationship between digital capabilities and digital transformation (DT). Amaliyah (2019) highlighted that digital leaders facilitate alignment between digital strategy and business goals, enhancing IT governance and strategic integration. Their shared knowledge and collaboration optimize IT value and strengthen organizational adaptability to digital changes.

Jesper (2022) noted that digital leaders guide the vision-setting process by collecting essential information, identifying innovation opportunities, and aligning offerings with customer needs. Their ability to manage digital products, services, and business models supports agile and customer-centric transformation. Thus, leadership is vital in converting digital strategy into effective transformation initiatives.

Hypothesis 4a (H4a): *Digital leadership positively moderates the relationship between digital strategy and digital transformation.*

Similarly, Shin (2023) emphasized that digital leadership is essential in translating digital culture into transformation success. Leaders foster cultural adaptation by promoting innovation, strategic thinking, and global perspectives. They shape employee behavior and align digital culture with organizational transformation goals.

Hypothesis 4b (H4b): *Digital leadership positively moderates the relationship between digital culture and digital transformation.*

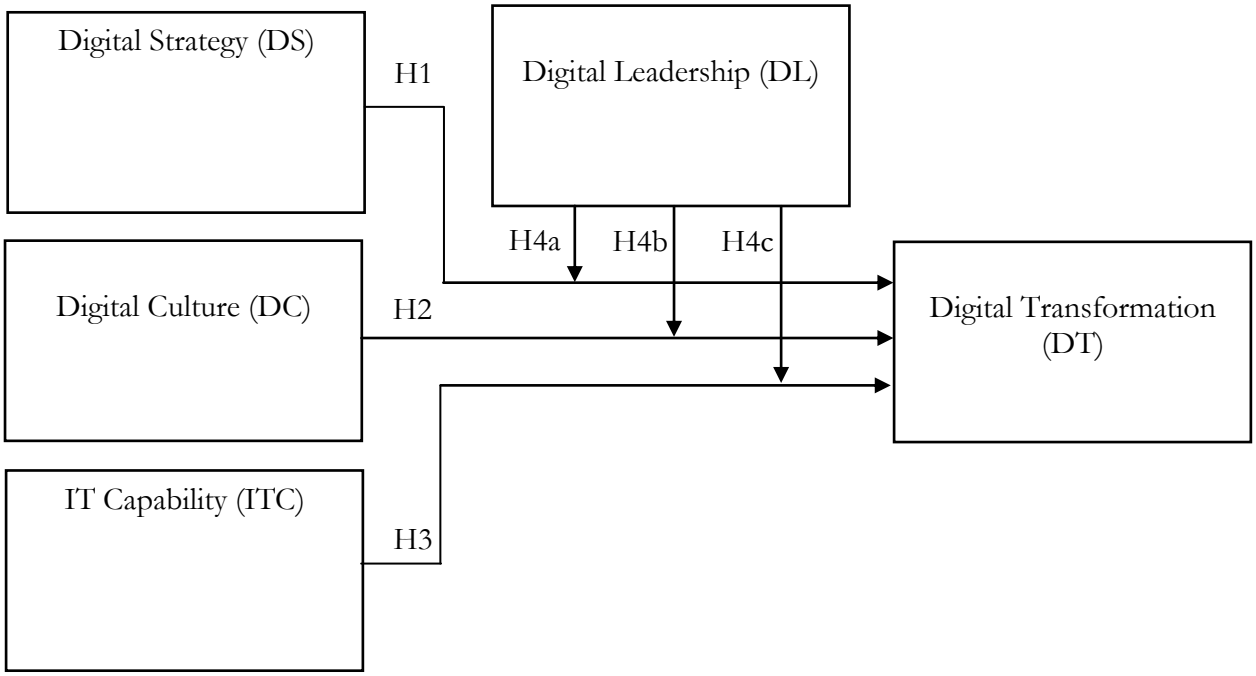
Brunner (2021) further elaborated that digital leaders strengthen the connection between IT capability and DT by enabling infrastructure agility, establishing robust IT governance, and developing hybrid digital skills. They play a key role in aligning technological competencies with business needs, optimizing processes, and identifying new market opportunities through data analytics.

Hypothesis 4c (H4c): *Digital leadership positively moderates the relationship between IT capability and digital transformation*

5. Research Methodology and Design

5.1 Research Conceptual Framework

Figure 1: Conceptual Framework



Source: Developed by the Researcher

5.2 Research Philosophy

Research philosophy refers to the foundational beliefs regarding knowledge development that shape methodological decisions (Majeed, 2020). Among the dominant paradigms in social sciences are positivism and interpretivism. Positivism assumes that reality is objective and measurable, independent of human perception, and best understood through scientific methods such as surveys and statistical analysis. It aims to derive generalized conclusions through empirical observation. Conversely, interpretivism posits that reality is socially constructed, emphasizing subjective meanings, context, and individual experience. It typically employs qualitative methods like interviews and ethnography to generate in-depth, contextual insights.

This study adopts a positive philosophy, which is particularly suited to the study's quantitative nature. The choice is justified by several considerations:

- Objectivity: Positivism ensures results are based on empirical data, free from researcher bias or value judgment.
- Alignment with Research Design: The research seeks to uncover measurable, objective truths through hypothesis testing using a structured, survey-based methodology.

