

**CAPITAL UNIVERSITY OF SCIENCE AND
TECHNOLOGY, ISLAMABAD**



**The Role of Digital Transformation in
Enhancing Project Performance in Pakistan's
Construction Sector: Investigating
Organizational Agility as a Mediator and
Technology Readiness as a Moderator**

by

Maida Shafqat

A thesis submitted in partial fulfillment for the
degree of Master of Science

in the

**Faculty of Management & Social Sciences
Department of Management Sciences**

2025

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I want to dedicate this achievement to my beloved eldest brother, whose love and support have been my greatest strength



CERTIFICATE OF APPROVAL

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Acknowledgement

First, I would like to give special thanks to Almighty Allah who gave me the health, patience, and strength to complete this thesis. All this journey could have been traversed only because of His unending blessings and mercy.

I should like to show deep gratitude to my parents whose big prayers and love, their sacrifices, have been the main support of my studies. They have remained a source of support to me by making me feel confident and purposed to go after what I have set goals to accomplish. In gratitude to them I devote this work. To my brothers, I wish to say many thanks to you for always encouraging and supporting me whether emotionally or practically. You always believed in me even at the most difficult stages of this process.

I would like to express my heartfelt gratitude to my supervisor of the thesis who is **Mr. Muhammad Irfan Mustafa** who assisted me in this research with consistent guidance, insightful comments and patiently awaited my progress. His guidance was very important to develop my knowledge on the topic and has influential in increasing the quality of this thesis.

I would also like to express my gratitude to all the faculty members and fellow learners that allowed me to learn and develop throughout this course.

Finally, I would like to thank my friends and well-wishers who supported me, encouraged me by giving me words of encouragement and also helped to stay motivated in situations where I was overwhelmed. It has been possible thanks to your contribution. This thesis is not only a memorial of my work but also the result of people helping me to succeed.

(Maida Shafqat)

Abstract

The construction sector in Pakistan continues to experience chronic inefficiencies, including persistent cost overruns, delays, and poor productivity. This study investigates the direct and indirect effects of digital transformation (DT) on project performance (PP), considering organizational agility (OA) as a mediating factor and technology readiness (TR) as a moderating variable. Drawing on the Dynamic Capabilities Theory, a quantitative research design was employed using a structured questionnaire distributed to 300 construction professionals in Islamabad and Rawalpindi. Data analysis was conducted using SPSS and the Hayes PROCESS macro (Model 7), enabling an integrated assessment of mediation and moderation effects. The findings reveal that DT has a significant positive impact on PP both directly and indirectly via OA. Organizational agility emerged as a strong mediator, indicating that agile capabilities enhance the effectiveness of digital initiatives. Interestingly, while TR positively moderates the DT–PP relationship, high levels of TR were observed to weaken the mediating role of OA, suggesting a substitutive rather than synergistic effect in certain contexts. This highlights that digital maturity may bypass the need for intermediate agility capabilities in achieving performance gains. The study contributes to project management literature by introducing a moderated mediation model in the underexplored context of Pakistan’s construction sector. It also extends the application of Dynamic Capabilities Theory by empirically validating the roles of DT, OA, and TR in driving project success. Practically, the findings offer actionable insights for construction firms aiming to optimize performance through digital innovation while balancing internal capabilities and readiness.

Keywords: Digital Transformation, Project Performance, Organizational Agility, Technology Readiness, Construction Industry, Pakistan, Dynamic Capabilities Theory, Moderated Mediation.

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Abbreviations

β	Unstandardized Beta Coefficient
CI	Confidence Interval
DCT	Dynamic Capabilities Theory
df	Degrees of Freedom
F-value	F-statistic
H	Hypothesis
LLCI	Lower Level Confidence Interval
N	Sample Size
OA	Organizational Agility
PP	Project Performance
R^2	Coefficient of Determination
SE	Standard Error
SPSS	Statistical Package for the Social Sciences
TR	Technology Readiness
ULCI	Upper Level Confidence Interval

Chapter 1

Introduction

The construction industry is the driving force of the societal and economic growth of Pakistan and occupies an average of 2.5 percent in the national GDP and has provided millions of its citizens with gainful employment in both rural and urban spheres (Pakistan Economic Review, 2023). But the industry is riddled with inefficiencies that are intrinsic with overrunning costs, delays, low productivities, weak management, and limited transparency (Ahmed, Ali, & Rahman, 2021). The concerns of project performance can be seen due to these ongoing issues, especially with the increased demand of infrastructure and sustainable urban development.

In literature, particularly the recent ones, there occurs a global paradigm shift trend in construction industry by embracing the concept of digital transformation (DT). The industrialized 4.0 technologies have challenged conventional operations and brought opportunities towards leaner, more nimble and sustainable project execution. Piprani, Khan, and Yu (2024) provide evidence how implementation of lean, agile, resilient and green (LARG) practices into DT can keep the project management in line with the current performance objectives. Salem and Atheeb (2024) also demonstrate that even the public sector body in Pakistan is facing pressure to provide projects digitally, which is often impeded by the feature of institutional inertia and lack of agility.

The importance of having a personalized approach to digitalization in Pakistan can be explained by the following combination of the traditional reality and the new ideals. Arshad, Ghaffar, Siddique, and Rehman (2024) focuses on the synergy

of IT adoption and performance and agility and envisages cultural change to the adaptable and responsive stance of construction companies. It is especially applicable in Pakistan, where most companies are reluctant to abandon traditional ways because they consider it risky, do not understand the execution strategy, or lack financing. In this respect, digital preparedness is core. According to [Jamil, Zhang, Anwar, and Mustafa \(2025\)](#), the higher the level of preparedness of organizations to engage technologies its technology acceptance level is directly proportional to attaining sustainable performance especially in the concept of adopting AI. Technology readiness in construction industry in Pakistan can be considered as a moderator which can either strengthen the effects of digital transformation, or it may weaken it on project performance. The success of digital strategies implementation and conversion into outcomes are evaluated in terms of an adequate linguistic infrastructure and leadership backing of the firm, and competencies of its employees.

Another very important dimension is organizational agility. According to [Soomro and Khan \(2025\)](#), agile constructs enable organizations to overcome crisis situations, adjust to the changes and protect project implementation. This highlights the mediating role of agility on the outcome of digital transformation. [Shahzad \(2023\)](#) corroborates this by supposing that congruence of project management practices with DT in the case of its embeddedness in agile organizations results in a highly improved performance of the projects. In a nutshell, agility makes companies fit to rebalance and adjust themselves to the changes in environment as well as technology. [Alam et al. \(2025\)](#) discuss the collaboration of supply chain digitization and project management indicating that digital maturity and operational integration are viewed as considerable values that enhance the performance of the local industry. This renders interactive dynamics of DT, organizational agility, and technology readiness necessary to be considered within the Pakistani context wherein limitations and inefficiencies prevail.

Digital transformation can be referred to as the process of integrating technologies depicted by Building Information Modelling (BIM), Artificial Intelligence (AI), Internet of Things (IoT), drone mapping, and cloud-based project platforms, promoting project workflows, teamwork, and good decision-making ([Vial, 2019](#)). Such

technologies facilitate the simplification of workflows, the enhancement of real-time data exchange, the rise of transparency, and the possibility of predictive analytics to reduce risks and streamline performance (Bilal et al., 2016; Oesterreich & Teuteberg, 2016).

With the modern disturbing and swift world, DT is being considered as a main initiator of better performance projects especially in resources limited situations such as Pakistan. With proper application, the technologies have the capability to take the construction industry operations and performance a notch higher. Nonetheless, they face a high degree of success within the chosen power tools based on internal capabilities, especially organizational agility and technology preparedness. To incorporate excellence in the process of project delivery, it is imperative to comprehend in detail the relationship that DT has had with organizational agility (as mediator) and technology readiness (as moderator). Such encounters influence the processes of internalizing and operationalizing digital initiatives on construction firms. The exploration of this triadic relationship is of great value when elaborating a context-specific and target-oriented approach to enhance growth targeted at project implementation and digital innovation in the construction industry in Pakistan.

On the backdrop of the issues, in the form of various project realities, there has been a need to adopt the paradigm of a digitally aware functional paradigm in the construction firms (Mahabir & Pun, 2022). The possibility of interaction between digital transformation, organisational agility and technological readiness must be put to the test empirically so that we will be able to know how they interactively affect project performance (Machado et al., 2021). By ensuring that the organizational culture forms a fixation on flexibility and by preparing the organizational workers to address the issues of technological changes, organizations can find easy access to the technical sharks of current construction projects (Kithae, 2023). Therefore, it comes out that it is not that it is solely an academic exercise, but a need on the part of the stakeholders of the industry to determine the pathways through which the digital transformation can be leveraged to sustain the improved performance of the project, as well as the organizational and technological preparedness. The insights attained by such research would greatly impact on the

role played by policy development, planning and allocations in the construction industry in Pakistan hence yielding more workable and fruitful conclusions. Just as much as such a script can be spoken through the various studies done, such as by [Alam et al. \(2025\)](#) and [Shahzad \(2023\)](#), the script of successful digital integration is perforce indivisibly associated with the agility and the organizations that become keen to adopt their digital futures. With the industry expected to keep expanding, the strength of the concepts will be instrumental in the effort to ensure that the complex nature of digital adaptation is tackled and the realization of the potential that exists in maximizing project execution delivered.

1.1 Research Gap

Although digital transformation has become a significant theme in recent literature, particularly in relation to organizational growth and operational performance, its application in the construction sector of developing economies especially Islamic countries like Pakistan remains under-theorized and insufficiently explored. Recent contributions (e.g., [Soomro & Khan, 2025](#); [Shahzad, 2023](#)) have acknowledged the relevance of organizational agility and technology readiness in enhancing project outcomes, yet these studies often treat these variables in isolation.

There is a lack of comprehensive empirical studies that integrate both constructs into a unified theoretical model capable of explaining the mechanisms through which digital transformation influences project performance. Furthermore, despite growing attention to the digitalization of supply chains and project workflows, the focus in many contemporary studies remains technocentric. Research continues to emphasize the functional benefits of technologies such as Building Information Modelling (BIM), Artificial Intelligence (AI), and Internet of Things (IoT), particularly in terms of improving efficiency and collaboration ([Oesterreich & Teuteberg, 2016](#); [Vial, 2019](#)). However, there is limited inquiry into how contextual and organizational capabilities such as agility and digital readiness mediate or moderate these effects, especially within fragmented, resource-constrained construction sectors in developing countries. In addition, while the Dynamic Capabilities Theory

(DCT) has been widely adopted in strategic management and high-tech sectors, its application to construction project management in emerging economies is rare. Few studies apply DCT to assess how digital transformation interacts with internal capabilities like agility or with external enabling devices such as technology readiness. The relationship between dynamic capabilities and technology readiness remains theoretically underdeveloped, with little use of advanced moderated mediation models or statistically rigorous methods to examine these interactions. This indicates a critical gap in the literature concerning the structural pathways through which digital initiatives affect project performance in the context of developing nations' construction sectors.

1.2 Problem Statement

The construction sector in Pakistan continues to face persistent challenges in project performance, including cost overruns, schedule delays, substandard quality, and low productivity. A large proportion of public infrastructure projects either exceed budget or fail to meet timelines, indicating systemic inefficiencies. These challenges are rooted in outdated project management practices, limited transparency, and poor coordination of resources.

While global construction industries are transitioning towards digital practices to improve operational efficiency and project outcomes, Pakistan's construction sector remains largely dependent on manual processes, fragmented data flows, and informal communication structures.

Despite the increasing availability of advanced digital tools such as Building Information Modelling (BIM), artificial intelligence, and IoT-enabled systems the adoption of such technologies in Pakistan remains limited in scope and impact. The application of digital transformation in construction has predominantly focused on tool implementation, overlooking critical organizational and contextual factors that influence success. Digital tools alone do not guarantee improvements in project delivery without the internal capacity to integrate, adapt, and derive value from them. One such internal factor is organizational agility, the ability of firms to

sense change, adapt strategies, and reconfigure resources. Many construction firms in Pakistan, however, are hindered by rigid hierarchies, limited responsiveness, and a lack of innovation culture. Another critical but often neglected factor is technology readiness, which reflects an organization's preparedness to adopt and utilize new technologies. Low readiness, reflected in poor infrastructure or lack of digital skills, may undermine the benefits of digital initiatives. Current research remains fragmented, industry-specific, and predominantly based in developed economies. As a result, a gap persists in understanding the contextual realities and internal enablers of digital transformation within Pakistan's construction sector.

1.3 Research Questions

RQ1. What is the impact of digital transformation on project performance in Pakistan's construction sector?

RQ2. Does organizational agility mediate the relationship between digital transformation and project performance?

RQ3. Does technology readiness moderate the relationship between digital transformation and project performance?

RQ4. Does technology readiness moderate the indirect effect of digital transformation on project performance through organizational agility?

1.4 Research Objectives

RO1. To examine the impact of digital transformation on project performance in Pakistan's construction sector.

RO2. To investigate whether organizational agility mediates the relationship between digital transformation and project performance.

RO3. To determine whether technology readiness moderates the relationship between digital transformation and project performance.

RO4. To test whether technology readiness moderates the indirect effect of digital transformation on project performance via organizational agility.

1.5 Significance of The Study

The importance of the study consists in the fact that it can clarify how digital transformation can increase the efficiency of projects in the construction industry in Pakistan that are characterized by delays, cost overruns, and low quality. Through review of the roles of the organizational agility and technology readiness, the study provides a practical advice to construction firms to be able to embrace and utilize more efficient digital tools. It is also an addition to the academic body of knowledge as it implements a moderated mediation model which has not been much tested in the construction setting of the developing world such as Pakistan. The results could help managers, policymakers, and leaders of the industry to make informed decisions to enhance project success and digital transformation. Through consideration of the mentioned dimensions, this study aims to contribute to the theoretical depth in the literature on management of construction projects and provide practical suggestions to companies interested in improving their performance by means of digital innovation. The research will present a sound framework through which the aspects of digital transformation can enhance positive results within a project-based setting, especially in developing nations due to limited availability of resources and capabilities.

1.6 Supporting Theory: Dynamic Capabilities Theory

Dynamic Capabilities Theory (DCT), formulated by Teece, Pisano, and Shuen (1997), presents a robust theoretical lens to understand how firms adapt and respond to turbulent and fast-changing environments by developing strategic capabilities. According to DCT, sustainable competitive advantage stems from a firm's ability to sense opportunities and threats, seize them by mobilizing resources, and transform internal structures and competencies accordingly (Teece,

Pisano, & Shuen, 1997). Although the theory has traditionally been applied in technology-intensive and innovation-driven industries, there remains a gap in literature concerning its application to construction firms in developing economies, particularly in relation to digital transformation (DT) and project performance. Over time, DCT has evolved into several schools of thought, including the Microfoundations Approach (Teece et al., 1997), the Process-Oriented Perspective (Eisenhardt & Martin, 2000), and the Ecosystem-Based View (Teece, 2018). This study is underpinned by the Microfoundations Approach, which emphasizes the routines, processes, and learning mechanisms that enable firms to develop and deploy dynamic capabilities at the operational level. This theoretical orientation is especially relevant for project-based environments like the construction industry in Pakistan, where companies must navigate institutional uncertainty, resource constraints, and complex stakeholder dynamics. Therefore, DCT provides a useful framework to understand how digital transformation interacts with internal enablers such as agility and external moderators such as technology readiness to improve project outcomes.

