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INVESTIGATING THE IMPACT OF DIGITAL LEADERSHIP ON PROJECT PERFORMANCE: MEDIATING AND MODERATING ROLE OF DIGITAL TRANSFORMATION AND CHANGE MANAGEMENT

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Abstract
This study investigates the critical relationship between digital leadership, project performance, digital transformation and change management within the context of IT firms in major cities of Pakistan, with individuals employed in the IT industry as the data set. While existing research focuses on various elements of digital leadership in pursuit of project performance, the current research examines the unique ways of incorporating digital transformation to achieve better project performance. The research particularly investigates how digital leadership enhances project performance in software development while also considering the mediating role of digital transformation and the moderating impact of change management. Convenience sampling was used in this research, with data gathered from all roles within a software project-based organization. Data analysis was computed using SPSS to use advanced statistical techniques involving correlation, regression and moderated mediation models using models 4 and 1 of Hayees Process macros. The results indicate that digital leadership significantly enhances project performance and that increased digital transformation further strengthens this relationship. The results of this study suggest that the application of digital leadership practices positively affects Project Performance.

CHAPTER 01
INTRODUCTION

Project Performance (PP) remains the primary focus of project success and has traditionally been evaluated against the "Iron Triangle" — "Cost, time, and quality". Over the last 50 years, these elements have become closely linked as key indicators of project management success (Atkinson, 1999). In present-day, technology-intensive conditions, digital leadership applied through and about digital applications changes how teams plan, innovate, and deliver results (Avolio et al., 2000; Torre & Sarti, 2020). Simultaneously, digital transformation (DT) gives the organizational direction through which leadership influences project outcomes; DT is "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies" (Vial, 2019a, p. 121). However, benefits from digital decisions are rarely automatic, but "successful management of change is crucial to any organization in order to survive and succeed" (Todnem, 2005, p. 369). Grounded in this idea, the present study tests how digital leadership impacts project performance, examines

digital transformation as a mediator of this correlation, and analyzes change management as a moderator—using proof from Pakistan's project industry, where digital programs and public–private projects make performance both a managerial and public imperative.

1.1 Historical Context of the Study

Over the past six decades, the concept of "project performance" has grown from the narrow limitation of the Iron Triangle to expanded organizational and societal results. Early project-management fellowship tied success tightly to efficiency milestones—time, cost, and quality. As Atkinson (1999) discussed, "Cost, time and scope (The Iron Triangle), in management, ears have turned inextricably linked with calculating the accomplishment of project management", while highlighting their limitations for conquering real value (Atkinson, 1999, p. 337). This evolution reconstructed performance to incorporate benefits realization, stakeholder gratification, learning, and long-term ability, a significant shift for digitally embedded projects where results materialize past go-live.

Leadership research functions on a parallel pathway. Standard work in project management represents who directs—and how—matters. Sketching mixed-methods evidence, Müller & Turner (2007) suggested that "project success depends heavily on the leadership style" (p. 21). This notion paved the way for testing how new, tools-embedded leadership logics affect outcomes in highly virtual, data-rich, and collaborative project settings.

As organizations modernize, scholars began defining e-leadership or digital leadership as management conducted through and about e-technologies. A foundational definition describes digital leadership as a communal influence process mediated by Advanced Information Technology (AIT) to bring about changes in attitudes, understandings, thinking, behavior, and/or performance (Avolio et al., 2000; Cortellazzo et al., 2019). This highlights two key points: (a) technology is a new medium for influence, and (b) performance is the ultimate measure—connecting e-leadership theoretically to project performance.

Simultaneously, digital transformation (DT) surfaces as the macro procedure reshaping value formation, governance, and capacity. Vial's (2019) influential synthesis explains DT as a process that focuses on improving an organization by triggering remarkable changes to its properties through the collaboration of data, computing, communication, and network technologies. This explanation has two outcomes for project studies. First, it places DT as the entity pathway across which digital leadership may be interpreted into outcomes. Second, it suggests that performance shows in changed processes, forms, and business model results typically realized from programs and projects.