- Generalizability: A large sample and statistical techniques allow for the derivation of generalizable findings, a hallmark of positivist inquiry.
- Theory Testing: The approach enables the systematic testing of theoretical relationships among variables using quantitative data and inferential statistics.

5.3 Research Approach

The research approach defines the structured process guiding this study from formulating research questions to data collection, analysis, and interpretation (Majeed, 2020). It integrates theoretical frameworks, methodological strategies, and analytical procedures. Two key reasoning methods inform research design: deductive and inductive. Deductive reasoning starts with existing theories or hypotheses and tests them through empirical data, while inductive reasoning develops new theories from patterns observed in data.

This study adopts a deductive research approach for several reasons. First, it aligns with a positive philosophy, emphasizing objectivity and hypothesis testing. Second, it is grounded in the Technology Organization Environment (TOE) framework, enabling a structured examination of the relationships among digital strategy, digital culture, IT capability, and digital transformation. Third, it builds on a robust literature review to test predefined hypotheses, aiming to validate theoretical relationships using empirical evidence.

By employing a deductive approach, the study ensures both methodological rigor and strong theoretical alignment in investigating the enablers of digital transformation.

5.4 Research Strategy

Research strategy refers to the overarching blueprint that guides data collection, measurement, and analysis to effectively answer the research questions (Kirsty, 2018). A variety of research designs are available, including descriptive, correlational, experimental, diagnostic, and explanatory. This study adopts a correlational research design, which is particularly suitable for examining the strength and direction of relationships among naturally occurring variables without manipulation.

The correlational design was chosen for several reasons. First, it facilitates the investigation of relationships among key organizational variables influencing digital transformation. Second, it allows for observation in natural settings, enhancing the ecological validity of the findings. Third, it helps determine both the direction (positive or negative) and strength of inter-variable associations.

To implement this design, the study employs a survey research strategy, which is commonly used in correlational studies and supports large-sample, quantitative data collection. Compared to other strategies such as experiments, case studies, or narrative inquiry, surveys offer scalability, cost-efficiency, and the ability to generate standardized data from a broad population (Kirsty, 2018).

The survey strategy was selected for the following reasons:

- It enables the collection of quantifiable data from large and diverse sample.
- It ensures anonymity, which encourages honest responses and minimizes bias.
- Its structured format promotes consistency in data collection.
- It provides a statistically sound basis for generalizable conclusions.

5.5 Research Method

Research methods refer to the systematic techniques used to collect, analyze, and interpret data in alignment with the study's objectives (Saunders, 2019). Broadly, research methods fall into three categories: qualitative, quantitative, and mixed methods. Qualitative methods are interpretive, providing in-depth understanding of complex phenomena through techniques such as interviews and focus groups. In contrast,

quantitative methods employ structured tools and statistical techniques to analyze numerical data, enabling hypothesis testing and the identification of variable relationships. Mixed methods combine both qualitative and quantitative approaches to offer a more holistic view of the research problem.

This study adopts a quantitative research method, which is well-suited to its deductive reasoning and positivist philosophical stance. Quantitative methods enable hypothesis testing and facilitate the analysis of relationships among variables across large, representative samples, enhancing the generalizability of the findings. This methodological choice is further justified by precedent in the literature; numerous studies examining digital transformation within the Technology–Organization–Environment (TOE) framework have effectively employed quantitative methods to measure constructs and validate structural relationships (e.g., Alotaibi, 2021; Nasiri, 2020; Li, 2021; Martínez-Caro, 2020; Brunner, 2021; Ramadan, 2023). Accordingly, the quantitative approach offers a structured, objective, and scalable method that aligns with the theoretical and empirical goals of this research.

5.6 Research Time-Horizon

The research time horizon defines the temporal scope for data collection (Gray, 2021). Two primary types exist: cross-sectional and longitudinal. Cross-sectional studies capture data at a single point in time, enabling the identification of patterns and correlations, while longitudinal studies track changes over an extended period to analyze trends and causality.

This study adopts a cross-sectional time horizon, as its primary objective is to capture a snapshot of the current state of digital transformation and its organizational antecedents in large enterprises. This approach is time-efficient, cost-effective, and appropriate for hypothesis testing in large-scale research.

5.7 Research Population and Sample Selection

5.7.1 Population

This study targets top, middle, and first-line management employees from large enterprises in Egypt, identified through the EGX 100 index, which includes Egypt's 100 most prominent firms based on scale, assets, and market influence. These enterprises, known for their regional or international operations and significant economic contribution, were purposively selected for their alignment with Egypt's digital transformation agenda and relevance to several Sustainable Development Goals (SDGs)—notably SDG 8 (economic growth), SDG 9 (industry and innovation), SDG 10 (reduced inequalities), SDG 12 (sustainable production), and SDG 17 (partnerships and transparency). This population provides a suitable context for assessing how organizational capabilities influence digital transformation in emerging economies.

5.7.2 Sampling Frame

A sampling frame provides the list from which a sample is drawn, ensuring inclusiveness and accuracy (Baltes, 2022). For accessibility and relevance, the sampling frame in this study includes large ICT enterprises in Egypt, specifically: WE, Vodafone, Etisalat, and Orange. These organizations represent the leading edge of digital transformation in the Egyptian ICT sector, offering rich insight into enterprise-level digital initiatives.