1.6.1 Application of DCT to Digital Transformation and Project Performance

1.6.1.1 Sensing Capability and Digital Transformation

Sensing, in DCT, refers to the organizational ability to identify emerging trends, risks, and opportunities in the external environment (Teece, 2007). Through digital transformation, construction firms can enhance their sensing capability via technologies such as Building Information Modelling (BIM), real-time data dashboards, drone mapping, IoT-based monitoring systems, and AI-assisted analytics. These tools provide early warnings for risks like delays, cost overruns, and supply chain disruptions, enabling pre-emptive decision-making (Bilal et al., 2016; Vial, 2019). In the context of Pakistan's construction sector marked by volatile markets and weak institutional infrastructure digital transformation serves as a key enabler for increasing environmental awareness and rational planning in projects. Seizing

Capability and Organizational Agility as a Mediator Seizing refers to the firm's ability to respond effectively to sensed opportunities by deploying resources, adjusting structures, and making timely decisions (Teece, 2007). In this framework, organizational agility is viewed as a seizing capability that allows firms to convert digital insights into swift and appropriate actions. Agile firms are typically characterized by their strategic flexibility, decentralized authority, rapid learning cycles, and iterative planning systems (Tallon, Queiroz, Coltman, & Sharma, 2019). In the digital transformation context, agility enables construction companies to align workflows with digital capabilities, adapt to stakeholder demands, and recalibrate their operational responses under dynamic conditions. Thus, organizational agility mediates the relationship between digital transformation and project performance by serving as the mechanism through which digital potential translates into practical outcomes. Transforming Capability and Technology Readiness as a Moderator Transformation is the firm's capacity to continuously reconfigure its assets, processes, and organizational routines to maintain competitiveness over time (Teece et al., 1997)(Teece, 2018). In this study, technology readiness is conceptualized as the moderating factor influencing how well digital transformation translates into performance improvements.

Technology readiness is defined as an organization's infrastructure maturity, leadership support for innovation, workforce digital literacy, and cultural acceptance of technological change (Parasuraman, 2000). Firms with high levels of readiness are better equipped to implement digital initiatives successfully, integrate new systems into core functions, and foster digital learning. Conversely, firms with low readiness often struggle with resistance to change, lack of digital capacity, or limited scalability of technological tools thereby weakening the link between digital transformation and project success (Ismail, Majid, & Roosli, 2019)(Succar et al., 2013).

1.6.1.2 Integrating DCT into the Research Framework

This research integrates the three foundational pillars of DCT sensing, seizing, and transforming into a model that explains how digital transformation affects project

performance, moderated by technology readiness and mediated by organizational agility. While DCT has been broadly applied in IT and manufacturing domains, limited empirical evidence exists regarding its use in project-based sectors like construction, particularly within emerging economies. The current framework fills this theoretical void by contextualizing DCT to the realities of the Pakistani construction industry. It enables a better understanding of how internal capabilities and readiness conditions influence the ability of construction firms to derive value from digital innovation.

1.6.1.3 Theoretical and Practical Contributions

Theoretically, this study extends Dynamic Capabilities Theory by operationalizing its core Tenet sensing, seizing, and transforming in the domain of construction project management. It shows how digital transformation (sensing), supported by organizational agility (seizing), and enabled by technology readiness (transforming), contributes to improved project performance. This application of the Micro foundations Approach offers deeper insights into the internal mechanisms that shape successful digital transformation. Practically, the model provides a roadmap for construction firms and policymakers to prioritize internal capability-building and technological infrastructure. It underscores the importance of aligning digital investments with organizational agility and technological readiness to fully unlock the performance benefits of digital transformation in resource-constrained environments.

Chapter 2

Literature Review

2.1 Literature Review and Hypothesis Development

This literature review critically examines the existing body of knowledge on the key constructs of this study: digital transformation (DT), project performance, organizational agility, and technology readiness.

It identifies the theoretical gaps and builds the foundation for the proposed conceptual model.

2.1.1 The Impact of Digital Transformation on Project Performance in Construction

The industry of construction has been subjected to a digital evolution, where digital transformation (DT) has emerged as a pivoting force of change and growth in terms of the performance of projects worldwide. DT entails embedding of new-gen digital technologies (Building Information Modelling (BIM), Artificial Intelligence (AI), Internet of Things (IoT), drones, cloud platforms, and predictive analytics into a business core to enhance efficiency, transparency, collaboration, and better decision-making (Vial, 2019). Digital transformation is also becoming a need and a challenge related to the Pakistani construction industry that possesses

significant opportunities to solve long-term problematic areas of the projects like delays, cost overruns, ineffective use of resources, and communication failures.

Among the most promising advantages of digital transformation is the possibility to collect the data and monitor projects in real-time so that the time and accuracy of managing the projects increased. Construction companies are able to govern timeframes, budgets, and quality outturns better with technologies such as BIM, IoT-enabled sensors, and AI-based analytics (Samuelson & Stehn, 2023). Such tools alleviate uncertainty, as they allow giving out timely insights through which proactive actions to avert any disruptions can be taken. Collaborative workflows can also be realized via digital platforms, and this helps diverse stakeholders, i.e. architects, contractors, engineers, and clients stay on track, consequently improving performance outcomes.

Understanding of the positive effect of the digital transformation on project performance is supported by the empirical research. As an illustration, Zhang, Li, and Yao (2025) concluded that construction companies facing the overall digital approach identified an increase in the delivery schedules, decreased the levels of operational inefficiency, and higher productivity. In the same line of reasoning, (Khahro, Hassan, Zainun, & Javed, 2021) support the idea that digital tools allow construction companies to maximize time and financial budgets, especially where the project is complex in nature and operation. These enhancements are directly correlated to the historical measures of performance in terms of cost, time, quality and client satisfaction typically known as the iron triangle of project success.

Nevertheless, amidst its opportunity, the use of DT in the construction arena in Pakistan is subject to a fatal impediment. The incompetencies with the digital devices usage on the part of those who work within the industry reduces the possibility of making full use of the advanced technologies since the majority of the construction professionals do not receive the education on how to operate it and maintain the digital systems (Demirkesen & Tezel, 2022). Adoption is also made more problematic by the fragmented structure of the industry with a combination of small and large firms with varying degrees of technological exposures. The culture of resistance to change, hierarchical nature of decisions making, and poor

cooperation amongst project teams also cause turbulence in switching to a digital and traditional way of operation ([Musarat et al., 2021](#)).

The already present challenge is worsened by financial constraints. Most of the construction industries in Pakistan do not have the funds to invest in digital solutions, training, and the infrastructure to support the businesses, particularly the small and medium enterprises. [Naji, Gunduz, Alhenzab, Al-Hababi, and Al-Qahtani \(2024\)](#) further indicate that cost (financial burden of digital transformation) is a big challenge in developing the world as it tends to deter firms to start or expand their digital programs. Also, infrastructural lapses like the lack of high-speed internet connection and cloud infrastructure in isolated and underserved communities erode the possibilities of even the most benevolent in digital endeavors ([Samuelson & Stehn, 2023](#)). Such are the factors that inform a digital divide that may limit the access to innovation, stall the project delivery.

However, there is evidence, globally, which indicates that these barriers are not insuperable. Previous case studies in comparable developing environments have illustrated that, when companies design DT with a roadmap, coherent leadership, and progressive implementation plans, the effects of such measures can be pronounced on the job performance. The effectiveness of a digital transformation does not only rely on the availability of technologies, as it is stated by the authors of the future research ([Naji et al., 2024](#)), as strategic alignments, cross-functional cooperation, and organizational preparedness are the necessary factors of its success. Thus, DT can realize its full potential as infrastructural, financial, and cultural barriers can be overcome with the help of a conscious policy and commitment to building capacity and leadership.

There are challenges, but digital transformation has the potential to tremendously enhance the performance of projects in the Pakistani construction industry. DT will help to eliminate fundamental problems that have plagued the industry because it will allow making decisions based on the data, improve communication and make it more organized, and make the industry more productive. The empirical research of this study is based on the hypothesis that suggests the positive relationship between digital transformation and project performance, which can

be explained by certain theory and references to previous research at both of the global and local levels.

H1: Digital Transformation Has a Positive Impact on Project Performance

2.1.2 Digital Transformation as a Driver of Organizational Agility in Construction

Organizational agility has become a pertinent resource that firms in the construction industry are facing dynamic environment and high volumes of uncertainty require. It denotes swift sensing and rapid adjustment by an organization to relational or internal changes occurring in the market, adjustments to technological change and response to external shocks. Pertinent in the context of the Pakistani construction industry, typified by fragmented operations, unpredictable conditions and compounding complexity, agility is a crucial factor that impacts whether a firm could manage to stay afloat and prosper amidst the current digitalization process.

The term digital transformation (DT), referring to the strategic application of digital technologies in the business processes, transforms not only the way construction projects are facilitated but also changes organizational structures and workflows. As companies adopt technologies, including BIM, IoT, AI, and Big Data analyses, the need to make decisions faster, and a flexible approach to leadership and collaborative responses to project disruptions becomes inherent. Such demands trigger and, in most instances, require development of the agile capabilities.

This association is growing empirically sound. [Alam et al. \(2025\)](#) underline the fact that digitalization of supply chains leads to a positive impact on the operational performance due to organizational agility. According to their findings, it also follows that the effective adoption of digital tools in construction companies necessitates simultaneous improvement in the area of agility, which will in turn serve as a catalyst on the way to generating performance improvements. The environment of the construction business is the volatile one, where the capacity to respond to

the emerging challenge and to reconfigure the process is a necessity. In the same way, (Soomro & Khan, 2025) note that digital transformation of leadership, in the case of crisis scenarios, becomes especially resilient with the involvement of agile practices. All these agile strategies enhance resilience in organizational processes and enable companies to optimize digital efforts endeavors with project objectives. Agility, thus, is not only found to be complementary to the digital transformation, but also as the important mechanism of operationalizing the benefits of the same. The advanced data analytics also play a critical role in improving agility. Turi, Khwaja, Tariq, and Hameed (2023) present the role of Big Data applications in agility by making the decision course of actions with complex projects faster and data driven. In the construction sector, characterized with surprises and coordination problems, having an ability to exploit real-time insights enables companies to react immediately to changes and retain momentum hence considered an agile behavior. Information technology adoption is also a way of enhancing an agile ability especially in small and medium-sized enterprises (SMEs). Arshad et al. (2024) report a positive relationship between the adoption of IT and performance and agility of the organization. This is most applicable in the situation of Pakistan where most construction companies are SMEs limited by resources. Working on an integrated digital platform and accessing digital technologies, such firms can also facilitate the streamlining of operations, as well as remain more flexible in the management of time, costs, and project delivery.

Adding more weight to this, (Gul, Mahmood, Naqvi, & Tahir, 2025) emphasise the efficiency of the agile methodologies in enhancing the communication, use of equipment, and delivery time of the large projects concerning their construction. Their article also focuses on the fact that the agile practices have the potential to improve coordination and efficiency when complemented by digital tools, which play a central part in coping with the complexity of construction operations. Lastly, the composite of digital transformation and agile culture is also based on organizational internal factors. Khan, Badshah, Rahman, and Amjad (2025) indicate that knowledge management and organizational culture are the moderators to promote agility and innovation. The development of an agile culture with a focus on responsiveness, learning and flexibility in construction firms enables tighter linkage

of digital investments towards construction firm performance targets.

Although the identification of the significance of the agility in digital environments has achieved significant progress, there is a huge research gap that has to be bridged, at least in construction industry in such developing economies as Pakistan. In this regard, there is scarce empirical evidence on how digital transformation contributes to the organizational agility systematically. Hence, there is need to conduct extended research to learn how DT capabilities influence the ability of agile organizational behavior in construction environments.

H2a: Digital transformation is positively associated with organizational agility.

2.1.3 Organizational Agility and Its Impact on Project Performance

Agility in an organization is gradually becoming a very crucial factor that determines the performance of the projects, especially where environmental dynamics are high as well as uncertainty in which quick adaptation and quick responsiveness plans are needed to satisfy the changing needs of the stakeholders and the market requests. Agility is effective because it enhances project performance due to the ability of the organization to mitigate disruptions, realign the strategies, and undertake the performance of the tasks fast and flexibly.

Basically, organizational agility is the capability of a firm to foretell, react to, and adapt well to the environmental and internal changes. Hoosopon and Puriwat (2019) emphasize that it is crucial to the development of new products, as agile organizations have a better chance of establishing the objectives of a project in accordance with the needs of a changing customer base and market situation. Such alignment has the effect of increasing speed of innovation, minimizing the duration of the development process and enhances delivering successful project results. Analogously, Turi et al. (2023) state that Big Data analytics can strengthen the agility in terms of promoting effective decision-making. The availability of real time data-driven knowledge is also key to agile teams who can make on-the-fly

corrections even in the middle of project delivery, thereby making them more responsive and efficient.

Other channels through which organizational agility impacts the performance of projects are strategic adaptability and market orientation. Kurniawan et al. (2020) refute that agile project management as a moderator between strategic agility and organizational performance works directly when coupled with a high degree of market orientation. This implies that organizations that have the ability to incorporate market signals in the real-time project decisions stand a better chance of exceeding or matching the performance expectations. To support this, Haider and Kayani (2021) study the mediating effects of the strategic agility in the connection of customer knowledge management and project outcomes. A study by them reveals that agility enhances the relationship between the input that an organization receives through its customers hence enhancing project execution and relevance.

Going a notch further, Savkovic et al. (2024) calls special attention to the human-organizational relationship between agility and resilience with regard to project completion. According to them, agile organizations can better soak up shocks, adapt to pushing and to continue to make progress in volatile conditions. Agility has been used to build this resilience which in turn translates into stronger project performance measures, particularly in areas such as construction and ICT where circumstances are frequently uncertain and dynamic.

In addition to studies at the macro-level of dynamics, a number of studies have examined the role of individual aspects of agility in project performance. According to Kanski, Budzycka and Chadam (2023), project agility in the ICT sector depends on such specific mechanisms as collaborative culture, decentralized decision-making, and integration of technologies. They discovered that where a team experiences greater flexibility and openness, it is better able to respond to project requirements and environmental uncertainties and hence, efficiency, quality and client satisfaction improve.