Strategic IS scholarship also emphasizes that, in a digital environment, strategy and technology are interconnected. Bharadwaj et al. (2013) describe e-business strategy as a blend of IT and business strategy viewpoints, shifting leadership focus toward adapting technologies, processes, and personnel to achieve competitive performance. From a project standpoint, this means digital oversight extends beyond online communication or tool proficiency; it involves aligning project choices with strategic goals to produce tangible benefits for both projects and the organization.

An important element in this history is changing management (CM). Decades of organizational-change research highlight that transformation outcomes depend on the quality of change practices. As Todnem (2005) succinctly notes that successful change management is essential for any organization to survive and succeed. This is not just a general judgment: change capabilities determine how teams incorporate new digital processes, adopt innovative tools, and restructure roles—systems crucial to the success of digital projects. In the past, high failure rates of change programs (and IT projects) increased interest in CM as a management factor that influences the leadership to performance pathway by enabling or restricting adoption, engagement, and long-term use.

Within Pakistan, the circumstantial arc of digitalization and project performance has distinguished features. Pakistan has followed ambitious ICT and digital-government programs,

often linked to big, multi-stakeholder agendas. For instance, a recent work in Heliyon states that "China has widely implemented e-government, which has helped the country to ensure good governance," and tests lessons relevant to Pakistan's approach (Atique et al., 2024, p. 1). In parallel, fellowship around the China–Pakistan Economic Corridor (CPEC) presents as a catalyst for transparency through e-platforms and governance models, data access, and collaborative execution—components directly connected to project performance in different portfolios (Zhong et al., 2022). Concurrently, practical studies of Pakistani projects proceed to surface performance limitations (e.g., capacity gaps, bureaucratic inertia, and creative suffocation) that reflect global discoveries about the critical role of leadership and implement different practices in IT and government-sector transformations (Iqbal et al., 2024).

Unifying these historical strands supports the current model. First, e-leadership has shifted from a communication-focused understanding to a planned, performance-driven ability for guiding technology-enabled change. Second, digital transformation is now seen as the channel through which leadership demonstrates its effects, organizing projects around process, systematic, and business-strategy changes. Third, change management has consistently been shown to influence transformation outcomes, indicating a credible moderating effect on the relationship between digital leadership and project performance. Finally, Pakistan's current push toward digital governance and larger infrastructure-plus-data decisions provides a timely, highly relevant setting for examining these connections in real project conditions where performance matters both organizationally and domestically. Together, this historical context provides a strong basis for testing (1) the direct impact of digital leadership on project execution, (2) the mediating role of digital transformation, and (3) the moderating role of change management in Pakistan's project industry.

1.2 Problem Statement

Despite decades of collaboration on project success, many Pakistani organizations still struggle to turn digital ambitions into successful project outcomes. Traditional success measures remain centered on the "Iron Triangle" of cost, time, and scope (Atkinson, 1999). However, value in the digital era often comes from redesigned processes, data-driven initiatives, and new business strategies that lead to further go-live. This change indicates that management and transformation processes plans and budgets must be designed and studied to understand their effects on project performance. Research on digital and e-leadership explores how leaders utilize technology. In digital settings, e-leadership is defined as "social influence process mediated by Advanced Information Technology (AIT) to produce a change in… performance" (Avolio et al., 2000; Cortellazzo et al., 2019, p. 2). At the same time, digital transformation (DT) is defined as the process by which organizations improve through technology-based changes to structures, patterns, and offerings (Vial, 2019). However, studies based in Pakistan rarely explore how digital leadership translates into project performance through DT at the project level, leaving the mediating mechanism underexplored in this context. Additionally, change management (CM) is a well-known factor affecting various outcomes (Todnem, 2005). However, its potential role whether CM strengthens or weakens the leadership leads performance relationship remains empirically unclear in Pakistan.