5.7.3 Sampling Technique

Sampling enables generalizing findings from a subset to the broader population, especially when complete enumeration is impractical (Bhardwaj, 2019). While probability sampling ensures equal selection chances, it is unsuitable here due to the absence of a defined population list. Thus, a non-probability sampling approach was adopted, combining convenience sampling and snowball sampling. Convenience sampling allows data collection from accessible respondents, while snowball sampling expands the network via referrals from initial participants ("seeds") who meet the study criteria. This hybrid approach balances practicality and relevance for hard-to-reach managerial segments.

5.7.4 Sample Size

Sample size depends on various factors including population size, confidence level, margin of error, and sampling method (Kadam, 2020). Given the non-probability approach, guidelines from Memon (2020) were initially used:

- Rule 1: 25 × number of independent variables = 100
- Rule 2: 50 + 8 × number of independent variables = 82

To ensure statistical rigor, G*Power analysis was employed with the following parameters:

- Effect size: 0.05
- Confidence level: 95%
- Margin of error: 5%

This resulted in a required minimum sample size of 218 respondents, sufficient for hypothesis testing and generalizability within the chosen context.

5.8 Data Collection

To meet the research objectives and address the research questions, both primary and secondary data sources were employed.

5.8.1 Primary Data

Primary data refers to information directly collected by the researcher for the specific objectives of this study. A structured questionnaire was distributed to top, middle, and first-line managers in large ICT enterprises, enabling hypothesis testing and examination of inter-variable relationships. The use of primary data is justified as the constructs were grounded in a thorough literature review, aligning with the study's deductive approach, correlational design, and survey strategy. Additionally, large-scale data collection was achievable within a limited timeframe, and analysis through SPSS allowed for efficient and cost-effective statistical processing.

5.8.2 Secondary Data

Secondary data, obtained from previously published studies, government reports, and organizational records, were used to define the research gap and context, support the formulation of research questions, objectives, and hypotheses, identify and justify the inclusion of key variables and develop the theoretical framework and research methodology.

The integration of secondary data provided a foundational basis for understanding the organizational enablers of digital transformation and guided the design of the primary research instrument.

5.9 Scale and Measures

The development of the research questionnaire followed a structured, three-stage process:

Literature Review and Item Selection where the researcher reviewed existing studies to identify relevant dimensions of each construct—digital transformation, digital strategy, digital culture, IT capability, and digital leadership. Only organizational dimensions were retained, while unrelated dimensions (e.g., technological, environmental) were excluded. Measurement items were selected from validated instruments in prior literature.

Questionnaire Refinement was simplified to enhance clarity and eliminate ambiguity. This ensured that all questions were easily understood by the respondents.

Pilot Testing was conducted with a sample of management-level employees from large enterprises to assess the clarity of the questionnaire and the time required for completion. Feedback was used to make minor refinements.

Table 3. Sources of Questionnaire Items

Variable	Dimension	Source	Item Numbers	Scale
Digital Transformation	Execution of DT	Nasiri (2020)	1–5	5-point Likert
Digital Strategy	Formulation of DS	Li (2021)	6–9	5-point Likert
Digital Culture	Values and Beliefs	Zhen (2021)	10–13	5-point Likert
IT Capability	IT Business Spanning Capability	Brunner (2021)	14–17	5-point Likert
Digital Leadership	General Leadership Mindset	Ramadan (2023)	18–23	5-point Likert

The questionnaire was structured to align with the study's objectives and ensure clarity. Section 1 introduced the study and explained the main variables. Section 2 covered demographic data—gender, age, experience, and managerial level. Section 3 included five items measuring digital transformation, while Section 4 featured fourteen items assessing organizational predictors: digital strategy, culture, and IT capability. Section 5 contained six items evaluating the moderating role of digital leadership.

All items were assessed on a 5-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

5.10 Statistical Analysis

Data analysis was carried out using the Statistical Package for the Social Sciences (SPSS), with techniques selected to align with the research objectives, hypotheses, and data characteristics. Following Memon (2020), the analysis was divided into two broad categories: descriptive and inferential statistics.

Descriptive analysis was first conducted to summarize the demographic profile of respondents and the central tendencies in the data. Frequencies and percentages were used to present variables such as gender, age, experience, and managerial level. Measures of central tendency (mean, median, and mode) and dispersion (standard deviation and range) were calculated to capture the data's overall distribution. Additionally, percentiles (25th and 75th) were examined to understand data spread and detect any potential outliers.

To ensure the reliability and validity of the instrument, Cronbach's Alpha was applied to assess internal consistency across the constructs. Furthermore, Exploratory Factor Analysis (EFA) was conducted to confirm the construct validity and the underlying structure of the measurement items.

Inferential statistical techniques were then applied to test the study's hypotheses and examine relationships among variables. Normality tests, including the Shapiro-Wilk and Kolmogorov-Smirnov tests, were used to determine whether parametric or non-parametric methods were appropriate. Spearman's rank-order correlation was employed to assess the relationships between the independent variables—digital strategy, digital culture, and IT capability—and the dependent variable, digital transformation.

To determine the predictive power of the independent variables, regression analysis was conducted using regression coefficients and R^2 values. Lastly, moderation analysis was performed by creating interaction terms between digital leadership (as the moderating variable) and each independent variable to assess how digital leadership influenced the relationship with digital transformation.

Together, these statistical techniques provided a comprehensive and rigorous understanding of both the measurement quality and the dynamics of the relationships within the proposed research mode.