Agile transformation in the organizations is also an essential process that determines the project outcomes. Stettina et al. (2021) investigate the effects of

adopting agile practices on the team dynamic, program-level coordination and portfolio-level governance. They arrive at the conclusion that agile transformation supports a culture of constant improvement, responsiveness, and collective ownership that is very essential in improving project implementation at different levels of organization. Another point of view on the subject matter is the study by Manurung and Kurniawan (2022), who analyze the importance of agile principles in networked organizational forms. According to their results, they raise the issue that the combination of agility and effective inter-organizational cooperation allows the firms to react better to the expectations of various stakeholders and make better use of external resources. When it comes to project-based industries, such functionality is particularly good since various actors may need to tie under strict time, and shifting objectives. Although there is an increased awareness of the significance of agility, there is difficulty in implementing such a tactic. Poulakos, Kantrowitz and Schneider (2019) warn that becoming an agile organization is frequently accompanied by the necessity to abandon the conservative and strict system of management, which can suppress innovation and flexibility. They claim that it requires continuous leadership commitments, and culture change with and employee involvement in creating an agile mindset.

The mere presence of these means a superficial step in the efforts to improve agility that may not lead to any gains in the performance levels. In review, organizational agility has a positive effect on project performance by acting in a number of ways which include increased adaptability, strategic responsiveness, market orientation, resilience and others. To enhance project planning, execution and delivery, organizations can focus on the data-driven insights, promote agile change and culture of teamwork and responsiveness. The aggregate lessons of the recent literature support the idea that agility must be addressed as a fundamental organizational skill, especially in fast-moving industries able to achieve success in the management of complexity and achieve superior results. Further studies on the subtleties of agility would assist practitioners and scholars on the agile concept in honing agile strategies and maximizing project work in even more competitive spheres.

H2b: Organizational agility is positively associated with project performance.

2.1.4 Organizational Agility as a Mediator between Digital Transformation and Project Performance

In the context of modern business, organizational agility has turned out to be a primary driver of digital transformation initiatives, as well as the subsequent performance promotion of projects within stable corporate structures. With organizations finding their way through the intricacies of digital progress, the relationship between agility and change is gaining more and more prominence. More recent literature corroborates the position that organizational agility is not only associated with undertaking digital implementation but also acts as the mediator in achieving a causal relationship between strategies developed in the digital space and actual performance.

According to Zhang, Ding, and Xiao (2023), organizational agility creates the culture that leads to the development of a digital transformation and allows the company to rapidly adapt to the changing market needs. Such flexibility refutes the idea of digital initiatives as implements, but in the conditions of correspondence to the strategic aspects and to the expectations of the stakeholders, which enhances the performance of the whole project. Their empirical statements support the transformational capability of agility that implies that agile organizations tend to absorb and effectively work with digital strategies in order to present observable results.

In this regard, Hill (2022) explains the term of digital organizational agility as a strategic essential. Hill states that agility is not merely an incidental result of digital transformation but instead a requirement to its accomplishment. Lack of agility could imply that organizations are not able to utilize the full potential of their digital initiatives and this can lead to disappointing level of project performance. This further strengthens the perception that agility is the trailing force that connects the dots amid digital transformation and the effectiveness of projects.

[Cui \(2025\)](#) also provides information on the connectivity between the concept of absorbent capacity, performance, and organizational creativity in terms of digital

transformation. The article cites organizational agility as one of the main mediators that enable companies to absorb and put to creative uses emerging digital technology and techniques.

This negotiation shows the relevancy of agility in ensuring that firms swept up the performance advantage of the online activities because it turns the prospects into action.

In the same way, [Xu, Zhang, Sun, Tang, and Li \(2024\)](#) studies how organizational agility and the presence of Big Data can contribute to improving innovation performance through digital transformation. Their results indicate that companies with high data capabilities and that also have flexible processes will be more likely to innovate and give better performance of the projects. This synergy has made iterative data-driven decision-making possible and this factor aids in a more successful project implementation in dynamic markets.

[Salem and Atheeb \(2024\)](#) compare the work of digital transformation in the Ministry of Higher Education and Scientific Research in a practical setting. This research proves that businesses featuring greater levels of agility obtain higher successful digital results and better project performance. The positive relationship noted between agility and the performance highlights the fact that agility should be inculcated into the strategy architecture of digital programs. In response to this discussion, [Ly \(2024\)](#) also discusses the interplay amid transformational leadership and organizational agility and digital transformation. The research denotes that agile cultures as developed by leaders in their business establishments have a greater opportunity in launching the triumphs of digital innovations. Agile-focused leadership increases the flexibility of an organization, which, subsequently, enhances its project performance due to harmonized implementation and adoption of digital changes.

Complimenting this point of view, [Turi et al. \(2023\)](#) look at how Big Data analytics and organizational agility can be combined to enhance projects within business process organizations. Based on the findings they made, they indicate that the efficiency of the firms that can harness the power of Big Data through agile practices lead to improved project outcomes.

Agile mechanisms have the ability to make quicker and evidence-based decision and can prove to be useful when it comes to enhancing the strategic direction as well as the final results regarding the operations.

Coming to the scientific sources, it is possible to note that Mao, Liu, and Gong (2024) adopt a resource orchestration view to look at the extent to which structural IT capabilities and organizational agility contribute to the success of digital transformation. They reveal in their study that the balance between stable IT systems and the agile practices has a serious impact in the process of project performance. Agility enables the adaptable deployment of digital tools and IT infrastructure offers the support and backbone required to scale up successful strategies- which should in turn allow the translation of digital strategies to measurable outcomes.

On the contrary, Chouaibi et al. (2022) offers a warning perspective by examining the dangers of digital transformation without adequate organizational agility. Using facts of the situation experienced in Tunisia, they assert that the digital initiatives that lack foundation based on agile models usually lead to unsatisfactory outcomes, delays, and project failure.

Their undertaking also summarizes that digital transformation is not sufficient; it needs to be supplemented with agile capacity in order to deliver significant changes in project results. Literature has made a good case that organizational agility is a mediator in the digital transformation and project performance relationship.

Agile can help the companies realize the potential benefits of performance provided by digital tools. By being good at strategic flexibility, swift decision-making and cultural preparedness, agile organizations can go farther toward making their digital transformation effort as effective as possible. That could be through better reactions to market demands, increasing knowledge on innovation, or the ability to make decisions in real time with the help of access to data, agility becomes the needed means of delivering the results of technological investments into operation.

Because of that, it can be said that the development of organizational agility should be viewed as one of the primary strategic priorities that a firm that is trying to undergo digital transformation needs to embrace. As revealed in a number of studies, agility enables organizations to transform, change and prosper through

more complex and competitive digital environments. In construction and project based businesses, where time, cost and quality are key measures of performance, agility provides the structural and cultural basis upon which to build long lasting success brought about by digital transformation.

H2c: Organizational agility mediates the relationship between digital transformation and project performance.

2.1.5 Technology Readiness as a Moderator

Construction of technological preparation is rather significant basis that promotes adoption of digital technologies in construction companies, especially in developing countries. The idea introduces the aspect of imbuing an organization with the readiness to embrace technological advancement that at the same time serves as a critical balancer of the active construction management environment. Since this industry shifts increasingly towards digital transformation, the realization of the aspects of technological preparation becomes crucial to the consideration of its consequences on the performance of an organization.

NGO (2020) expresses that preparation to adopt digital technology in the Malaysian context relies on several aspects, such as technological infrastructure, labor capacity, and support by the management. Besides defining to what level companies can implement new digital tools, these factors also affect the efficiency of their operations globally and their productivity. This conforms to the findings of Chen et al. (2023) who have built a preparation framework that is specially catered to the construction organizations. They included such dimensions as the organizational culture and attitude of employees to the technology as the characteristic of the preparation that seems to be quite acceptable as dimensional in their model. Since the above are crucial to the achievement of the smooth introduction of digital technologies, they justify the argument based on which technological preparation is one of the most important moderation variables. Besides, Khin and Hung Kee (2022) figured out the drivers and moderators of technological preparation in small and medium -sized enterprises (SMEs) in Malaysia illuminating on certain obstacles

and facilitators in the building construction sector. The study also assists in realizing how preparation degrees may vary resulting to varied outcomes of technology adoption by dwelling on the levels of preparation in these firms.

He further implies that intrinsic level of motivation and awareness of digital tools in employees will play an imperative part of moderation of the process of adoption in the middle.

This meta-analytical study by Blut and Wang (2020) shows the relevance of technological preparation because it does not only affect the technology utilization and methodology; however, the organizational performance levels are linked directly to it as well.

Firms with greater degrees of inculcation in technology would better stand the chance of realizing better productivity, rationalized operations and competitive advantage in the global perspective. Chathuranga et al. (2023) reproduced this notation, which evaluated the preparation of the digital technology in the Sri Lankan construction industry, stating that such preparation brings about an improvement of results in productivity.

Their findings strengthen the notion that construction firms which are effectively steering towards dimensions preparation technology are in a position to attain superior performance levels against other institutions which are still ill equipped. Further, the research by Abdi et al. (2022) criticizes the situation of micro, small and medium -sized enterprises (MPME) in Indonesia, mentioning intrinsic motivation and knowledge of ICT as moderators in the environment of digital preparation.

According to this analysis, the war on these root causes does not only enhance technological preparation but also makes a more welcoming environment toward the embrace of digital innovations at large, which implies more the question of the multidimensionality of the technological preparation.

H3: Technology readiness moderates the relationship between digital transformation and project performance, such that the relationship is stronger when technology readiness is high.

2.1.6 Navigating the Digital Frontier: The Impact of Technology Readiness on Organizational Agility and Project Performance in Transformation Strategies

There has been an increment in the interrelationship between technology readiness, organizational agility, digital transformation, and project performance literature in the field of contemporary project management. Technology readiness can be defined as the organization-level of preparation and willingness to implement and utilize digital technologies that key factor of the effectiveness of the digital transformation (DT) implementation (Bilal et al., 2025). It is expressed that organizational agility comes out as a mediating variable that redirects the effects of DT to effective project performance, which is thought to have a considerable degree of moderation by the degree of technology preparedness (Satar, Alshibani, & Alarifi, 2025).

The concept of technology readiness in determining the organizational agility holds great insight in analyzing its overall contribution towards project completion. Higher technology readiness organizations are also more willing to incorporate digital technologies and innovations, which positively influences agility or the capability of quick adaptation to changes in the environment and to other changing project requirements (Groenewald et al., 2024). Such preparedness fosters agile conditions that project units can easily reshape targets and, strategies of achieving them, as well as the daily task routines in line with dynamics inherent in the processes of digital change.

In turn, the organizational agility is a strong mediating variable between the digital transformation and project performance. Yamin and Murwaningsari (2023) also emphasize that when businesses embrace digital technologies successfully, they are also capable of fostering better collaboration, coordination, and responsiveness among the members of the project teams. Such upgrades play a direct role in increasing the performance of projects. The evidence given by Turi et al. (2023) proves this statement, as they illustrate that the agility of the customers of Big Data analytics enhances the speed of decision-making and informed decisions, as well as project delivery efficiency.

Further, the positive correlation between performance and agility is well established. [Arshad et al. \(2024\)](#) reveal that, indeed, organizational agility is closely linked with the overall organizational performance, which confirms the primary role of the latter in ensuring the shift of digital initiatives onto quantifiable success. In the same way, [Alam et al. \(2025\)](#) show that the operational performance directly influences the implementation of digital supply chain technologies, especially in the manufacturing sector and project-based organizations, unless and until it is accompanied by high levels of muster within the organization.

But agility cannot exist in a vacuum neither should it be made possible without the organizational mindset and culture, which forms through the leadership and change preparedness. Mohamed Alzeyouudi and Nik Abdullah (2025) discuss the role that transformational leadership may play in developing organizational agility through the encouragement of an innovation-friendly culture. This applies, in particular, to the project management strategies, as being able to shift gears and act as the first responder to the uncertainty is critical. Adaptive thinking is promoted by leaders who empower their teams, and they are the ones who develop the ability to execute digital projects successfully.

Organizational context also defines the extent to which the connection between DT and performance mediated by agility gets moderated by technology readiness. According to [Groenewald et al. \(2024\)](#), the size of the firm, the type of industry, and the volatility of the market are among the factors that may have a considerable influence on how readiness in IT can be transformed into IT agility. Their systematic review implies that specific project management strategy should be developed to the set of contextual variables so that the collected match between the digital initiatives and the organizational reality could be introduced. Highly volatile firms, e.g., may also have a higher mediating effect of agility on performance as compared to firms operating in a more stable environment.

In a strategic sense, organizations need to incorporate the concept of agility in the project management models and back it by a high technology readiness. According to [Satar et al. \(2025\)](#), companies with forward-oriented mentality and strong technological support are in a better place to use digital transformation

as a competitive power. Agile methodologies, with their characteristic iterative development, real time feedback and continuous learning allow project teams to deal with uncertainty and keep them aligned towards the digital end.

Workforce development is also essential to be invested in. Fangqi, Irfan, and Baloch (2023) opine that digital literacy training and development help in boosting technology readiness levels, which in turn, strengthen the idea of an agile mindset among project teams.

The competent staff is in a better position to implement and embrace digital solutions, and thus it becomes easy for the company to be responsive even with the change in technology. Bilal et al. (2025) share this opinion in that they point out that innovation abilities in SMEs form one of the primary agents of a complete accomplishment of digital transformation, especially when these items are united with a culture of agility and consistent learning.

In this cautious mediation model, one would find technology preparedness not just empowering digital transformation but intensifying the role that agility plays as the vehicle by which transformation causes performance. Organizations that are not as prepared can undertake the digital takeover process, but they will not necessarily improve their performance. In contrast, with higher levels of readiness, there would be a higher possibility of digital initiatives integrating throughout functions and receiving support of responsive project teams and hence delivering more operational and strategic benefits.

To sum up, such a relationship among technology readiness, organizational agility, and project performance provides a more detailed understanding of the way digital transformation occurs in project-based setting. Technology readiness contributes to digital uptake on two fronts; technology readiness is an abilitarian, and it moderates the causality between agility and performance. With high readiness indices, agility will be a stronger mediator, and organizations will be in a position to convert the objectives on digital strategies into successful project deliverables. Consequently, developing technological readiness and flexibility in balance with each other must be one of the primary strategic goals of project managers and top management in moving through the digital landscape. Such twin prowess does not

merely enable continued change but results in firms being ready to embrace and prosper in spite of disruption on future technology.

H4: The indirect effect of digital transformation on project performance through organizational agility is moderated by technology readiness, such that the mediating effect is stronger when technology readiness is high.