The urgent need is evident. National assessments and sector-specific evidence highlight capacity gaps, implementation challenges, and policy–execution conflicts that obstruct digital decision-making and project outcomes in Pakistan (Atique et al., 2024; Iqbal et al., 2024). While leadership style influences project success globally (Müller & Turner, 2007), the combined analysis of (a) digital leadership's direct impact on project performance, (b) DT's mediating role, and (c) CM's moderating effect has not been typical within Pakistan-based project data.

Therefore, this study primarily focuses on the lack of specific, empirical evidence regarding the system and conditions through which digital

leadership influences project execution in Pakistan. By examining a moderated-mediation model (digital leadership to digital transformation to performance, influenced by CM) using data from projects in Pakistan, the study aims to identify where leadership practices should be targeted, how restructuring can help clarify stakeholder interests, and when change initiatives result in the performance improvements leaders expect.

1.3 Research Gap

Throughout project-based companies, digital transformation has shifted from being solely a technology issue to a control and change challenge. However, the academic evidence linking these aspects within projects remains inconsistent. A recent analysis highlights " the extensive yet diverse and fragmented literature on digital transformation," asserting that traditional change frameworks only capture the phenomenon "partially" (Hanelt et al., 2021, p. 1159). This division becomes clear in how it's described and measured. Vial (2019) characterizes DT as a process aimed at enhancing an entity by inducing substantial changes to its properties through the use of information, computing, communication, and connectivity technologies. However, some project management studies implement this process more holistically, starting from leadership to achieve outcomes.

First, while "digital leadership" is frequently discussed by practitioners, reliable and validated tools have only recently appeared in academic literature. For example, Zeike et al. (2019) explicitly stated that "we developed a new scale for digital leadership in managers", calling for further validation across different sectors and situations (p. 1). However, research at the project level that applies proven digital leadership (DL) practices and measures its impact through digital transformation (DT) on project performance (PP) remains limited, especially in developing economies.

Second, the dependent variable in multi-project research remains narrowly defined. Contemporary responses emphasize that project success/performance is multidimensional: "PS is a multidimensional construct that comprises three main dimensions: impact on stakeholders, impact on the organization, and general project management" (Pacheco et al., 2023, pp. 17–18). Even in project settings in Pakistan, researchers argue that the understanding of success has "evolved… from simply the Iron Triangle… success criteria such as quality [and] customer satisfaction" (Naeem & Akbar, 2021, p. 259). Despite this, few empirical studies link digital leadership to digital transformation to project performance by applying multidimensional project performance practices.

Third, the procedure between digital leadership and project performance is below the specifications in the project conditions. Emerging proof outside solid project tests indicate that digital leadership encourages digital transformation and downstream execution (e.g., Mollah et al., 2024; Qiao et al., 2024). For instance, Qiao et al. discussed that "digital transformation serves as a crucial intermediary" between digital leadership and results (2024). However, thorough mediation experiments with project-level facts and with proven digital transformation tools are limited. However, new digital transformation calibration exists (e.g., financial-services DT scale for rural banks; Chao, 2024), their implementation to projectized entities and structure/ICT projects in surfacing markets remains rare.

Fourth, change management (CM) is broadly recognized as median to digital transformation, but is rarely represented as a moderator between digital leadership to project performance path. Strategic views claim that digital transformation is an enterprise-wide change attempt requiring shifts in procedures, structures, and culture (Verhoef et al., 2021; Warner & Wäger, 2019). Yet quantitative project researches rarely examine whether change management ability/readiness heightens or weakens the impact of digital leadership on project performance. Validated estimates are accessible—for example, the Organizational Readiness for Implementing Change (ORIC) instrument "measures organizational members' shared solution to implement a difference (change commitment) and their considered collective abilities… (change

efficacy)" (Shea et al., 2014). But ORIC (or comparable CM scales) has rarely been integrated as a frontier condition in DL–DT–PP structures for projects.