6. Data Analysis

A total of 308 valid responses were analyzed after excluding non-managerial staff to ensure that the data accurately reflects the perspectives of individuals involved in decision-making and strategic processes

6.1 Demographics Analysis

This section presents an analysis of the respondents' demographic characteristics, focusing on four key variables: gender, age, years of experience, and managerial level. Understanding these attributes provides essential context for interpreting the findings and ensures the representativeness of the sample.

Table 1: Respondents' Demographic Information

Variable	Category	Frequency	Percentage
Gender	Female	90	29.2%
	Male	218	70.8%
Age	25 - below 35 years	52	16.9%
	35 - below 45 years	112	36.4%
	45 - below 55 years	122	39.6%
	55 years and above	22	7.1%
Years of Experience	Less than 10 years	52	16.9%
	10 to 19 years	101	32.8%
	20 years and above	155	50.3%
Managerial Level	First Line Management	67	21.8%
	Middle Management	125	40.6%
	Top Management	116	37.7%

Source: SPSS Data Analysis

The gender distribution indicates a predominantly male sample (70.8%), suggesting possible gender imbalance in managerial roles within the participating organizations. Female respondents constituted 29.2% of the sample.

The age profile shows that most respondents are between 35 and 55 years old (76%), reflecting a mature and experienced workforce. Only 16.9% are under 35, and 7.1% are 55 or older. This age concentration implies that the sample mainly consists of mid- to late-career professionals who likely possess considerable exposure to strategic initiatives, including digital transformation.

In terms of experience, 50.3% of respondents have 20 or more years of professional background, with an additional 32.8% having 10–19 years. Only 16.9% reported less than 10 years of experience. This distribution confirms the depth of experience across the sample, which strengthens the reliability of insights drawn regarding digital transformation.

Regarding managerial level, middle management constitutes the largest group (40.6%), followed closely by top management (37.7%). First-line managers make up 21.8% of the sample. The predominance of mid-to-senior level roles aligns with the study's focus on strategic leadership and organizational change, ensuring the responses come from individuals with decision-making authority.

6.2 Descriptive Statistics

The following table presents the descriptive statistics—mean scores and standard deviations—for the five main variables of the study: Digital Transformation, Digital Strategy, Digital Culture, IT Capability, and Digital Leadership.

Table 2 – *Descriptive Statistics for Model Variables*:

Variables	N	Mean	Std. Deviation
Digital Transformation	308	4.02	0.635

Digital Strategy	308	3.85	.824
Digital Culture	308	3.70	.828
IT Capability	308	3.79	.736
Digital Leadership	308	3.65	.779

Source: SPSS Data Analysis

The results indicate that Digital Transformation has the highest mean score (M = 4.02, SD = 0.64), suggesting that respondents generally perceive a strong level of digital transformation within their organizations. Digital Strategy and IT Capability follow with mean scores of 3.85 and 3.79, respectively, reflecting moderately high levels of strategic alignment and technological readiness.

Digital Culture (M = 3.70, SD = 0.83) and Digital Leadership (M = 3.65, SD = 0.78) have slightly lower mean values, indicating areas with relatively more variation or development needs. The standard deviations across all variables are under 1.0, showing consistent responses with moderate variability.

These results provide a foundational understanding of participants' perceptions and set the stage for further inferential analysis.

6.3 Reliability Analysis

Reliability analysis is a crucial step in confirming the consistency and stability of the measurement instruments used in this research. It assesses the extent to which items within a scale consistently measure the same underlying construct, thereby ensuring the integrity of the data (Field, 2018). A reliable measurement scale reduces the risk of measurement error and enhances the credibility of the research outcomes.

Cronbach's alpha is one of the most widely used indicators for assessing internal consistency reliability. This coefficient examines the inter-item correlations within a scale, with values closer to 1.0 indicating stronger reliability (Pallant, 2020). According to the widely cited threshold by Nunnally and Bernstein (1994), Cronbach's alpha value of 0.70 or higher is considered acceptable for demonstrating scale reliability. This study conducted a reliability analysis on all the variables: Digital Transformation, Digital Strategy, Digital Culture, IT Capability, and Digital Leadership. The results are summarized in the table below.

Table 3: Reliability Statistics for All Variables

Variable	Cronbach's Alpha	Number of Items
Digital Transformation	0.704	5
Digital Strategy	0.792	4
Digital Culture	0.808	4
IT Capability	0.742	4
Digital Leadership	0.787	6

Source: SPSS Output

All scales exceeded the commonly accepted Cronbach's alpha threshold of 0.70, confirming the internal consistency and reliability of the measurement instruments used in this study (Nunnally & Bernstein, 1994; Pallant, 2020). This strong reliability foundation supports the robustness of subsequent statistical analyses.

6.4 Validity Analysis

Validity analysis is an essential step in evaluating the accuracy and appropriateness of measurement tools used in research. It determines the extent to which the instrument measures the intended construct and supports meaningful interpretation and generalization of findings (Field, 2018). In survey-based research, construct validity is particularly important, as it examines how well the items represent the theoretical concepts they are intended to measure (Hair et al., 2019).