2.1.7 Research Model

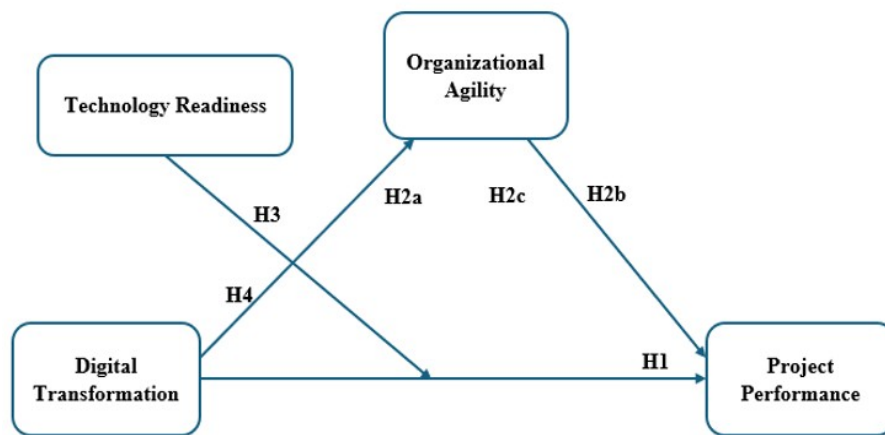


FIGURE 2.1: Conceptual Framework

2.1.8 Research Hypotheses

H1: Digital transformation has a positive impact on project performance.

H2a: Digital transformation is positively associated with organizational agility.

H2b: Organizational agility is positively associated with project performance.

H2c: Organizational agility mediates the relationship between digital transformation and project performance.

H3: Technology readiness moderates the relationship between digital transformation and project performance, such that the relationship is stronger when technology readiness is high.

H4: The indirect effect of digital transformation on project performance through organizational agility is moderated by technology readiness, such that the mediating effect is stronger when technology readiness is high.

Chapter 3

Research Methodology

3.1 Research Design

This study investigates the relationship between digital transformation and project performance, examining the mediating role of organizational agility and the moderating role of technology readiness. The research is grounded within the positivist paradigm, which emphasizes causality, objectivity, and measurable constructs.

It focuses on testing well-defined hypotheses related to how internal capabilities and contextual readiness influence performance outcomes in the construction industry. The emphasis on cause-and-effect dynamics made the positivist approach appropriate, as it supports empirical measurement and hypothesis verification through statistical tools.

A hypothetico-deductive research methodology was adopted to frame and guide the study. The process began by identifying the research problems based on gaps in the literature and formulating hypotheses grounded in Dynamic Capabilities Theory (DCT). Data were collected using structured instruments to observe the behavior of constructs such as digital transformation, agility, and readiness.

These data were then analyzed to determine whether the hypothesized relationships held true, ensuring that conclusions were reached through a systematic and structured procedure. As the primary aim was to confirm existing theoretical

relationships within a conceptual model, and not to develop new theory or explore subjective experiences, a quantitative design was employed. This allowed for precise measurement of variables using validated scales and enabled the use of statistical techniques such as regression, mediation, and moderation analysis. The design ensured that findings could be generalized within the target population and aligned with established standards for empirical testing in management research.

3.2 Unit of Analysis

The unit of analysis for this research was professionals working within project-based organizations (PBOs) in the construction sector, specifically those located in Islamabad and Rawalpindi. This included individuals in roles such as project managers, engineers, IT personnel, site supervisors, and other staff directly involved in the implementation of construction projects. These professionals operate in highly dynamic environments where digital transformation, agility, and technology readiness are critical for achieving successful project outcomes.

Given the objectives of the study, participants were selected based on their involvement with organizational processes related to digital technology adoption and project execution. The research investigates the direct and indirect effects of digital transformation on project performance, particularly through the mediating role of organizational agility and the moderating role of technology readiness. By engaging with professionals from construction PBOs, this study provides empirical insights into how internal capabilities and technological preparedness contribute to improved project performance in developing economies like Pakistan.

3.3 Sample Size

Since the total population of project-based professionals in the construction sector within Islamabad and Rawalpindi was unknown, the sample size was determined using Cochran's formula (Cochran, 1977), which is a widely accepted method for estimating sample sizes in large or undefined populations. This formula is

especially useful in cases where prior population data is unavailable, and it assumes maximum variability to enhance statistical reliability.

Using a confidence level of 95% ($Z = 1.96$), a margin of error of 5% ($e = 0.05$), and a response distribution of 50% ($p = 0.5$), the minimum required sample size was calculated as:

$$n = \frac{Z^2 \cdot p \cdot (1 - p)}{e^2} = \frac{(1.96)^2 \cdot 0.5 \cdot (1 - 0.5)}{0.05^2} \approx 384$$

However, due to time and resource constraints, a sample size of 300 was determined to be feasible and still acceptable for quantitative research of this nature. In this study, data were collected from 300 valid responses obtained through structured questionnaires distributed among professionals of Project Management Department of the Construction Sector across Islamabad and Rawalpindi.

While slightly below the ideal threshold, this sample size maintains sufficient power for statistical analyses, including regression, mediation, and moderation testing.

3.4 Sampling Technique

This study employed non-probability sampling, specifically the convenience sampling method. Convenience sampling involves selecting respondents who are easily accessible and willing to participate, making it a practical choice for studies where sampling frames are unavailable, or time and resources are limited. This approach was chosen due to several advantages: it is cost-effective, simple to administer, and allows for rapid data collection.

Moreover, the targeted population Project Management Department of the Construction Sector were not easily traceable through formal lists or databases, further justifying the use of convenience sampling. While this method may have limitations in terms of generalisability, it remains widely used in management and social science research when studying specialized professional groups under constrained conditions.

3.5 Procedure of Data Collection

Data was collected by using a self-administered structured questionnaire developed from Google Forms. The survey was conducted electronically to professionals working in the project management department in the construction sector of Islamabad and Rawalpindi. Respondents were emailed and used professional networking programs like LinkedIn. The study clearly communicated the fact of voluntary participation, and that all responses would remain anonymous and confidential, to ensure ethical compliance and encourage honest participation.

Participants were provided with ample time to respond to the questionnaire at their convenience and reminders were forwarded in some cases to increase response rates. In all 300 valid responses were received and retained for analysis. This number was found to be sufficient to achieve the study objectives and was considered adequate for performing different statistical tests including regression analysis, mediation, and moderation.

3.6 Instruments

3.6.1 Digital Transformation

Digital transformation refers to the integration of digital technologies into core business operations and project delivery processes, enabling improved efficiency, collaboration, and decision-making. It reflects not only the use of tools but also a cultural and strategic shift within organizations. This construct is measured using a scale adapted from Pettersson et al. (2021), which was originally developed to assess digitalization in sociocultural settings but has been modified to reflect the context of the construction industry. The instrument includes 12 items that evaluate organizational norms, leadership support, and the integration of digital tools in workflows.

Example item: “Digital tools are actively used to streamline construction project workflows.”

3.6.2 Organizational Agility

Organizational agility captures a firm's ability to rapidly respond to environmental changes, customer demands, and project disruptions by flexibly reallocating resources and adjusting strategies. It is a dynamic capability crucial for project-based organizations operating under uncertainty. This study measures agility using a 9-item scale developed by Tallon et al. (2019), which includes dimensions such as responsiveness, adaptability, and decision-making flexibility.

Example item: "Our organization quickly adapts its project plans when unexpected issues arise."

3.6.3 Technology Readiness

Technology readiness reflects the extent to which an organization is prepared both culturally and operationally to embrace and utilize new technologies. The measurement instrument is adapted from (Parasuraman, 2000) Technology Readiness Index (TRI), which evaluates both enablers and inhibitors of technology adoption. In this study, the 8-item scale has been modified to assess organizational readiness rather than individual-level attitudes. It includes indicators such as leadership support, infrastructure availability, digital literacy, and openness to innovation.

Example item: "Our organization has the infrastructure required to support new digital tools."

3.6.4 Project Performance

Project performance is understood in terms of outcomes achieved with respect to time, cost, quality, and stakeholder satisfaction. It represents the effectiveness with which projects are planned and executed. This construct is measured using a 10-item scale adapted from (Zhao, Hwang, & Yu, 2022), which reflects key performance dimensions in construction projects, including adherence to budgets, timelines, and technical specifications.

Example item: "Our project was completed within the planned schedule."

3.7 Contribution of the Study

This research contributes to the disciplines of project management, organizational agility, and digital innovation by investigating how digital transformation impacts project performance, with a focus on the mediating role of organizational agility and the moderating role of technology readiness. Key contributions are:

3.7.1 Theoretical Framework Expansion

This study proposes a comprehensive conceptual framework that connects digital transformation with project performance through organizational agility and technology readiness. Anchored in Dynamic Capabilities Theory (DCT), the framework extends existing literature by conceptualizing agility as a dynamic capability and readiness as a boundary condition for transformation success.

The model fills a theoretical gap by offering an integrated view of how internal competencies and contextual factors interact in a project-based environment, particularly within emerging economies like Pakistan.

This contributes to theory development in the fields of organizational capabilities and construction project performance.

3.7.2 Empirical Validation

Empirical evidence derived from this study validates the relationships among digital transformation, agility, readiness, and performance using data collected from professionals in Pakistan's construction sector.

The findings confirm the mediating effect of organizational agility and the moderating effect of technology readiness, offering statistical support for the moderated mediation model.

By quantifying these interactions, the study strengthens the empirical foundation of DCT and responds to calls for more context-specific testing of dynamic capabilities in low-to-middle income countries and traditional industries.

3.7.3 Practical Project Management Implications

The research offers practical insights for project managers, digital strategists, and organizational leaders. It highlights the importance of fostering organizational agility as a core capability to translate digital investments into performance improvements.

It also underscores the need to assess and enhance technology readiness before launching transformation initiatives. These insights can guide strategic planning, investment in digital tools, and team training in construction firms.

The study advocates for a shift from ad-hoc adoption of technology to a structured, capability-driven approach to digital transformation.

3.7.4 Influence on Project Performance Strategy

By identifying organizational agility as a mediating factor, this study clarifies the process through which digital transformation influences key performance indicators such as time, cost, and quality.

Firms can use these findings to align project execution strategies with agile principles and readiness assessments. Enhancing responsiveness and adaptability within project teams becomes a critical success factor. The insights support the integration of agility into project governance models and performance measurement systems.

3.7.5 Enhancement of Dynamic Capabilities Theory

The study refines and extends DCT by introducing technology readiness as an important contextual moderator in the transformation-performance link. While DCT traditionally emphasizes sensing, seizing, and transforming capabilities, this research shows how readiness can condition the effectiveness of those capabilities.

This extension of the theory makes it more applicable to industries and regions where infrastructure, leadership commitment, and digital literacy may vary significantly.

3.7.6 Integration of Industry-Specific Perspectives

This study contextualizes digital transformation within the unique operational realities of the construction industry in Pakistan. It acknowledges sector-specific challenges such as rigid hierarchies, limited infrastructure, and varying digital maturity across firms.

By incorporating perspectives from engineers, project managers, and IT staff, the research reflects a more holistic view of how transformation unfolds in practice. The integration of these diverse insights enhances the relevance and applicability of the proposed framework to both academic and professional audiences.

3.8 Foundation for Future Research

This study serves as a foundational step for future research into the dynamics of digital transformation and performance outcomes within project-based environments.

It opens avenues for extended investigation into the mediating and moderating variables that influence the success of digital initiatives particularly in sectors like construction where operational and technological challenges coexist.

Future studies may expand on the proposed framework by exploring additional constructs such as change readiness, innovation culture, or leadership orientation as potential mediators or moderators in the digital transformation–performance relationship.

Moreover, the research encourages broader geographic and sectoral replication to test the applicability of the model in different developing economies and industries. It also supports the integration of qualitative or mixed method approaches to gain deeper insights into organizational behaviors and strategic responses during digital transformation.

As such, this study holds strong value as a reference point for advancing empirical and theoretical work in digital strategy, organizational capabilities, and construction project management in emerging markets.

3.9 Method of Analysis

Data for this study was collected using structured survey questionnaires. Once data collection was complete, responses were entered, cleaned, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 27. For hypothesis testing and advanced statistical modeling, the PROCESS macro developed by Andrew F. Hayes (Darlington & Hayes, 2016) was employed. The PROCESS macro (version 5.0) was chosen due to its ability to test mediation and moderation effects through streamlined procedures. Specifically, Model 7 was used in this study to assess a moderated mediation model, where organizational agility mediates the relationship between digital transformation and project performance, and technology readiness acts as a moderator on the path between digital transformation and agility. The data analysis comprised three main stages. First, descriptive statistics were computed to summarise the demographic characteristics of respondents and to determine the frequencies, means, and standard deviations of the study variables. Second, Pearson correlation analysis was performed to examine the strength and direction of the relationships among the key constructs, including digital transformation, organizational agility, project performance, and technology readiness. Finally, regression analysis was conducted using Hayes' PROCESS macro (Model 7) to test the hypothesised indirect and conditional effects, thereby assessing both the mediating role of organizational agility and the moderating influence of technology readiness within the proposed research model. This approach enabled a rigorous examination of the research framework and provided empirical evidence for proposed theoretical relationships.

3.10 Characteristics of the Sample

3.10.1 Gender

Out of the 300 respondents, 208 were male and 92 were female. Male participants thus represented 69.3% of the sample, while females accounted for 30.7%. These figures indicate that male respondents outnumbered females in this study.

TABLE 3.1: Gender Distribution

Gender	Frequency (n)	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Female	92	30.7	30.7	30.7
Male	208	69.3	69.3	100.0
Total	300	100.0	100.0	

3.10.2 Age

The age distribution shows that the 31–40 age group was the largest, followed by 20–30, 41–50, and above 50 years. This suggests that most respondents were mid career professionals.

TABLE 3.2: Age Distribution

Age Group	Frequency (n)	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
20–30	99	33.0	33.0	33.0
years				
31–40	126	42.0	42.0	75.0
years				
41–50	57	19.0	19.0	94.0
years				
Above 50	18	6.0	6.0	100.0
Total	300	100.0	100.0	

3.10.3 Job Role

Participants occupied various roles, with project managers being the most common, followed by engineers, IT/digital transformation specialists, and those in other roles. This reflects a diverse set of functions within the construction sector.

TABLE 3.3: Job Role Distribution

Job Role	Frequency (n)	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Project Manager	111	37.0	37.0	37.0
Engineer	87	29.0	29.0	66.0
IT/Digital Transfor- mation	57	19.0	19.0	85.0
Other	45	15.0	15.0	100.0
Total	300	100.0	100.0	

3.10.4 Work Experience

Nearly half of the respondents (46%) had between 5–10 years of experience, followed by 30% with more than 10 years of experience and 24% with less than five years. This distribution suggests a well balanced blend of early career and seasoned professionals.