Fifth, there is a circumstantial gap for Pakistan. Benchmarking studies on e-governance present persistent application frictions: Pakistan's EGDI levels have shown a "gradual decline" ascribe to "lack of investment in infrastructure, … weak institutional capabilities" and a "gap between public policy and public implementation" (Atique et al., 2024). These systemic circumstances make Pakistan an impractically rich and practically acute context to examine whether DL creates DT that transforms into better PP—and if CM abilities are the prime switch that authorizes (or blocks) those influences in real projects.

In short, the literature signs what to research but not how it performs out in project implications: (1) validated DL and DT practices are underused in project experiments; (2) PP is usually under-measured compared to its multidimensional conditions; (3) DT is advanced but rarely examined as a mediator in the middle of DL and PP; and (4) CM as a moderator is impractically credible yet empirically less-examined—specially in Pakistan's project environment. Addressing these shortcomings, the present research will apply validated tools (e.g., Zeike et al.'s DL scale; a DT scale suitable for organizational settings; multidimensional PP; and ORIC for CM), and will examine a mediated–moderated structure (DL to DT to PP; CM moderates DL to PP) utilizing Pakistani project entities. By doing so, it answers directly to questions to advance past "diverse and fragmented" transcripts of DT (Hanelt et al., 2021) regarding an integrated, evidence-based report of how digital leadership independently, transformation mediatingly, and change capability jointly affect project performance.

1.4 Research Aim

To examine how Digital Leadership (DL) influences Project Performance (PP) in Pakistan, with Digital Transformation (DT) as a mediator and Change Management (CM) as a moderator.

1.5 Research Questions

1. What is the effect of digital leadership on project performance in Pakistan?
2. What is the effect of digital leadership on digital transformation?
3. What is the effect of digital transformation on project performance?
4. Does digital transformation mediate the relationship between digital leadership and project performance?
5. Does change management moderate the relationship between digital leadership and project performance?

1.6 Research Objectives

1. To assess the effect of digital leadership on project performance in Pakistani project-based organizations.
2. To examine the effect of digital leadership on digital transformation.
3. To evaluate the effect of digital transformation on project performance.
4. To test the mediating role of digital transformation in the digital leadership to project performance relationship.
5. To test the moderating role of change management on the digital leadership to project performance relationship.

1.7 Significance of the Study

This study is important on two fronts: it contributes to developing a better theory and guiding practice in project-based companies navigating digital change in Pakistan. Theoretically, it incorporates digital leadership (DL), digital transformation (DT), and change management (CM) into a single, moderated–intervention model of project performance (PP). Prior reviews describe the digital transformation corpus as "extensive yet diverse and fragmented," calling for integrative perspectives that link strategy, change, and outcomes (Hanelt, Bohnsack, Marz, & Marante, 2021). By treating DT as the system that translates DL into measurable project outcomes, the study goes beyond just looking at basic two way links and explains how leadership actually creates value in projects. It also shows that CM acts as a factor that can either strengthen or weaken the

impact of leadership on performance a theory consistent with classic change scholarship that "the successful management of change is crucial to any organisation in order to survive and succeed" (Todnem By, 2005, p. 369).

Conceptually, the study simplifies constructs with contested scope. We adopt a widely cited definition of DT as "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies" (Vial, 2019, p. 121). By using this step-by-step view, we can clearly tell the difference between digitalization (using new tools) and digital transformation (changing routines, structures, and ways of doing business). At the same time, we make digital leadership measurement stronger by using new research that defines it as a unique skill set designed for the needs of the digital age (Zeike, Bradbury, Lindert, & Pfaff, 2019). Finally, we draw out the performance view: whereas traditional success has been chained to the Iron Triangle—"Cost, time and quality (The Iron Triangle), over the last 50 years have become inextricably linked with measuring the success of project management" (Atkinson, 1999, p. 338) our model aligns PP with current value creation, including stakeholder benefits and sustained use, which are central in digital initiatives.