In this study, Exploratory Factor Analysis (EFA) was employed to assess construct validity. EFA helps uncover the underlying structure of the data and identifies whether the items load strongly onto the

appropriate constructs. Factor loadings indicate the strength of the relationship between each item and its underlying factor, with values of 0.50 or higher generally considered acceptable (Pallant, 2020). High factor loadings enhance the credibility of the measurement tool and confirm that each item contributes meaningfully to the construct it represents.

Table 4: Factor Loading per Construct

Variable	Constructs	Factor Loading
Digital Transformation	DT1	0.726
	DT2	0.569
	DT3	0.543
	DT4	0.632
	DT5	0.483
Digital Strategy	DS1	0.761
	DS2	0.760
	DS3	0.775
	DS4	0.664
Digital Culture	DC1	0.719
	DC2	0.702
	DC3	0.779
	DC4	0.757
IT Capability	ITC1	0.593
	ITC2	0.674
	ITC3	0.757
	ITC4	0.768
Digital Leadership	DL1	0.739
	DL2	0.678
	DL3	0.699
	DL4	0.704
	DL5	0.636
	DL6	0.663

Source: SPSS Data Analysis

The factor loadings for the digital transformation items ranged from 0.483 to 0.726. DT1 (0.726) showed the strongest contribution to the construct, followed by DT4 (0.632). However, DT5 (0.483) fell slightly below the commonly accepted threshold, suggesting it may need further refinement to enhance its construct representation.

The digital strategy items demonstrated strong validity, with factor loadings ranging from 0.664 to 0.775. DS3 (0.775) was the most significant contributor, while DS4 (0.664) had the lowest loading within an acceptable range, confirming the construct's integrity.

For digital culture, all four items had high factor loadings between 0.702 and 0.779. DC3 (0.779) and DC4 (0.757) contributed most significantly, indicating that the scale reliably captures the cultural aspects of digital transformation.

The IT capability construct showed acceptable validity with loadings between 0.593 and 0.768. ITC4 (0.768) and ITC3 (0.757) were the strongest indicators, while ITC1 (0.593) had the lowest but still acceptable loading.

Digital leadership items loaded between 0.636 and 0.739. DL1 (0.739) emerged as the strongest indicator, and even the lowest item (DL5 at 0.636) remained within the acceptable threshold, confirming the overall robustness of the scale.

In summary, the EFA results confirm that the measurement items are appropriately aligned with their respective theoretical constructs. These findings provide strong evidence of construct validity, reinforcing the credibility and integrity of the measurement model used in this research.

6.5 Normality Test

Assessing normality is essential before applying parametric tests such as regression and correlation, which assume normally distributed data (Field, 2018). This study applied both the Kolmogorov–Smirnov and Shapiro–Wilk tests, along with skewness and kurtosis values, to evaluate normality.

Table 5: *Normality Test Results for Study Variables*

Variable	Kolmogorov–Smirnov Sig.	Shapiro–Wilk Sig.	Skewness	Kurtosis
Digital Transformation	.000	.000	–1.340	2.901
Digital Strategy	.000	.000	–1.375	1.709
Digital Culture	.000	.000	–1.123	1.020
IT Capability	.000	.000	–1.206	2.054
Digital Leadership	.000	.000	–1.164	1.368

Source: SPSS Data Analysis

As shown in Table 8, all variables yielded significant p-values ($p < .05$), indicating that the data significantly deviates from a normal distribution. Skewness values (ranging from –1.123 to –1.375) reflect moderate left skew, while kurtosis values (1.020 to 2.901) suggest slight deviations from a normal peak. Despite falling within acceptable bounds for moderate non-normality (Hair et al., 2019), the significant results from the tests confirm that the data are not strictly normal.

Given this, non-parametric or robust methods may be employed to ensure the validity of subsequent analyses (Field, 2018).

6.6 Correlation Test Analysis

Correlation analysis was conducted to examine the relationships between the independent variables (digital strategy, digital culture, and IT capability) and the dependent variable (digital transformation). Given the non-normal distribution of the data, Spearman's rank-order correlation was applied. This non-parametric method is suitable for assessing the strength and direction of associations without assuming normality (Field, 2018). Correlation coefficients range from –1 to +1, with values above 0.5 indicating strong, 0.3–0.5 moderate, and below 0.3 weak relationships (Pallant, 2020).

Table 6: ***Spearman's Rho Correlation Matrix***

		Digital Transformation
Digital Transformation	Correlation Coefficient	1.000
	Sig. (2-tailed)	
	N	308
Digital Strategy	Correlation Coefficient	.342**
	Sig. (2-tailed)	0.000
	N	308
Digital Culture	Correlation Coefficient	.358**
	Sig. (2-tailed)	0.000
	N	308
IT Capability	Correlation Coefficient	.341**
	Sig. (2-tailed)	0.000
	N	308

Note: N = 308; **p** < .01 (2-tailed)

Source: SPSS Output

The findings reveal that digital Strategy is moderately and positively correlated with Digital Transformation ($\rho = .342$, $p < .001$). Digital Culture shows the strongest correlation with Digital

Transformation (ρ = .358, p < .001), suggesting its central role in enabling transformation efforts. IT Capability also shows a moderate positive relationship (ρ = .341, p < .001) with digital transformation.