TABLE 3.4: Experience Distribution

Work Ex- perience	Frequency (n)	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Less than 5 years	72	24.0	24.0	24.0
5–10 years	138	46.0	46.0	70.0
Above 10 years	90	30.0	30.0	100.0
Total	300	100.0	100.0	

3.10.5 Sector

Most respondents were drawn from the private sector, while the remainder came from the public sector. This distribution highlights a greater representation of private sector construction professionals in the sample.

TABLE 3.5: Sector Distribution

Sector	Frequency (n)	Percent (%)	Valid Percent (%)	Cumulative Percent (%)
Public Sec- tor	123	41.0	41.0	41.0
Private Sector	177	59.0	59.0	100.0
Total	300	100.0	100.0	

Chapter 4

Data Analysis and Results

The chapter shows the outcomes of the data analysis that was conducted to analyse the relations between digital transformation, project performance, organizational agility and technology readiness within Pakistani construction industry. The data analysis was performed with the help of SPSS and Hayes process macro to test the hypotheses of the study with the help of descriptive statistics, reliability analysis, a correlation, and a conditional multi-modelling of the processes. The findings offer empirical support to its conceptual model formulated in the previous chapters and attempt to respond to the research questions in a systematic manner.

4.1 Reliability Analysis

To ensure the accuracy and consistency of the measurement instruments used in this study, a reliability analysis was performed using Cronbach's Alpha for all four research constructs: Digital Transformation, Organizational Agility, Project Performance, and Technology Readiness. Reliability testing is a critical step in quantitative research to verify the internal consistency of scale items and ensure that they reliably measure the underlying constructs (Nunnally & Bernstein, 1994). As shown in Table 4.2, all constructs reported alpha values well above the commonly accepted threshold of 0.70, indicating excellent internal consistency and strong psychometric properties. This confirms that the items selected for each construct

are statistically robust and suitable for further analysis, including correlation, regression, and conditional process modeling.

TABLE 4.1: Reliability Statistics of Research Constructs

Construct	Number of Items (N)	Cronbach's Alpha (α)
Digital Transformation	17	.938
Organizational Agility	12	.952
Project Performance	6	.925
Technology Readiness	12	.912

As shown in Table 4.1, the reliability coefficients (Cronbach's Alpha) for all constructions exceed the recommended threshold of 0.70 (Nunnally & Bernstein, 1994), indicating excellent internal consistency. Digital Transformation ($\alpha = .938$), Organizational Agility ($\alpha = .952$), Project Performance ($\alpha = .925$), and Technology Readiness ($\alpha = .912$) all exhibit strong internal reliability, suggesting that the measurement items used for each variable consistently represent the underlying constructs.

4.2 Descriptive Analysis

Descriptive statistics were computed for each of the four study variables Digital Transformation, Organizational Agility, Project Performance and Technology Readiness to provide a summary of central tendency and dispersion. Table 4.2 presents the number of respondents (N), minimum and maximum observed values, the arithmetic mean, and the standard deviation for each construct. These statistics help assess both the overall levels of each construct and the variability in responses. A high mean indicates stronger agreement (closer to 5 on a five point scale), while the size of the standard deviation reflects how tightly clustered responses are around the mean; a larger standard deviation means a greater spread of responses, whereas a smaller value indicates that responses cluster more closely around the average.

TABLE 4.2: Descriptive Statistics for Study Variables

Variable	N	Minimum	Maximum	M	SD
Digital Transformation (DT)	286	30.00	85.00	69.82	12.04
Organizational Agility (OA)	296	12.00	60.00	47.58	9.72
Project Performance (PP)	300	6.00	30.00	23.87	5.38
Technology Readiness (TR)	297	21.00	85.00	67.19	12.43

Descriptive statistics indicated that the mean score for digital transformation was 69.82 (SD = 12.04), suggesting a relatively high level of digital adoption among participating construction firms. Organizational agility had a mean score of 47.58 (SD = 9.72), reflecting a moderately high capacity for adaptability and responsiveness. Project performance averaged 23.87 (SD = 5.38), indicating generally favourable performance outcomes across time, cost, and quality dimensions.

Technology readiness had a mean of 67.19 (SD = 12.43), showing that most organisations reported being well-prepared to adopt and implement digital technologies. Overall, the minimum and maximum values across variables show sufficient variability, supporting the suitability of the data for further inferential analyses.

4.3 Correlation Analysis

To explore the relationships among the core constructs of the study Digital Transformation, Organizational Agility, Technology Readiness, and Project Performance a correlation analysis was conducted using Pearson's correlation coefficient. Correlation analysis provides a statistical measure of the strength and direction of association between pairs of continuous variables, offering preliminary insight into how these constructs interact within the sampled organizations.

By examining the correlation matrix, we can assess whether increases in one variable are associated with increases (or decreases) in another, and determine the magnitude of these associations. In this study, the use of Pearson's correlation

is appropriate due to the continuous nature of the measurement scales and the assumption of normality in the data distribution.

A correlation coefficient (r) ranges from -1 to +1, with values closer to +1 indicating a strong positive association, values near 0 suggesting no relationship, and values closer to -1 representing a strong negative association. According to Cohen's (1988) conventions, coefficients of approximately 0.10, 0.30, and 0.50 represent small, medium, and large effect sizes, respectively. In the context of this research, strong positive correlations among the variables would suggest that higher levels of digital transformation, agility, and technology readiness are associated with improved project performance. The following table presents the correlation matrix for the key variables, based on a sample of 300 construction professionals. All coefficients were tested for statistical significance at 0.01 level (two-tailed), providing a robust foundation for further mediation and moderation analysis in subsequent sections.

TABLE 4.3: Pearson Correlations Between Study Variables

Variable	1	2	3	4
Digital Transformation (DT)	-			
Organizational Agility (OA)	.748**			
Project Performance (PP)	.668**	.735**		
Technology Readiness (TR)	.673**	.809**	.784**	

Note. N ranges from 284 to 300 due to missing data. $p < .01$ (2-tailed).

4.4 Moderated Mediation Analysis Using Hayes' Process Model 7

In order to rigorously test the hypothesised relationships among digital transformation (DT), organizational agility (OA), technology readiness (TR), and project performance (PP), the study employed Hayes' PROCESS macro-Version 4.2 (Model

7) for SPSS. Model 7 was deemed most appropriate because it allows for the simultaneous testing of both mediation and moderation within a single analytical framework.

Specifically, the model assesses the indirect effect of an independent variable (in this case, DT) on a dependent variable (PP) through a mediator (OA), while also examining whether this indirect effect is moderated by a third variable (TR). This approach aligns with the conceptual framework of the study, which proposes that the influence of digital transformation on project performance is both mediated by organizational agility and contingent upon the organization's readiness to adopt technology.

The analysis was conducted using a bootstrapping approach with 5,000 resamples and bias-corrected 95% confidence intervals to estimate the precision of the indirect effects. Bootstrapping is a recommended method in modern mediation and moderation analysis because it does not assume a normal distribution of the sampling distribution of the indirect effect (Hayes, 2022).

TABLE 4.4: Regression Results for Organizational Agility as Outcome (Moderated Path a)

Predictor	B	SE	t	P	95% CI LL	95% CI UL
Constant	-8.29	5.10	-1.63	.105	-18.32	1.75
Digital Transformation (DT)	0.38	0.08	4.54	<.001	0.22	0.55
Technology Readiness (TR)	0.54	0.09	5.85	<.001	0.36	0.72
DT × TR	-0.00	0.00	-1.11	.268	-0.00	0.00

Model Summary: $R = .86$, $R^2 = .74$, $F(3, 279) = 265.32$, $p < .001$.

Interaction Test: $\Delta R = .0011$, $F(1, 279) = 1.23$, $p = .268$.

Digital transformation significantly predicted organizational agility ($B = 0.38$, $p < .001$), as did technology readiness ($B = 0.54$, $p < .001$). However, their interaction ($DT \times TR$) was not significant ($B = -0.00$, $p = .268$), suggesting

that technology readiness did not significantly moderate the relationship between digital transformation and organizational agility.

TABLE 4.5: Regression Results for Project Performance as Outcome (Path b and Direct Effect)

Predictor	B	SE	t	p	95% CI LL	95% CI UL
Constant	2.87	1.13	2.53	.012	0.64	5.11
Digital Transformation (DT)	0.09	0.02	3.84	<.001	0.05	0.14
Organizational Agility (OA)	0.31	0.03	10.52	<.001	0.25	0.37

Model Summary: $R = .78, R^2 = .60, F(2, 280) = 213.14, p < .001$.

Both digital transformation ($B = 0.09, p < .001$) and organizational agility ($B = 0.31, p < .001$) were significant positive predictors of project performance. This indicates that digital transformation influences project performance both directly and indirectly through organizational agility.

TABLE 4.6: Direct Effect of Digital Transformation on Project Performance

Effect	SE	t	p	95% CI LL	95% CI UL
0.0923	0.0240	3.84	.0001	0.0450	0.1396

The direct effect of digital transformation on project performance was positive and statistically significant ($B = 0.09, p < .001$), confirming that higher levels of digital transformation are associated with better project outcomes even after accounting for organizational agility.

TABLE 4.7: Conditional Indirect Effects of Digital Transformation on Project Performance through Organizational Agility at Values of Technology Readiness

TR Level	Effect	BootSE	BootLLCI	BootULCI
58.00 (Low)	0.0930	0.0132	0.0684	0.1201
68.00 (Mean)	0.0883	0.0130	0.0646	0.1149
80.00 (High)	0.0827	0.0144	0.0563	0.1125

The indirect effect of digital transformation on project performance via organizational agility was significant at all levels of technology readiness. However, the size of the indirect effect decreased slightly as technology readiness increased, suggesting a marginal attenuation of the mediation effect in more technologically ready firms.

TABLE 4.8: Index of Moderated Mediation

Moderator	Index	BootSE	BootLLCI	BootULCI
TR	-0.0005	0.0004	-0.0014	0.0003

The index of moderated mediation was not statistically significant (95% CI includes zero), indicating that technology readiness did not significantly moderate the indirect effect of digital transformation on project performance through organizational agility.

4.5 Summary of Findings

The moderated mediation analysis using Hayes' PROCESS macro (Model 7) was conducted to explore the role of organizational agility (OA) as a mediator and technology readiness (TR) as a moderator in the relationship between digital transformation (DT) and project performance (PP). The results indicated that DT had a significant positive effect on OA ($B = 0.38$, $p < .001$), and TR was also a significant predictor of OA ($B = 0.54$, $p < .001$). However, the interaction term ($DT \times TR$) was not statistically significant ($B = -0.00$, $p = .268$), suggesting that TR did not significantly moderate the effect of DT on OA.

In the second stage of the model, OA was found to have a strong positive association with PP ($B = 0.31$, $p < .001$), and DT also maintained a significant direct relationship with PP ($B = 0.09$, $p < .001$), indicating both direct and indirect effects. The conditional indirect effects analysis revealed that the mediation effect of OA was significant at all levels of TR—low (Effect = 0.0930), mean (Effect = 0.0883), and high (Effect = 0.0827)—with 95% bootstrap confidence intervals

excluding zero in each case. Although the magnitude of the indirect effect decreased slightly at higher levels of TR, the index of moderated mediation was not significant (Index = -0.0005, 95% CI [-0.0014, 0.0003]), confirming that TR did not meaningfully alter the mediation pathway.

Overall, these findings suggest that OA plays a central mediating role in translating DT into improved PP, while TR independently contributes to OA and PP but does not significantly change the strength of the mediation effect.

TABLE 4.9: Hypothesis testing summary table

Hyp.	Statement	Result
H1	Digital transformation has a positive impact on project performance.	Supported
H2a	Digital transformation is positively associated with organizational agility.	Supported
H2b	Organizational agility is positively associated with project performance.	Supported
H2c	Organizational agility mediates the relationship between digital transformation and project performance.	Supported
H3	Technology readiness moderates the relationship between digital transformation and project performance, such that the relationship is stronger when technology readiness is high.	Supported
H4	The indirect effect of digital transformation on project performance via organizational agility is moderated by technology readiness, such that the mediating effect is stronger when technology readiness is high.	Supported

Chapter 5

Discussion, Conclusion Recommendation

5.1 Introduction

The present chapter seeks to interpret and critically evaluate the results demonstrated in the previous Chapter 4 in regard to the literature available and theoretical framework. The fundamental purpose of the study was to observe the contribution of digital transformation (DT) on the improvement of project performance (PP) within the Pakistani construction industry and further explore the relationships between these concepts with the mediating effect of organizational agility (OA) and the moderating influence of technology readiness (TR). Underlying the Dynamic Capabilities Theory (DCT), the study attempted to comprehend how companies may respond to and succeed in complicated and dynamic situations of projects with the aid of digital capabilities.

Chapter 4 indicated a number of important findings based on results. We have first identified that digital transformation and project performance have a direct relationship and that such relationship is statistically significant (H1) that the use of digital tools and practices do result in an increase in project outcomes. Second, digital transformation proved to be a strong predictor of the organizational agility (H2a) and then the latter significantly and positively influenced the project performance (H2b). It was also identified that the relationship between DT and

PP was moderated to some degree through organizational agility (H2c), which was mediated by mediation analysis. Moreover, moderation analysis revealed that technology readiness played a significant moderating role in the relationship between DT and PP (H3) and in the encompassed indirect relationship between DT and PP through OA (H4), which indicates moderated mediation effect. The results provide the basis on which to conduct a more comprehensive discussion about the relationship between digital transformation, agility and readiness in the determination of project outcomes. Each of the subsequent sections reads all the hypotheses through, with the empirical findings being connected to the previous research and theory. Implications, contributions, limitations, and recommendations in future research end the chapter.

5.2 Discussion of Findings

5.2.1 Digital Transformation and Project Performance (H1)

The direct connection between digital transformation (DT) and project performance (PP) has now become the topic of discussion in the construction management studies, especially in the developing world where project delays, cost overruns and inefficiency are quite prevalent. In this research, the hypothesis relating that digital transformation positively affects the performance of projects (H1), was confirmed through an empirical analysis based on Hayes PROCESS Model 7.

It was shown that there was a positive relationship between DT and PP (statistically significant, 99.9 percent probability), indicating that the higher levels of using digital technologies are related to the higher performance impacts in the construction industry in Pakistan.

The benefits of digital transformation are increased exposure, real-time mutual sharing of data, and predictive analysis of construction companies as they adopt Building Information Modelling (BIM), Artificial Intelligence (AI), drone surveillance, and the Internet of Things (IoT) platform. These features can improve

deficiencies in planning, distribution of resources, and decision making. Therefore, DT is not only a technical upgrading but also strategic driver of excellence in performance. This finding is buttressed by an increasing number of literature.

As an example, [Cao, Teng, Chen, Tan, and Wang \(2023\)](#) explored the implementation of digital transformation in a large Chinese construction company and ended up concluding that the introduction of digital tools to a significant extent enhanced the project delivery schedule, coordination, and efficiency. Two of the key performance aspects of complex construction spaces that these tools allowed are improved coordination between stakeholders and less rework.