Practically, the research offers decision-ready suggestions for sponsors, PMOs, and carriage teams. First, it points out where leadership matters most: if DL influences PP essentially through DT, capacity building should rate leaders' ability to adapt cross-functional change, letting data-driven study, and position technology with benefits comprehension. Second, by structuring CM as a moderator, the research highlights the reasons under which leadership is not the most beneficial –that is, the stage of readiness, communication, and application help at which leadership behaviours transform into scalable performance results. This is directly done in governance (e.g., stage-gates that dictate application KPIs along with delivery KPIs) and in risk management (e.g., early symptoms of change bottlenecks that could reduce benefits). Third, the gaps inform leadership growth and aptitude decisions: companies can filter selection, development, and training to focus on digital orchestration and change-application—not only tool expertise. Supportive strategy research shows that building potent capabilities is key for digital transformation in current settings, strengthening the managerial principles of leadership that can recognize opportunities, reconfigure assets, and sustain performance (Warner & Wäger, 2019).

For strategy and public projects in Pakistan, the research provides an evidence-based prototype to enhance digital project delivery. incorporating CM requirements (readiness testing, training programs, post–go-live initiatives) and benefits-detecting in procurement and supervision can shorten the findings between digital strategy and perceived value. In sum, by debriefing how DL generates value (via DT) and when it occurs (under sufficient CM), the research advances theory further fragmentates and gives applicants concrete grounds to enhance project performance in digitally embedded portfolios.

1.8 Hypotheses

Guided by the research aim to analyse how Digital Leadership (DL) impacts Project Performance (PP) within Pakistan along with Digital Transformation (DT) acting as a mediator and Change Management (CM) acting as a moderator we specify directional hypotheses positioned with RQ1–RQ5. The expectations contain the view that leadership in unstable, technology-embedded contexts generates value initially by reconfiguring procedures and routines (mediated influence through DT), and that the understanding of those pros are based on contextual adjustment and adoption capability (moderation by CM).

H1. Digital leadership has a positive influence on project performance (DL to PP).

H2. Digital leadership has a positive impact on digital transformation (DL to DT).

H3. Digital transformation has a positive impact on project performance (DT to PP).

H4. Digital transformation mediates the relationship between digital leadership and project performance.

H5. Change management positively moderates the impact of digital leadership on project

performance (DL effect on CM to PP), such that the DL to PP relationship is strengthened at higher levels of change-management capability (e.g., readiness, communication, training, reinforcement).

These hypotheses will be tested using SPSS: direct effects via ordinary least squares (OLS) regression (H1–H3), bootstrapped mediation using PROCESS Model 4 (H4), and moderation using PROCESS Model 1 with mean-centered variables and simple-slopes/Johnson–Neyman probes (H5) (Field, 2018; Hayes, 2018).

1.9 Supporting Theory

This research is grounded in dual corresponding perspectives—Dynamic Capabilities Theory (DCT) and Structural Contingency Theory—that together elaborate how digital leadership (DL) develops value through digital transformation (DT) and when that value is understood in the perspective of project performance (PP) under differing stages of change management (CM). DCT gives the procedure logic for the mediated pathway (DL to DT to PP), while contingency theory gives the contented-condition logic for the moderating effect of CM on the DL to PP link. These lenses also plan cleanly to the study questions (RQ1–RQ5) and the related hypotheses for this thesis.

1.9.1 Dynamic Capabilities Theory (DCT)

DCT elaborates performance in unstructured contexts by focusing on leaders' capabilities to restructure organizational resources and processes. The canonical meaning defines dynamic capabilities as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997, p. 516). Teece's later microfoundations state the managerial tasks through which leaders validate this reconfiguration—observing opportunities and threats, utilizing them through optimum investments, and transforming/reconfiguring strength and processes (Teece, 2007). In project environments, digital leadership implements these capabilities: goal-oriented and data-driven decision-making (sensing), arranging cross-functional adoption and optimum choices (seizing), and restructuring workflows/platforms (transforming). The digital transformation initiative in our model catches these reconfiguration results at the project/organizational limits (new processes, structures, and ways of working), which DCT predicts to interpret into enhanced project performance. Accordingly, DCT directly backs RQ2 (DL to DT), RQ3 (DT to PP), and the mediated correlations in RQ4 (DL to DT to PP). In hypothesis state, this motivates: H2 (DL positively affects DT), H3 (DT positively affects PP), and H4 (DT mediates the DL to PP relationship); it also allows a prudent H1 (a direct DL to PP effect), with DCT expect that much of the leadership impact is indirect via transformation. For authoritative background usage throughout this study, Teece's monograph integrates the program (Teece, 2009), while the prominent and microfoundations studies supply quotable meaning and mechanisms (Teece et al., 1997; Teece, 2007).