All relationships are statistically significant and positive, underscoring the importance of strategic direction, cultural readiness, and IT infrastructure in driving digital transformation

6.7 Regression Analysis

Regression analysis was conducted to examine the predictive influence of digital strategy, digital culture, and IT capability on digital transformation. This technique quantifies the unique contribution of each independent variable to the dependent variable while accounting for the effects of the others (Field, 2018).
The regression model yielded an R^2 value of 0.434, indicating that approximately 43.4% of the variance in digital transformation is explained by the combined effects of digital strategy, digital culture, and IT capability, suggesting a moderate model fit.

Table 7: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.413	.174		8.109	.000
	Digital Strategy	.196	.037	.254	5.345	.000
	Digital Culture	.230	.038	.300	6.044	.000
	IT Capability	.265	.042	.307	6.309	.000
R square = 0.434						
a. Dependent Variable: Digital Transformation						

Dependent Variable: Digital Transformation
Source: SPSS Output

All predictors were statistically significant (p < 0.01). Among them, IT capability had the strongest effect on digital transformation (β = 0.307), followed by digital culture (β = 0.300) and digital strategy (β = 0.254). These results indicate that enhancing IT capabilities has the greatest influence on advancing digital transformation, but this should be supported by robust digital culture and strategic alignment.
In summary, the regression analysis confirms that digital strategy, culture, and IT capability are key enablers of digital transformation, with IT capability emerging as the most impactful predictor.

6.8 Moderating Analysis

Moderation analysis is a statistical method used to determine whether the strength or direction of the relationship between an independent variable and a dependent variable changes depending on the level of a third variable, known as the moderator (Baron & Kenny, 1986). It enables researchers to explore complex interaction effects within regression models, offering deeper insights into the dynamics among variables.

In this study, moderation analysis is conducted to examine whether digital leadership moderates the relationships between the three independent variables—digital strategy, digital culture, and IT capability—and the dependent variable, digital transformation. The moderation effect is tested by introducing interaction terms (e.g., Digital Strategy × Digital Leadership) into separate regression models for each independent variable, following the procedures suggested by Aiken and West (1991).

Table 8: Moderation Analysis Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.568	.156		16.433	.000
	Int_DL_DS	.057	.028	.102	1.998	.047
	Digital Strategy	.375	.039	.486	9.495	.000

2	(Constant)	2.465	.144		17.109	.000
	Digital Culture	.416	.038	.542	11.053	.000
	Int_DL_DC	.055	.026	.103	2.107	.036
3	(Constant)	2.302	.164		14.023	.000
	IT Capability	.452	.042	.524	10.655	.000
	Int_DL_ITC	.037	.026	.071	1.450	.148
R square for model 1 = 0.228						
R square for model 2 = 0.286						
R square for model 3 = 0.271						

Source: SPSS Data Analysis

Model 1: Digital Strategy × Digital Leadership: The interaction term (Int_DL_DS) is statistically significant (B = 0.057, β = 0.102, p = 0.047), indicating that digital leadership positively moderates the relationship between digital strategy and digital transformation. This suggests that as digital leadership increases, the positive effect of digital strategy on transformation outcomes is amplified. The model accounts for 22.8% of the variance in digital transformation.

Model 2: Digital Culture × Digital Leadership: The interaction between digital culture and digital leadership (Int_DL_DC) is also statistically significant (B = 0.055, β = 0.103, p = 0.036). This indicates that digital leadership strengthens the relationship between digital culture and digital transformation. When digital leadership is high, the effect of a supportive digital culture on transformation becomes more pronounced. The model explains 28.6% of the variance.

Model 3: IT Capability × Digital Leadership: The interaction term (Int_DL_ITC) is not statistically significant (B = 0.037, β = 0.071, p = 0.148). This implies that digital leadership does not significantly moderate the relationship between IT capability and digital transformation. IT capability exerts a strong direct influence on transformation, regardless of the level of leadership. This model explains 27.1% of the variance.

These results reveal that digital leadership plays a significant moderating role in enhancing the influence of both digital strategy and digital culture on digital transformation. In contrast, its effect on IT capability is limited.

The findings suggest that strong digital leadership amplifies the impact of strategic and cultural initiatives aimed at driving transformation. IT capability contributes independently and robustly to transformation outcomes, regardless of leadership presence. Organizations aiming for digital transformation should invest in leadership development, particularly to enhance the effectiveness of their strategic and cultural change efforts.

7. Discussion of the Results

This study examined how digital strategy, digital culture, and IT capability influence digital transformation in large Egyptian enterprises, with digital leadership as a moderating factor. The ICT sector, vital for innovation and economic growth in Egypt, served as the context.

Most respondents were male (70.8%) and aged 35–55 (76%), reflecting the current managerial landscape. Over half had 20+ years of experience, emphasizing the role of seasoned professionals in strategic change. A balanced representation across management levels (first-line, middle, top) underscores that digital transformation is a shared priority. Respondents showed high agreement on digital transformation (mean = 4.02), indicating strong engagement with digital initiatives, especially around process integration and customer experience.

With a mean of 3.85, digital strategy was moderately agreed upon. Respondents emphasized aligning digital tools with business strategy and creating a shared transformation vision. However, variability

suggests uneven strategic maturity across organizations. A clear, well-integrated digital strategy is essential for transformation success (Yao et al., 2023).

Digital culture scored a mean of 3.70, reflecting moderate support for values like innovation and collaboration. Participants recognized the need for a flexible IT vision and management understanding of IT investments. Fostering a digital-first mindset and integrating IT into strategic discussions remain key to cultural readiness (Holgeid, 2019).