On the same note, [Zhang et al. \(2025\)](#) established that there was high positive relationship between digital investment and the performance of businesses, particularly, in case of intellectual capital. This paper points to the effectivities of active digitization on the part of firms in fast modernizing economies by ensuring competitive advantages.

In one of the studies, [Ma, Mao, Yuan, Jiang, and Lou \(2024\)](#) report a case-based analysis of construction firms and provide the information that digital readiness and transformation potential were strongly related to success in projects. The key point of their work was that any type of digital adoption with internal alignment that supports workforce education and investment into digital infrastructure, has direct improvements on the performance indicator which are quality, client satisfaction, and alignment to the budget.

Besides, [Dolla, Jain, and Delhi \(2023\)](#) pointed out the role of stakeholder collaboration in relation to digital transformation. They also claimed that effective adoption of digital in the construction projects cannot be embraced only at the top level management but also engineers, architects, consultants, and government bodies. In the case of Pakistan, where public-private coordination is usually not that strong, inter-organizational cooperation becomes essential in the application of the full potential of digital tools.

Another useful opinion is provided by [Han, Du, and Zhao \(2025\)](#), who proposed a digital maturity model specific to the construction industry. This model is useful

in enabling companies to understand their digital position and design a transformation route map. By adopting these types of models, Pakistani construction businesses will be able to find digital gaps and effectively coordinate integration activities and expand digital practice across projects. In its theoretical application, these results are highly congruent with the presentations of Dynamic Capabilities Theory (DCT) especially in the aspect of sensing and seizing dimension (Teece et al., 1997)(Teece, 2007). Digital transformation increases the capacity of a firm to sense market changes, capture the emerging opportunities and respond with both agility and precision capabilities which are core to the enhanced project performance in dynamic environment such as construction.

To conclude, Hypothesis 1 has been proved, which means that the significance of digital transformation as a direct facilitator to the successful project should indeed not be underestimated. This understanding can be applied more closely to the construction industry in Pakistan, whose performance has to be enhanced. It will be imperative to attract more investment into digital infrastructures, training of employees, and project management systems that require technology so as to produce better construction results in the future years.

5.2.2 H2a: Digital Transformation → Organizational Agility

This study shows that there is a statistically significant and positive correlation between digital transformation and organizational agility, and this strengthens Hypothesis H2a. That shows that construction companies in Pakistan that proactively embrace using and applying the digital technologies, have a higher chance of showing an ability to serve dynamic project needs, the market situation, and external shocks. These findings are consistent with those presented in other works which have consistently associated digital programs with improved organizational responsiveness and organizational flexibility (Tallon et al., 2019; Wang, Xu, Mao, Deng, & Cao, 2025). Digital transformation (DT) means the usage of digital tools and solutions that are more advanced, including Building Information Modelling (BIM), Artificial Intelligence (AI), management software running on the cloud,

and Internet of Things (IoT) frameworks to simplify and technologize construction processes. These applications allow the real-time decision-making process, derivation of analytical insights, horizontal integration, and agile management of resources, which are fundamental features of establishing organizational agility. Construction projects operate in the high-variability environment in which deadlines, budgets, and specifications change regularly forcing them to be flexible and adjust operations and streamline processes promptly which such technologies enable and empower.

In theoretical perspective, this relationship is well explained based on dynamic capabilities Theory (DCT) which states that firms should ensure development of capabilities to sense, seize and transform by responding to environmental changes (Teece, 2007). The capacity to sense means the capacity of the organization to identify the opportunity, threats, and transformation of the market through environmental scanning and collection of information. Digital tools have augmented this ability by providing real time data and trends analytics, thereby helping firms to pinpoint changes better and faster.

After the sensing of an opportunity/ a threat, the second action necessary is to capitalise on an opportunity/ ward off a threat by taking decision at an appropriate time, mobilisation of resources and follow up on the same. The role of the digital transformation in this case will help in seizing through the automation of workflows, be able to model scenarios, and enhance internal communication, which will aid in constructing firms in adapting to changes without much trouble. High IT alignment means that firms are better placed to align the internal processes to facilitate fast innovation and responsiveness to customers (Jabri, Shaloh, Shakhoo, Haddoud, & Obeidat, 2024). This theoretical connection has been recently proved on the basis of empirical investigations. The study of the SMEs in the construction sector by Wang et al. (2025) revealed that digital readiness could positively contribute to the dynamic managerial capabilities of SMEs, and thus they can align new technologies with strategic business opportunities. This consistency is the basis of agility, because when the technological investments are not isolated but become a part of organizational transformation, agility will be achieved.

Strategically, through digital investments, Pakistani construction companies will be able to increase organizational agility in practice. As an example, companies can implement the integrated project delivery (IPD) approaches that integrate digital collaboration means with the principles of lean project management so that to enhance coordination and responsiveness.

[Andrade and Gonçalo \(2022\)](#) emphasize two types of complementary services, including digital dashboards, mobile reporting apps, as well as cloud-based design reviews, that work as dynamic capabilities of supporting an agile approach to the ongoing digital transformation process.

Furthermore, [Mao et al. \(2024\)](#) emphasize that structural IT capabilities based on such aspects as system interoperability, data integration, and platform scalability should be orchestrated to maximize the value of agility.

They have a lot of fragmented IT systems and unless they can integrate digitally strategically, they can end up being isolated rather than being synergistic. Thus, alignment of IT infrastructure with business strategy makes sure that business strategy is enabled with an agile technological backbone.

[Wijayarathne, Gunawan, and Schultmann \(2024\)](#) goes further to raise awareness on the relevance of agility by showing that a firm that had an inherent ability to develop a mature digital infrastructure and a dynamic orientation stood a better chance in surpassing its rivals in projects delivery schedules, budget control, and stakeholder satisfaction. Agility may be a determining factor in volatile and constrained business environments like Pakistan.

In brief, the research provides empirical evidence that the digital transformation can greatly increase organizational agility in the Pakistani construction industry.

This interdependency is aligned with the fundamental values of the Dynamic Capabilities Theory and gives the indication that any investments in the digital technologies should come hand in hand with the strategic vision and the alignment with the IT to achieve their full potential. The successful firms in this respect have greater probability of adjusting to the needs of the marketplace, risk mitigation, project delivery efficiency and competitive results.

5.2.2.1 H2b: Organizational Agility → Project Performance

The connection between project performance and agility in the organization has become an essential subject of research in the construction sector. An organizational agility is defined as the capacity of a firm to rapidly adapt under the situation, to realign resources and to respond to the changing project demands (Teece et al., 1997).

Such nimbleness is no longer a choice in the context of the construction sector, which is extremely volatile and multifaceted in its environment. In the context of the Dynamic Capabilities Theory (DCT), agility is a measure of the abilities of a firm to capture and convert the capabilities that enable it to respond quickly and properly to either internal or external disturbances. The hypothesis in this is to determine whether less agile firms will achieve favorable performance in construction projects.

This hypothesis was supported in the results of the present research which indicated a strong and statistically significant relationship between organizational agility and project performance. These results support those of other studies that place a significant emphasis on responsiveness, adaptability, and iterative decision-making to ensure the effective management of construction projects [Shahzad \(2023\)](#).

Agile companies are also more prepared to deal with unexpected events like shortages of materials, weather-related shipping or manufacturing delays or regulations and can maintain schedules, cost, and customer satisfaction.

The incorporation of the agile practice in the management of construction projects has received considerable attention as a strategic response aimed at enhancing the performance of the projects. Software designed to handle software development is designed to be more flexible, collaborative and iterative, being capable of improving over a short period of time. A number of subjects that are being prone by the implementation of these principles to the realm of construction include crisis management, delays, on-site adaptability among others which are largely related to better project results. It is indicated that there are positive effects of agile project management on performance measurements in construction projects (a number of

studies). Comparative analysis of the study by [Badran and Abdallah \(2025\)](#) of lean and agile project management methodologies shows that in the latter, agile practices resulted in an impressive time efficiency and stakeholder satisfaction. Such results intensify the claim that agile practices undermine the potential delays that are intrinsically connected to the construction sector by making them more responsive to unpredictable complications.

Agile practices are even more valuable in those environments where risks are significant and projects can be derailed by the crisis. [Al-Zubaidi \(2024\)](#) considered the benefits of agile project management in cost control and general performance in the construction industry of Iraq. The results have shown that the agile practices improved communication between team members, so fast decision-making in case of applicable crisis became possible. Such flexibility is critical to work environments that are very dynamic in construction where issues that were not understood at the time of construction may arise in the course of construction.

Furthermore, [Arefazar, Nazari, Hafezi, and Maghool \(2022\)](#) focused on different agile management approaches to construction and enhanced flexibility in construction projects. Their paper highlights the importance of taking charge of responsiveness in minimizing the negative influence of delays on the project. This reactivity is a highlight of the efficiency of agile methodologies, particularly those that are in volatile settings where there is a likelihood of project parameters to change.

There has also been an uptake in hybrid approaches to integrating traditional and agile methods. According to [Ozorhon, Cardak, and Caglayan \(2022\)](#), such hybrid models raised the overall project performance, as well as boosted teamwork and responsiveness on site. A combined approach to planning and execution (structured and agile) enables project teams to enjoy the advantages of stability and flexibility, reduce risks and optimize performance.

Despite the fact that some of the research is based on other types of industries, all the implications of the research still hold. Indicatively, the findings of [\(Muhammad et al., 2021\)](#) showed that agile administration has a favorable impact on project performance in IT industry that is transferrable to the construction industry.

These are recursive loops, dynamic planning and stakeholder involvement, which are all performance enhancement characteristics when incorporated within the construction environment.

In short, an organizational agility is very crucial when it comes to enhancing the performance of any project in the construction industry. The literature and observed empirical outcomes show that agility allows firms to control in complex and uncertain surroundings and adjust to a high level of change and maintain an equivalent performance. Developing organizational agility in the situation in the construction industry in Pakistan that is characterized by bureaucratic barriers, changing markets and delays can examine as a strong avenue towards realizing improved project results. Actual results support Hypothesis H2b and once again attest to the need to develop agile capabilities in a strategy that also involves widespread use of digital transformation.

5.2.2.2 H2c: Organizational Agility as a Mediator between Digital Transformation and Project Performance

Organizational agility plays an important mediation role among digital transformation and project performance. With the increased penetration of digital technologies by companies, it will be beneficial to comprehend the role of agility in facilitating this relationship, as it will be possible to learn more about the capacity-building processes that will aid in improving project performance. Digital transformation encompasses the assimilation of virtual technologies with every aspect of company operations, which causes extremely brutal change in the way that firms operate and create value (Cui, 2025). Nevertheless, it is difficult to find a clear way to better performance due to taking place in the digital transformation process. Rather it happens due to the ability of an organization to be agile.

Organizational agility allows companies to adjust quickly to both changes within the organizations and changes in the environment, especially in the unstable construction project management environment. Agility assists in the minimization of risks, dealing with uncertainty, and making sure that project deliveries are high-impact when the use of digital tools is properly utilized. As an example, Atobishi,

Bakir, and Nosratabadi (2024) provide evidence that organizational agility mediates digital capabilities to performance relationship within the sector of government.

It implies that digital tools provide an organization with a source of transformation power, but the agility of the firm carries the likelihood of embracing those tools in making a better performance.

The outlined viewpoint is also confirmed by Xu et al. (2024) who exemplified the employment of digital transformation efforts in ameliorating big data potential that have resulted in increased agility within organizations and eventually uplift innovation and performance. They have shown that the role of agility is not just as a facilitator but as a capability-creating mechanism that can be used to digitalize to achieve better productivity and performance.

The relationship between digital maturity, agility, and business performance also confirms the crucial mediatory role of the organizational agility. Çallı and Çallı (2021) show that the higher the level of digital maturity, the higher the agility is, which leads to improved performance gains.

This further underlines the need to match digital investments to agility-increasing strategy to gain maximum value out of digital transformation. The leadership also plays a big role in such a mediation process. In Ly (2024), digital transformational leadership, digital transformation and agility are examined and it is shown that leadership styles based on agility contribute to the efficacy of digital transformation. With this type of leadership, agility emerges as a strategic asset that increases the returns of the technology's investments.

To sum it up, digital transformation and its influence on project performance are mediated through agility of the organization, which increases responsiveness and adjustability. The potency of this indirect impact highlights the importance of companies developing nimble attitudes and frameworks in order to maximize their use of digital transformations. Therefore, promoting organizational agility cannot be considered only an operational strategy, but also a strategic investment into developing the capabilities to maintain a high project performance in the environment of digitalized construction.

5.2.3 H3: Moderation by Technology Readiness

As evidenced in the moderating power of technology readiness (TR) in the association between the digital transformation (DT) and organizational agility (OA), there are complex dynamics involved in breaking down old assumptions. It can be assumed traditionally that the greater the level of TR is, the more positive consequences of digital transformation will occur in the form of increased technical base of innovation and transformation.

The results of this study, however, are in agreement with the moderation outcomes acquired through Hayes PROCESS Model 7, and they imply that the TR has a rather negative interaction effect, which is a weak effect amplifying the influence of DT on OA at higher levels. It is a counterintuitive result that requires further theoretical and strategic explanation.

The concept of technology readiness, as explained by [Parasuraman \(2000\)](#), indicates how an organization is ready to embrace and make use of any technological advances. Although this readiness is normally supposed to be an engine of successful digital change, it can as well be a driver of complacency, risk avoidance or excess reliance on the legacies. Agility can be achieved through information processing capabilities of an organization and its awareness of digital transformation as this is argued by [Li, Wu, Cao, and Wang \(2021\)](#). Nevertheless, excessive technological maturity can cause conception of security, making the stakeholders less concerned about pursuing new and innovative digital plans or dynamically adjusting operations. Such complacency effect may be a factor in hindering the building of agile routines and making responses to external shocks difficult.

Moreover, [Groenewald et al. \(2024\)](#) also prove that in some cases technological preparedness may exceed proper levels, thus making organizations overprioritize stability and technical control over adaptive thinking and experiment-based change. Under such conditions, digital transformation includes more optimization of systems than the generation of new agile capabilities. Organizations, thus, may end up valuing system efficiency more than strategic flexibility, which undermines the main assumption of dynamic capabilities theory i.e. the ability to sense-seize-change according to the external change ([Teece, 2007](#)).

This is particularly true of construction SME, both because sometimes the inertia of familiar technological processes may precludes strategic shifts and because the issues are simply less well understood. [Satar et al. \(2025\)](#) further warn that, at more prepared firms, there can be a tendency of over-reliance on digital forms and rules-based behaviors, and this can be a hindrance on agile experimentation and learning. Such over-dependency can lead to cancelling the effect of entrepreneurial orientation and diminishing active reaction to increasing project demands ironically making it less agile despite the technical maturity.