1.9.2 Contingency Theory of Organizations (structural contingency)

Contingency perspectives elaborate performance as an attribute that matches between organizational practices and seasonal demands; there is, in short, no generic design that works best in all situations (Donaldson, 2001). The classic foundation is Burns and Stalker's study of mechanistic in contrast of organic systems, where "a mechanistic management system is appropriate to stable conditions," and the original form fits changing conditions that create "fresh problems and unforeseen requirements for action" (Burns & Stalker, 1961/1994). Digital projects often go through high uncertainty and application challenges; in such environments, best arrangement depends strongly on effective change management—containing readiness, communication, guidance, and reinforcement practices — that adjust people and procedures with the innovative digital design. In our structure, CM is defined as a moderator that shapes whether DL changes into PP benefits (RQ5). When the match is strong (robust CM), leadership's aim is effectively applied in day-to-day practice; when the

match is weak, application frictions weaken its effect. This yields H5: CM positively moderates the DL to PP relationship (the leadership impact on performance is stronger at higher levels of CM). For large theoretical support and literature to cite in your analysis, Donaldson's book gives a comprehensive solution of the fit to performance logic throughout contingencies (Donaldson, 2001), and the Burns–Stalker volume is the primary base for the mechanistic/organic distinction (Burns & Stalker, 1961/1994).

Bringing these frames together delivers a coherent clarification for all five research questions. From DCT, DL is theorized to align DT and PP because leaders' 'sense–seize–transform' in response to digital pressures (supporting RQ1–RQ4; H1–H4). From contingency theory, whether those leadership results are noticed in project performance relies on fit, implemented here as CM (supporting RQ5; H5). The two theories are thus completely applicable and empirically controllable for this thesis: they justify examining (a) direct DL effects, (b) an indirect DL to DT to PP pathway via bootstrapped mediation, and (c) a moderated DL to PP path via interaction terms—precisely aligning the model to be estimated.