With a mean of 3.79, IT capability emerged as the strongest driver of transformation. Respondents emphasized integrating IT in planning and governance, promoting cross-functional collaboration, and agility. These findings confirm that IT capability, built on people and processes, forms the foundation for successful transformation (Saputro, 2022; Warner, 2019).

Digital leadership scored lowest (3.65), suggesting room for growth. Traits like adaptability, decisiveness, creativity, and self-awareness were valued. Strong leadership is essential for aligning teams, inspiring innovation, and embedding digital values (Sebastian et al., 2017).

H1: Digital strategy positively affects digital transformation.

The research found a significant positive relationship between digital strategy and digital transformation, confirming that organizations with well-defined digital strategies are better positioned to achieve successful digital transformation. This aligns with previous research emphasizing the critical role of strategic alignment between digital initiatives and overarching business objectives. The formulation of a digital strategy—whether centered on innovation, cost efficiency, or quality enhancement—plays a pivotal role in shaping the organization's digital transformation journey. A well-aligned strategy ensures that digital initiatives are not only integrated seamlessly into business operations but also drive sustainable growth, competitive advantage, and long-term value creation (Proksch, 2021; Boonlua, 2023). The findings suggest that a clear digital strategy acts as a structured roadmap, guiding organizations through the complexities of digital transformation, ensuring that digital initiatives are aligned with business goals, and optimizing processes for transformation success. Thus, Hypothesis H1 is supported, confirming that organizations that prioritize digital strategy formulation and development are better positioned to achieve digital transformation success.

H2: Digital culture positively affects digital transformation.

Digital culture emerged as a critical predictor of digital transformation. A culture that embraces key values such as innovation, adaptability, continuous learning, and collaboration significantly enhances an organization's ability to navigate digital transformation. This finding underscores the importance of fostering a digital-first mindset and an agile culture that is open to change across all levels of the organization. The research further suggested that an organization's digital transformation posture (whether it is a Beginner, Fashionista, Conservative, or Digital Master) is largely shaped by its cultural maturity. Organizations with a strong digital culture are more likely to overcome resistance to change, seamlessly integrate new technologies, and drive sustained transformation (Nasution, 2020; Steiber, 2023). Thus, Hypothesis H2 is supported, confirming that organizations that foster a strong digital culture are more likely to drive successful digital transformation and maintain competitive advantage.

H3: IT capability positively affects digital transformation.

IT capability was identified as the strongest predictor of digital transformation, with business capabilities playing a crucial role in bridging technology and organizational strategy. Strong IT business capability is driven by people and processes, ensuring that digital transformation efforts align seamlessly with business objectives. Developing skilled, adaptable teams through continuous training influences the execution of digital transformation, enabling organizations to respond proactively to technological and market changes. Additionally, cross-functional collaboration enhances integration across departments, breaking down silos

and promoting a unified approach to transformation. Agile and streamlined processes further strengthen business capabilities by eliminating inefficiencies, optimizing workflows, and ensuring that IT initiatives support broader strategic goals (Brunner, 2021; Van Riel, 2023). Thus, Hypothesis H3 is supported, confirming that IT capability serves as the foundation for successful digital transformation, allowing organizations to maximize the potential of emerging technologies and optimize operations.

Digital leadership was found to positively moderate the relationships between digital strategy, digital culture, and digital transformation, reinforcing the importance of visionary leadership in navigating digital change. Effective leadership enhances the execution of digital transformation by aligning digital strategy formulation with organizational goals, embedding cultural values and beliefs that support innovation, and fostering collaboration to drive meaningful organizational change (Jesper et al., 2022).

H4a: The relationship between digital strategy and digital transformation is positively moderated by digital leadership.

Digital leadership was found to positively moderate the relationship between digital strategy and digital transformation. The significant moderation effect suggests that leaders play a crucial role in formulating digital strategies and aligning them with organizational goals and technological initiatives. Strong leadership ensures that digital strategies are not just planned but also effectively implemented, reinforcing previous research that emphasizes the need for leadership-driven digital transformation. Leaders play a crucial role in facilitating information gathering to support data-driven decision-making. As customer expectations evolve, they integrate advanced technologies into their offerings to create unique value and maintain a competitive edge. Additionally, digital leaders address the broader impact of digital transformation on business models by managing resistance to change and ensuring the seamless adoption of new technologies. They also navigate organizational change by balancing workforce dynamics and fostering digital competencies within the organization (Verhoef et al., 2021).
Thus, Hypothesis H4a is supported, confirming that digital leadership enhances the effectiveness of digital strategy formulation, ensuring successful digital transformation execution.

H4b: The relationship between digital culture and digital transformation is positively moderated by digital leadership.

Digital leadership moderation of digital culture confirms that leadership enhances the role of digital culture in transformation by strengthening the link between organizational culture and transformation success. This could take place by fostering adaptability, innovation, and a shared vision while guiding teams through change and ensuring the seamless integration of digital values for effective execution (Hammami, 2024). Leaders influence cultural shifts within organizations, ensuring employee engagement, aligning vision with technological advancements, and embedding digital principles into the organization's core, asserting sustainable growth and competitive advantage (Qiao, 2024). Thus, Hypothesis H4b is supported, confirming that digital leadership enhances digital culture by fostering an environment of innovation, learning, and digital adaptability, thereby strengthening the success of digital transformation efforts.