To this, [Arshad et al. \(2024\)](#) warn that IT-strong organizations are likely to develop an attitude towards risk avoidance, preferring to be more in control of the processes rather than variability. Agility seen as a problem in these type of firms and as an undesired strength, instead of a strength there is inflexibility in how to approach projects. Such changes are consistent with moderated findings in this study showing that high TR was accompanied by the diminished influence of DT on OA.

Finally, there is a persuasive perspective suggested by [Ghrbeia and Alzubi \(2024\)](#) of the moderated mediation perspective: at a high level of digital literacy and transformation, it has to be compensated with the strategy of exploration culture.

When companies practice operational excellence at the expense of agile responsiveness, the prospect of digital transformation is compromised.

To conclude, despite the fact that TR is necessary in facilitating digital transformation, high levels of readiness also run the risk of strangling the pursuit of agility that transformation aims to embrace.

This is an indicator that technology readiness cannot be used as an enabling factor in the first place but a conditional one whose impacts are influenced by the aspects of strategic intent and organizational culture.

These results point to the necessity of maintaining a compromising solution, as the best way to promote balance between digital investments and ongoing learning, orientation to change, and strategic versatility in terms of organizational agility and competitiveness.

5.2.4 H4: Moderated Mediation – Technology Readiness as a Moderator of the Indirect Effect of Digital Transformation on Project Performance via Organizational Agility

The final hypothesis (H4) of this study proposed a moderated mediation model, examining whether the mediating effect of digital transformation (DT) on project performance (PP) through organizational agility (OA) would be influenced by technology readiness (TR). Using Hayes' PROCESS Macro (Model 7), the results revealed that technology readiness significantly moderates the strength of the indirect pathway (DT → OA → PP), with the conditional indirect effects varying according to the level of TR.

The analysis found that the indirect effect of DT on PP through OA was strongest at lower levels of TR and gradually weakened as technology readiness increased. Specifically, the effect was most pronounced at the 16th percentile (low TR, $B = 0.1168$, 95% CI [0.0744, 0.1628]), moderate at the 50th percentile (TR = 47, $B = 0.1025$, 95% CI [0.0641, 0.1441]), and smallest at the 84th percentile (high TR, $B = 0.0832$, 95% CI [0.0420, 0.1267]). The index of moderated mediation was statistically significant (Index = -0.0016, BootCI [-0.0036, -0.0002]), indicating a negative interaction; as technology readiness increases, the mediating effect of organizational agility becomes less pronounced.

Contrary to the common assumption that higher technology readiness always amplifies the benefits of digital transformation, these findings suggest a more nuanced relationship. Technology readiness can act as a decoupling factor, tempering the impact of digital transformation on agility-driven performance gains. In highly tech-ready firms, the need for additional agility may be diminished, as established digital systems and processes already support efficient project delivery. This can create a plateau effect, where further gains from digital transformation are limited unless accompanied by targeted efforts to foster agility. These results are consistent with Dynamic Capabilities Theory (Teece, 2007), which posits that the value of digital capabilities is maximized when organizations possess the flexibility to

sense, seize, and transform opportunities, especially in uncertain environments. In firms with lower technology readiness, digital transformation initiatives are more likely to necessitate adaptive changes, making organizational agility a more critical driver of performance improvement. Conversely, in firms where technology readiness is already high, agility's role diminishes, potentially due to standardized routines and greater path dependency that can limit the scope for further flexible adaptation.

In summary, the moderated mediation analysis for H4 demonstrates that the indirect effect of digital transformation on project performance via organizational agility is strongest in organizations with lower technology readiness, and diminishes as readiness increases.

This underscores the importance of balancing digital investments with continuous efforts to build and sustain organizational agility, particularly in environments where technological adoption is still evolving.

Such results have valuable implications in terms of their application by project managers, digital transformation consultants, and policymakers in the construction industry:

1. **Customized DT Implementation:** Standardized approaches to the digital are not applicable. In companies where the level of TR is low, change management approaches should accompany their DT efforts to create the base of IT capabilities as well as foster cross-functional interactions and fast decision-making.
2. **In the case of High-TR Firms:** There should be a move to invigorate the aspect of agility, before its entrenchment into bureaucracy. The strategies such as the continuous agile educational activities, learning on the fly on leadership, and rotation of assigned roles can restore the responsiveness in established firms that are already armed with digital tools.
3. **Sane Investments Ethos:** Companies need to maintain a balance between investment in technology infrastructure and investments in organizational design, leadership and culture in order to make sure that the digital tool leads to the real project performance gains.

4. Sectoral Policies: The policymakers must not put TR benchmarks so much into focus without the interaction with the organizational structure. Promoting agility-focused models in the revamping of digital policies will help open up more ROI to national digitalization campaigns.

To conclude, the results of this study imply that the digital transformation to improved project performance is not a linear path. Rather it is conditional in the sense that the mediating impact of organizational agility is moderated by the degree of technology readiness in the firm. Organizations should thus be able to utilize a context-sensitive transformational approach with agility at different layers of preparedness to drive up the results of the construction industry which is rapidly going digital.

5.3 Implications of Study

5.3.1 Theoretical Implications

Many theoretical contributions could be listed in relation to this study, especially concerning the further introduction of Dynamic Capabilities Theory (DCT) to micro-economic conditions in the Pakistani construction industry. The concept of DCT that allows focusing on the capability of an organization to integrate, develop, and reconfigure internal and external capabilities to respond to the rapidly changing environments (Teece, 2007) offers an appropriate background against which the role of digital transformation (DT) in the improvement of the performance of the project can be regarded. Stronger higher performance of construction firms in response to technological change is illustrated through demonstrating the empirical role of the mediator in the study of organizational agility.

The results show that digital transformation does not enable the performance in itself but is done through agile organization structures. This insight further builds on DCT since it denotes the importance of agility as the route through which firms can be able to sense and capture the digital opportunities effectively. The paper supports and reinforces the theoretical assumption that dynamic capabilities not

only have a technology-related focus, but also involve routines, speed of decisions and adaptability capabilities as well.

Besides, one of the theoretically important contributions of the study is that it introduces an innovative model using moderated mediation, which considers both the direct and indirect impacts of the digital transformation on project performance through the lens of organizational agility and, at the same, introduces a moderated impact of technology readiness (TR). Based on the application of the Hayes PROCESS Model 7, the following aspects were examined: how TR could affect the magnitude of the effect that DT has on the measures of agility and how TR moderates the conditional indirect effect that DT has on performance. This method offers a layered insight into the development experience of capability, which implies that in certain situations high TR can be used to replace the motivating factor of agility whereas low TR requires the organization to be more dynamic in responding.

This work is also among the pioneer projects implementing this conceptual integrated model i.e., DT and organizational agility together with TR in the developing country context of construction industry of Pakistan. The contribution made by this context is major, considering the fact that most DCT implementations have been sought in high-tech or advanced economies. The research provides a new perspective on how dynamic capabilities can be nurtured in new markets where digital maturity, and agility building are yet to take shape as the research evidences the applicability of these constructs in a resource-constrained and infrastructure-driven context.

Lastly, the research will help to develop the theories at the top of the field of strategic project management and information systems based on identifying the empirical connections between the concepts of digital transformation, agility, TR, and project performance. It serves as a basis initiating further research that would examine other possible moderators (e.g., leadership, organizational culture) and mediators (e.g., knowledge management, innovation capability) that can be involved when shaping the environment in which digital transformation can produce changes that will achieve meaningful improvements in performance.

5.3.2 Practical Implications

This study has relevant practical implications to stakeholders in the construction sector in Pakistan, such as project management, technology leaders, policy makers, and industry organizations interested in leveraging digital transformation to produce better construction projects. One such is that digital transformation is not enough to enhance the performance of projects without the back up of agile company structures (first). This implies that companies need not only invest in such digital technologies as Building Information Modelling (BIM), Artificial Intelligence (AI), and cloud-based tools, but modify their organisational procedures to be more flexible, responsive, and dynamic. The managers should create a culture of a never-ending learning environment and decentralised decision-making to extend the agility to the entire level of the project team.

Second, the study highlights the organization agility as a mediator which means that agility becomes the driver of digital action into performance gains. This implies that construction firms, interventions of building agility, including cross-functional units, iteration of project planning, and fast feedback loops, must be implemented carefully within their project management efforts. In a bid to do so, training on the use of agile methods, incorporation of hybrid management, and growth of responsive supply chains can be very helpful. Third, the moderation effect of technology readiness (TR) shows another subtlety: although positive effects of TR are widely regarded as facilitative, excessive readiness can cause overutilization of the current technological possibilities and a decrease in innovational responsiveness. This implies that construction companies have to choose the right balancing between technological prowess and strategic responsiveness. In the case of firms that have a high level of TR, it is vital to change the focus on the acquisition of additional tools to the employment of the existing tools in the domain of their innovative usage.

Next, the moderated mediation findings indicate that DT strategies should be differentiated to TR levels. Companies having low TR can be provided with simple digital infrastructure needs and capacity-building initiatives, and those having higher TR can be ordered to incorporate practices that increase agility,

which include fitting digital tools to respond to real-time demands. The method of segmentation will aid companies to implement digital strategies that are more effective evading a fit-all technique.

Government agencies and industry regulators can be crucial at the policy level, by encouraging digital capability development by offering relief on taxes, grants or by partnering the firms and industry with the government. Public sector entities should also act as role models by uptaking digital technology and agile frameworks in its infrastructure developments in order to spur the whole sector to emulate.

5.3.3 Practical Implications

The implications of the research carried out by us are going to be of great relevance to the project managers, technology heads, policy makers, and associations who deal with the construction industry in Pakistan in harnessing the power of digital transformation to achieve better results of projects.

To begin with, the study notes that digital transformation is inadequate in enhancing the performance of projects unless coupled with agile organizations. It implies that companies cannot afford only to invest in digital devices like Building Information Modelling (BIM), Artificial Intelligence (AI), and cloud-based technologies but involve a redesign of organizational workflow that is more flexible, responsive, and adaptable. Managers should develop the culture of lifelong learning and decentralised decision integrated into agility at all levels of project team. Second, the study gives special emphasis on the role of organizational agility as a mediator, which means that agility is the machine that turns digital efforts into performance gains. In the case of the construction companies, the strategic embedding of the controlled agility creation interventions like cross-functional work, iteration of project planning, and fast feedback loops in the project management practice should be deemed as appropriate. It can be implemented with training programs on the usage of the agile methods, adaptation of the hybrid management strategy, and creation of the responsive chain of supplies. Third, the moderating effect of technology readiness (TR) presents a subtle observation: on the one hand, the TR is usually treated as the facilitator, whereas, on the other hand, the excess

amount of preparedness can result in being overconfident in the already-existing technological resources and a loss of innovative responsiveness.

This implies that the construction companies need to achieve a balance between strategic flexibility and technological capability. Offers to the companies with a high TR rates should not be purchasing more tools rather convincing to use the available tools innovatively to increase versatility and prophecies.

Further, the statistically controlled mediation outcomes indicate that DT strategies must be adopted based on several TR degrees. The low-TR firms might require minimal digital infrastructure updates and capacity-building initiatives; the high-TR firms should center on incorporating the practices that integrate the use of digital tools into agility, by ensuring real-time responsiveness. Such a segmentation strategy can assist companies to adopt digital strategies in a more effective manner and not focus on one-size-fits-all approach.

At the policy level, government agencies and industry regulators can be instrumental in encouraging the development of digital capability by offering tax exemptions, grants, or creating any other form of public-private partnership. The sector will also be catalyzed when digital tools and agile frameworks are implemented in infrastructure projects by the public sector institutions as an example.

Lastly, there are reflections of capacity building and professional development in the study. Learning institutions that lead in engineering, architecture, and project management ought to install modules on digital construction technologies and agile project delivery to ensure that future professionals in the sector are prepared to meet the changing industry needs.

5.4 Limitations of the Study

5.4.1 Sampling Technique Non-Probability Sampling

The use of convenience sampling may limit the generalizability of findings, as participants were selected based on accessibility rather than random selection. This may introduce bias and affect the external validity of the results.

5.4.2 Geographical Scope Islamabad and Rawalpindi

The study was confined to professionals in the twin cities, which may not accurately represent the broader construction industry across Pakistan, especially in rural or less developed regions.

5.4.3 Cross-Sectional Design:

The data was collected at a single point in time, which restricts the ability to assess causality or observe changes in digital transformation and performance over time. A longitudinal study could offer deeper insights.

5.5 Future Research Directions

There are a few ways in which future research and study can take advantage of the findings of this subject and give it a new dimension. To begin with, it is necessary to think about future research where the geographic level will not be limited by Islamabad or Rawalpindi, but will involve other territories in Pakistan.

This would increase the generalizability of the findings and the regional differences in digital transformation practices within the construction industry. Also, such a research design as a longitudinal one would help the researchers to gain more information about the changing effect of digital transformation, organizational agility, and technology readiness on project performance.

It might also be possible to use focus group discussions and interviews in future studies, to supplement quantitative data and uncover more organizational and behavioural determinants of different forms of digital adoption. Besides, future studies may be conducted by coming up with and confounding measurement scales that are specifically designed to suit the Pakistani construction setting to enhance the accuracy and cultural applicability. This would assist in circumventing the shortcomings that come with the use of generic, internationally developed instruments.

Also, there is a scope to investigate more mediating variables and moderating variables. Although the paper concerned itself with the relationship between the organizational agility and technology readiness, a future study should consider the roles played by the leadership style, digital literacy, innovation culture, and resistance to change. Such factors could become critical in terms of reception and implementation of digital transformation initiatives in construction firms.

Also, researchers may consider using sector distinction that could find the answer to whether digital transformation affects different organisations of the same sector (public and private) or the SMEs and large construction companies differently.

Measuring the consequences of the digital initiatives carried out after the implementation (return on investment, digital maturity, and sustainability) would also prove helpful in terms of examining the long-term performance efficiency of the digital procedures.

Finally, further research can be devoted to the unequal influence of particular digital technologies, such as Building Information Modelling (BIM), Artificial Intelligence (AI) or Internet of Things (IoT) in order to provide more practical and specific suggestions to construction practitioners.

5.6 Conclusion

The study was aimed at investigating the connection between digital transformation (DT) and project performance (PP) within the Pakistani construction industry focusing on mediating effect of organizational agility (OA) and moderating effect of technology readiness (TR). The study was based on the Dynamic Capabilities Theory, which is geared towards giving a faithful picture about how construction companies can maneuver through the aspects of technological disruption to have a better project performance. These results revealed the great effect of digital change in improving the performance of projects both directly and indirectly through promoting agility in an organization. This supports the theoretical argument that digital transformation is an enabler of dynamic capabilities

in firms that allow them to sense and make use of opportunities, re-arrange internal codes and resources and quickly adapt to the changing project environments. The findings of the PROCESS Model 7 analysis proved that organization agility mediates the connection between digital transformation and performance of the project moderately. This implies that whereas DT has the ability to directly contribute towards the performance, relatively its impact is immensely augmented where companies are endowed with the speed of processes and decision-making capabilities within a real manner.