1.8 Theoretical Framework / Research Model

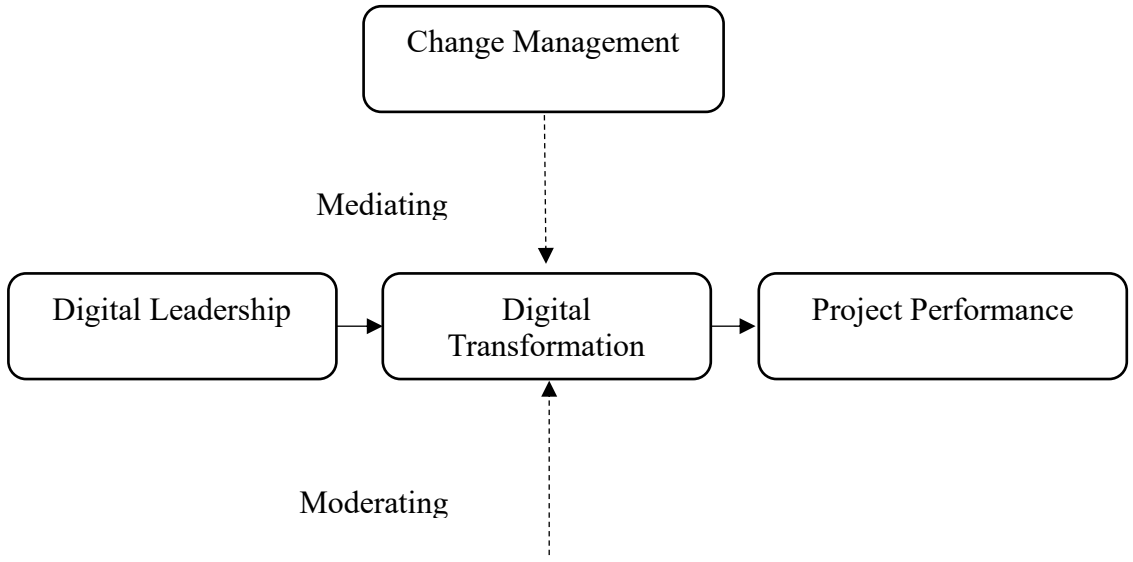


Figure 1. **This figure illustrates a conceptual model exploring the impact of Digital Leadership (DL) on Project Performance (PP), with Digital Transformation (DT) as a mediator and Change Management (CM) as a moderator, within the context of project-based organizations in Pakistan.**

CHAPTER 02
LITERATURE REVIEW

2.1 Project Performance in Contemporary Project Management

Project performance is one of the most important aspects of Project Management, and it is important to develop an understanding of the evolving nature of project performance. The measuring criteria for performance have been the "Iron Triangle" of cost, time, and quality. Atkinson (1999) famously indicated that Cost, time and quality (the Iron triangle) have become the most common measures of success of project management, while also warning that "Time and costs are at best, only guesses, whereas Quality is a phenomenon" (Atkinson, 1999, p. 337). The critique of this phenomenon leads to the broader definition where success includes stakeholder and

strategic dimensions beyond the famous iron triangle (Naeem, 2021). In the development sector of Pakistan, the understanding of project success has changed from the simple Iron Triangle into quality, customer satisfaction, and knowledge management (Naeem, 2021, pp. 259–260). This multidimensional approach is consistent with recent synthesis work, which indicates that performance is not about efficiency only (completing the project right), but also about effectiveness (completing the right project (Varajão, Loureiro, & Gomes, 2022). This study adopts the broader lens to study how digital leadership, channeled through digital transformation and contingent on impactful change management, shapes project performance in Pakistan.

Based on this background, the present research focuses on the project performance (PP) as an outcome created by digital leadership (DL) and digital transformation (DT) with change management (CM) as a contextual moderator because the digital pressures increase the recasting of what is considered as "success". In the digital settings, planning agility and value creation through the use of digital resources become essential to performance. Bhardawaj et. al (2013) states that we should move from placement view to a "fusion of business strategy and IT strategy which is digital business strategy". Based on this fusion logic, this study contends that DL orchestrates DT to evolve the digital options into project-level benefits, with CM deciding the degree to which those benefits are recognized in project-based organizations of Pakistan.

2.2 Digital Leadership: Behaviors and Measurement

"Digital leadership" is a contemporary concept that describes the leadership skills and behaviours essential to facilitate digital change. In the psychometrics contributions, a new digital leadership scale has been developed and a new construct regarding individualized, innovative and supportive behavior of digital leadership. Moreover, multiple empirical studies further indicate that digital leadership was "significantly and positively associated with employee mental strain, resilience, and goal attainment," explaining both the positive and nuanced impacts of DL on followers (Zeike et al., 2019). These outcomes provide a validated measurement opportunity for DL and underline mechanisms which include individualized consideration, innovation support, and digital enablement that DL can initiate to effect project outcomes.

Recent work on digital transformation guarantees that digital transformation is used as a construct and a benchmark. A detailed structured report in Administrative Sciences draws that "digital leadership remains a prominent research interest, as it has not yet reached maturity," plotting distinct role assumptions about visioning, engineering of data/information, and people-driven change authority (López-Figueroa et al., 2025, p. 3). This undetermined state embraces the rationale in the subject for examining DL's direct impact on project performance (PP) and its secondary impacts via digital transformation (DT), because underdeveloped constructs usually appear through contingent procedures before steady main impacts show.