H4c: The relationship between IT capability and digital transformation is positively moderated by digital leadership.

The non-significant moderation effect suggests that IT business capability drives digital transformation independently of leadership, reinforcing studies that highlight IT capability across all dimensions, including the business perspective (organizational side), infrastructure perspective (technological side), and proactive stance (environmental side), as fundamental enablers rather than leadership-dependent factors (Saputro et al., 2022). This finding aligns with research that indicates organizations with strong IT capabilities can achieve transformation regardless of leadership influence. This could be attained by challenging perspectives that attribute the moderating role of digital leadership solely to business capability while overlooking its impact on infrastructure and proactive readiness (Brunner, 2021; Ongena, 2024). Unlike the

moderation of digital strategy and culture by leadership, IT business capability operates as a fundamental enabler of digital transformation in the ICT sector. Driven by people and processes, strong IT business capability ensures that transformation efforts align seamlessly with business objectives, fostering organizational agility and sustainable growth in a rapidly evolving technological landscape. Thus, Hypothesis H4c is not supported, reinforcing that while digital leadership is crucial for aligning strategy and culture, IT business capability remains a self-sufficient structural enabler of digital transformation.

8. Recommendations

Based on the findings of this research, the following recommendations are proposed for organizations, policymakers, and practitioners to enhance the effectiveness and sustainability of digital transformation.

8.1 For Organizations

● **Develop a Comprehensive Digital Strategy**: Organizations should create a clear, actionable digital strategy aligned with business goals. This strategy must outline initiatives, timelines, and measurable outcomes and be continuously updated to stay relevant in a fast-evolving digital landscape (Yao et al., 2023).

● **Foster a Digital-First Culture**: Promote a culture that values agility, innovation, and continuous learning. Leaders must set a clear vision, encourage experimentation, and support upskilling to embed digital values and empower employees to embrace transformation (Holgeid, 2019; Hammami, 2024).

● **Invest Strategically in IT Capabilities**: A scalable IT foundation is essential. Invest in technologies like AI, cloud, and data analytics, while also strengthening people, processes, and governance to ensure IT initiatives align with strategic goals (Awamleh, 2022; Saputro, 2022).

● **Empower and Develop Digital Leaders**: Identify and train digital leaders with both technical expertise and strategic acumen. Leadership programs should emphasize innovation, adaptability, and inclusive leadership to drive successful transformation (Verhoef et al., 2021).

8.2 Policymakers

● **Support National Digital Transformation Initiatives**: Policymakers should foster digital innovation through incentives, funding, and updated regulations that support technologies like AI, IoT, and cloud computing, while ensuring data privacy and cybersecurity (MCIT, 2022).

● **Promote Cross-Sector Collaboration**: Encourage partnerships among government, industry, academia, and civil society through PPPs, innovation hubs, and research alliances. These initiatives align academic output with industry needs and promote inclusive transformation (Rehman, 2022)..

● **Strengthen and Expand Digital Infrastructure**: Invest in broadband, cloud platforms, and secure data centers, with special focus on rural access and cybersecurity. Ensuring equitable infrastructure is key to closing the digital divide and enabling trust in digital services (MCIT, 2022).

● **Develop a Future-Ready Workforce**: Embed digital skills into national education and training systems. Promote lifelong learning, upskilling, and digital literacy through certifications, scholarships, and public-private partnerships to build a capable, adaptable workforce (UN, 2019).

8.3 For Practitioners

● **Adopt a Customer-Centric Digital Transformation Approach**: Practitioners should prioritize customer experience using data analytics, AI, and personalized digital interactions. Enhancing digital channels—like apps and chatbots—builds loyalty and engagement in the digital age (Korachi, 2020).

● **Embrace Agile and Iterative Methodologies**: Agile practices, such as rapid prototyping and cross-functional collaboration, enable faster responses to change and drive innovation. Agile mindsets promote flexibility, resilience, and speed-to-market (Demir, 2019)

● **Embed Data-Driven Decision Making**: Use predictive analytics and business intelligence tools to guide strategy and operations. A strong data culture—with training and governance—ensures insights are ethical, accurate, and actionable (Smith, 2023).

● **Establish Monitoring and Performance Evaluation Systems**: Define KPIs to measure transformation outcomes, including ROI and customer satisfaction. Real-time dashboards and continuous feedback loops help refine strategies and maintain alignment with evolving goals (Westerman et al., 2020)

9. Future Research

This study opens several avenues for future exploration to deepen understanding of digital transformation:

1. Cross-Cultural Contexts: Future studies could examine how cultural differences influence digital transformation outcomes, offering insights for multinational firms to tailor strategies based on regional dynamics.

2. Sector-Specific Insights: Research focused on industries (e.g., healthcare, finance, manufacturing) can uncover sector-specific challenges and success factors, enabling more targeted digital transformation roadmaps.

3. Longitudinal Studies: Digital transformation is an evolving process. Long-term studies would help track progress, assess sustainability, and understand how transformation efforts impact performance over time.

4. Emerging Technologies: Further research could explore how technologies like AI, blockchain, and IoT enable or hinder transformation. This includes evaluating adoption barriers such as cybersecurity, data privacy, and regulatory compliance.

5. External Environmental Factors: Future research should also consider external influences—economic shifts, government policies, and competitive pressures—that shape digital strategies and transformation outcomes.

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