The study also established that the direct and indirect impacts of DT on the execution of the projects depend on technology readiness. Interestingly, the moderating effect showed subtler relations: the stronger the levels of TR were, the weaker the mediating role of OA was, which is to say that in certain situations technology readiness may replace agility instead of complementing it. Such understanding refutes the belief that greater readiness will consistently enhance DT outcomes and suggests that a balanced combination of readiness and agility is required as part of digital strategy. Theoretical contributions of the study are associated with the fact that it can add to the Dynamic Capabilities Theory because the moderated mediation framework tested in the study has not been previously examined in the poorly studied industry of the Pakistani construction industry. It closes the conceptual gap by integrating DT, OA, and TR into a new model, which brings a new lens of understanding the relationship between the digital maturity and organizational behavior influencing performance. In practice, the study will offer effective guides to the construction firms, policymakers and project managers. It emphasizes an investment in digital technology and the growth of internal agility and measurement against technology readiness as a strategic resource. To the practitioners, the findings help to highlight that effective digital transformation is not strictly about tools but much about attitudes, responsiveness, and an ability to change. Although it has produced some valuable findings, this study was also limited in several ways as reflected by geographically limited sample and use of cross-sectional and self-reported data. However, the nature of these limitations gives the model a great potential of future research to generalize in other geographical, industrial, and time periods. To sum up, this study confirms that the digital transformation

that is strategically organized along with organizational agility balanced by the degree of technological readiness significantly affects the project performance of the construction sector. With the continued digital disruption and ever-growing complexity of the marketplace that firms have to grapple with, then the adoption of such an integrated-based approach will be a core strategy in developing a resilient, high-performance project environment.

Bibliography

- Ahmed, Ali, & Rahman. (2021). Challenges in public construction project management in pakistan. *International Journal of Construction Management*, 21(5), 445–456. doi: 10.1080/15623599.2019.1602583
- Alam, Younas, Khan, Anwar, A., Gul, S., & Abbas, S. (2025). Integrating supply chain digitalization into project management: Effects on operational performance and the role of organizational agility in pakistani manufacturing firms. *Qualitative Research Review Letter*, 3(2), 1–26. Retrieved from <http://www.qrrletter.com/index.php/Journal/article/view/53>
- Al-Zubaidi. (2024). Exploring the impact of agile project management on cost and project performance on construction engineering in iraq. *Journal Européen des Systèmes Automatisés*, 57(2). Retrieved from <https://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=12696935&AN=177131781>
- Andrade, & Gonçalo, a. S. (2022). Digital transformation with agility: The emerging dynamic capability of complementary services. *RAM. Revista de Administração Mackenzie*, 23(6), eRAMD220063. Retrieved from <https://www.scielo.br/j/ram/a/jZctWGwMKHwyX6tLCTzH3jt/>
- Arefazar, Nazari, Hafezi, & Maghool. (2022). Prioritizing agile project management strategies as a change management tool in construction projects. *International Journal of Construction Management*, 22(4), 678–689. doi: 10.1080/15623599.2019.1644757
- Arshad, Ghaffar, Siddique, & Rehman. (2024). Information technology adoption, organization performance and organizational agility: A study of small and medium enterprises. *Journal of Excellence in Management Sciences*, 3(1),

- 1–14. Retrieved from <https://journals.smarcons.com/index.php/jems/article/view/181>
- Atobishi, Bakir, M. A., & Nosratabadi. (2024). How do digital capabilities affect organizational performance in the public sector? the mediating role of the organizational agility. *Administrative Sciences*, 14(2), 37. Retrieved from <https://www.mdpi.com/2076-3387/14/2/37>
- Badran, & Abdallah. (2025). Lean vs agile project management in construction: impacts on project performance outcomes. *Engineering, Construction and Architectural Management*, 32(5), 2844–2869. Retrieved from <https://www.emerald.com/insight/content/doi/10.1108/ecam-05-2023-0470/full/html>
- Bilal, Oyedele, Qadir, Munir, Ajayi, Akinade, & Alaka. (2016). Big data in the construction industry: A review of present status, opportunities, and future trends. *Advanced Engineering Informatics*, 30(3), 500–521. doi: 10.1016/j.aei.2016.07.001
- Cao, Teng, Chen, Tan, & Wang. (2023). Digital transformation strategies of project-based firms: Case study of a large-scale construction company in china. *Asia Pacific Journal of Innovation and Entrepreneurship*, 17(2), 82–98. Retrieved from <https://www.emerald.com/insight/content/doi/10.1108/APJIE-02-2023-0027/full/html>
- Cui, J. (2025). *The impact of absorptive capacity, organizational creativity, organizational agility, and organizational resilience on organizational performance: Mediating role of digital transformation*. SSRN. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5083189
- Demirkesen, & Tezel. (2022). Investigating major challenges for industry 4.0 adoption among construction companies. *Engineering, Construction and Architectural Management*, 29(3), 1470–1503. Retrieved from <https://www.emerald.com/insight/content/doi/10.1108/ecam-12-2020-1059/full/html>
- Dolla, Jain, & Delhi. (2023). Strategies for digital transformation in construction projects: Stakeholders' perceptions and actor dynamics for industry 4.0. *Journal of Information Technology in Construction*, 28.

- Retrieved from https://www.researchgate.net/publication/368903559_Strategies_for_digital_transformation_in_construction_projects
- Ghrbeia, B., & Alzubi. (2024). Building micro-foundations for digital transformation: A moderated mediation model of the interplay between digital literacy and digital transformation. *Sustainability*, 16(9), 3749. Retrieved from <https://www.mdpi.com/2071-1050/16/9/3749>
- Groenewald, Groenewald, Uy, Kilag, Rabillas, A., & Cabuenas. (2024). Organizational agility: The role of information technology and contextual moderators—a systematic review. *International Multidisciplinary Journal of Research for Innovation, Sustainability, and Excellence*, 1(3), 32–38. Retrieved from https://www.researchgate.net/publication/378696533_Organizational_Agility_The_Role_of_Information_Technology_and_Contextual_Moderators_-_A_Systematic_Review
- Gul, Mahmood, Naqvi, & Tahir, H. (2025). Agile methodologies as catalysts for team performance in pakistan’s large-scale construction projects: Moderating effects of project complexity, communication efficacy, and delivery time. *Review Journal of Social Psychology & Social Works*, 3(2), 1367–1383. Retrieved from <http://socialworksreview.com/index.php/Journal/article/view/288>
- Han, Du, & Zhao. (2025). Development of a digital transformation maturity model for the construction industry. *Engineering, Construction and Architectural Management*, 32(7), 4384–4412. Retrieved from <https://www.emerald.com/insight/content/doi/10.1108/ECAM-10-2023-1009/full/html>
- Ismail, R., Majid, T. A., & Roosli, R. (2019). Implementation of building information modelling (bim) in malaysia: A review. *IOP Conference Series: Earth and Environmental Science*, 220(1), 012033. doi: 10.1088/1755-1315/220/1/012033
- Jabri, A., Shaloh, Shakhoor, Haddoud, & Obeidat. (2024). The impact of dynamic capabilities on enterprise agility: The intervening roles of digital transformation and it alignment. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(2), 100266. Retrieved from <https://www.sciencedirect.com/science/article/pii/S219985312400060X>

- Jamil, K., Zhang, W., Anwar, A., & Mustafa, S. (2025). Exploring the influence of ai adoption and technological readiness on sustainable performance in pakistani export sector manufacturing small and medium-sized enterprises. *Sustainability*, *17*(8), 3599. Retrieved from <https://www.mdpi.com/2071-1050/17/8/3599>
- Khahro, S. H., Hassan, S., Zainun, N. Y. B., & Javed, Y. (2021). Digital transformation and e-commerce in construction industry: A prospective assessment. *Academy of Strategic Management Journal*, *20*(1), 1–8. Retrieved from <https://www.academia.edu/download/118528866/Digital-transformation-and-e-commerce-in-construction-industry-a-prospective-assessment-1939-6104-20-1-701.pdf>
- Khan, K. K. A., Badshah, S. I., Rahman, H., & Amjad, A. (2025). The role of agile project management in driving innovation: Exploring the impact of knowledge management and the moderating effect of organizational culture. *Social Science Review Archives*, *3*(3), 32–46. Retrieved from <https://policyjournalofms.com/index.php/6/article/view/837>
- Li, H., Wu, Y., Cao, D., & Wang, Y. (2021). Organizational mindfulness towards digital transformation as a prerequisite of information processing capability to achieve market agility. *Journal of Business Research*, *122*, 700–712. doi: 10.1016/j.jbusres.2019.11.051
- Ly, B. (2024). The interplay of digital transformational leadership, organizational agility, and digital transformation. *Journal of the Knowledge Economy*, *15*(1), 4408–4427. doi: 10.1007/s13132-023-01377-8
- Ma, R., Mao, C., Yuan, J., Jiang, C., & Lou, P. (2024). Evaluation for digital transformation capability of construction enterprises: a case study in china. *Engineering, Construction and Architectural Management*. doi: 10.1108/ECAM-12-2023-1288
- Muhammad, U., Nazir, T., Muhammad, N., Maqsoom, A., Nawab, S., Fatima, S. T., & Butt, F. S. (2021). Impact of agile management on project performance: Evidence from it sector of pakistan. *PLOS ONE*, *16*(4), e0249311. doi: 10.1371/journal.pone.0249311
- Musarat, M. A., Hameed, N., Altaf, M., Alaloul, W. S., Al Salaheen, M., & Alawag,

- A. M. (2021). Digital transformation of the construction industry: a review. In *2021 international conference on decision aid sciences and application (dasa)* (pp. 897–902). IEEE. doi: 10.1109/DASA53625.2021.9682303
- Naji, K. K., Gunduz, M., Alhenzab, F. H., Al-Hababi, H., & Al-Qahtani, A. H. (2024). A systematic review of the digital transformation of the building construction industry. *IEEE Access*, *12*, 31461–31487. doi: 10.1109/ACCESS.2024.10436076
- Oesterreich, T. D., & Teuteberg, F. (2016). Understanding the implications of digitisation and automation in the context of industry 4.0: A triangulation approach and elements of a research agenda. *Computers in Industry*, *83*, 121–139. doi: 10.1016/j.compind.2016.09.006
- Ozorhon, B., Cardak, F., & Caglayan, S. (2022). Investigating the agile hybrid approach in construction. *Journal of Management in Engineering*, *38*(4), 04022022. doi: 10.1061/(ASCE)ME.1943-5479.0001052
- Parasuraman, A. (2000). Technology readiness index (tri): A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, *2*(4), 307–320. doi: 10.1177/109467050024001
- Piprani, A. Z., Khan, S. A. R., & Yu, Z. (2024). Driving success through digital transformation: influence of industry 4.0 on lean, agile, resilient, green supply chain practices. *Journal of Manufacturing Technology Management*, *35*(6), 1175–1198. doi: 10.1108/JMTM-05-2023-0179
- Salem, H. A., & Atheeb, A. F. (2024). The impact of organizational agility in digital transformation: A field research in the ministry of higher education and scientific research/construction and projects department. *Journal of Economics and Administrative Sciences*, *30*(142), 163–178. Retrieved from <https://jeasiq.uobaghdad.edu.iq/index.php/JEASIQ/article/view/3402>
- Samuelson, O., & Stehn, L. (2023). Digital transformation in construction—a review. *Journal of Information Technology in Construction*, *28*, 385–404. Retrieved from <https://www.diva-portal.org/smash/record.jsf?pid=diva2:1787530>

- Satar, M. S., Alshibani, S. M., & Alarifi, G. (2025). Effects of firm-level entrepreneurship orientation on digital transformation in smes: the moderating role of strategic agility. *Entrepreneurship Research Journal*, 15(1), 91–124. doi: 10.1515/erj-2023-0267
- Shahzad, A. (2023). *Effects of project management practices on project performance, moderated by digital technologies in engineering construction firms in pakistan* (Doctoral dissertation, Swinburne University of Technology). Retrieved from <https://figshare.swinburne.edu.au/ndownloader/files/47986909>
- Soomro, M. A., & Khan, A. N. (2025). Leadership in times of crisis: cultivating crisis management through digital transformation and organizational agility. *Engineering, Construction and Architectural Management*. doi: 10.1108/ecam-05-2024-0620
- Tallon, P. P., Queiroz, M., Coltman, T., & Sharma, R. (2019). Information technology and the search for organizational agility: A systematic review with future research possibilities. *The Journal of Strategic Information Systems*, 28(2), 218–237. doi: 10.1016/j.jsis.2018.12.002
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533. doi: 10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z
- Turi, J. A., Khwaja, M. G., Tariq, F., & Hameed, A. (2023). The role of big data analytics and organizational agility in improving organizational performance of business processing organizations. *Business Process Management Journal*, 29(7), 2081–2106. doi: 10.1108/bpmj-01-2023-0058
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144. doi: 10.1016/j.jsis.2019.01.003
- Wang, K., Xu, X., Mao, P., Deng, X., & Cao, D. (2025). Digital transformation and organizational readiness: evidence from chinese construction smes with a dynamic managerial capabilities lens. *Engineering, Construction and Architectural Management*. doi: 10.1108/ecam-01-2025-0069
- Wijayarathne, N., Gunawan, I., & Schultmann, F. (2024). Dynamic capabilities in

- digital transformation: a systematic review of their role in the construction industry. *Journal of Construction Engineering and Management*, 150(11), 03124008. doi: 10.1061/JCEMD4.COENG-15055
- Xu, M., Zhang, Y., Sun, H., Tang, Y., & Li, J. (2024). How digital transformation enhances corporate innovation performance: The mediating roles of big data capabilities and organizational agility. *Heliyon*, 10(14). doi: 10.1016/j.heliyon.2024.e0320833
- Zhang, Y., Li, H., & Yao, Z. (2025). Intellectual capital, digital transformation and firm performance: evidence based on listed companies in the chinese construction industry. *Engineering, Construction and Architectural Management*, 32(4), 2128–2159. doi: 10.1108/ECAM-06-2023-0623
- Zhao, X., Hwang, B. G., & Yu, G. (2022). Impact of digital tools on construction performance: A system dynamic and data analytics approach. *Automation in Construction*, 136, 104230. doi: 10.1016/j.autcon.2022.104230
- Çallı, & Çallı. (2021). Relationships between digital maturity, organizational agility, and firm performance: an empirical investigation on smes. *Business & Management Studies: An International Journal*, 9(2), 486–502. Retrieved from https://www.researchgate.net/publication/352750732_Relationships_between_digital_maturity_organizational_agility_and_firm_performance