In project situations, leadership impacts often depend on project type and ambiguity. Classic work determines that similar leadership tactics to project characteristics are vital for achieving ideal outcomes (Turner & Müller, 2005). In digital settings, leadership is often employed through visioning, sensemaking, and capability adaptation, all of which are consistent with DL's facilitating role for DT initiatives that span functions and ecosystems.

What qualities make a good leader "digital"? A massive, mixed-method investigation was conducted with 64 SME leaders showing a quality spine and strategic observation, data-driven decision-making, environmental collaborations, and ambidextrous knowledge as the abilities that helped leaders actually incorporate DT outcomes (Schiuma et al., 2024). These results filter our DL operationalization and prove our focus on leader behaviours that make transformation paths accessible which are linked to PP (RQ1–RQ4).

2.3 Digital Transformation: Construct Clarification, Mechanisms, and Performance Link

Despite its ubiquity, DT remains theoretically diffuse. A comprehensive review includes that DT corpus is "diverse and fragmented", and there is a need for more extensive conceptual consolidation. Henelt et al. (2021) stress the importance of scholars adopting the lens of organizational change behavior while researching DT that includes foregrounding people, procedures and structures rather than only techniques and technologies.

A commonly used definitional presenter is Vial's (2019) explanation that digital transformation is "a process that aims to expand an entity by triggering important changes to its properties through mixtures of information, computing, communication, and connectivity technologies." This expression highlights process (continuous change), improvement (performance intent), and digital technologies (as triggers). Technically, DT reframes performance by interlinking technology with. Business model innovation and capability regeneration, as Bharadwaj et al. (2013) indicate, that the rise of DBS reorients the performance system of measurement "beyond efficiency and productivity to those that drive competitive improvement and strategic differentiation" (p. 472). Moreover, this study treats DT as the processual means through which DL reconfigures routines and structures to deliver multidimensional project performance results.

At the operational stage, DT practices visibly enhanced operations performance. A multi-year panel was used for manufacturing companies, Tian et al. (2023) manifests DT practices remarkably increase employee's productivity, substantial benefit efficiency, and net working-capital planning, proof that DT makes value streams related to project execution planning and streamline PP like cost/schedule compliance. Their procedure-based point of view also suggests that DL is significant to the extent it starts off such standards in projects and programs.

DT's association to project performance is both direct (process digitization, analytics, and collaboration platforms that improve schedule, cost, and quality) as well as indirect through capability building (agility, sensing, seizing, and transforming routines). In longitudinal research of DT programs, leaders foster dynamic abilities that enable organizations to sense, seize, and transform opportunities in iterative cycles, with agility being the central mechanism (Warner & Wäger, 2019). Their work synthesizes dynamic ability micro foundations for DT, the important lesson is that leadership enabled DT abilities paved the pathway through which projects recognize benefits under digital turbulence.

At mega/local scale, the EU's DESI measures show by using a comparative study that SEM digitalization is related to superior performance results, but with diverse payoffs throughout countries and sectors (Skare, de las Mercedes de Obesso, & Ribeiro-Navarrete, 2023). For the project scenario, this assists in expanding PP further than the iron triangle to incorporate market/strategic results when DT encourages new value propositions altering with our PP idea and making RQ3/RQ4 strong.

2.4 Change Management and Readiness for Change as a Performance Context

Project performance through DT relies heavily on how well organizations accomplish change. Shea et al (2014) hypothesize organizational readiness for implementing change (ORIC) as a common, proximal state that forecasts implementation success. Their validated measure captures two major variables: "change commitment" and "change efficacy" (Shea et al., 2014).

Readiness is "a communal resolution to implement a modification (commitment) and communal belief in collective ability to do so (efficacy)," making it a manageable proxy for the quality of change management performed surrounding a project's DT initiatives (Shea et al., 2014).

DT success links with organizational readiness for change (ORC). Latest SAGE Open research creates and provides a reliable modern Readiness for Organizational Change scale, providing psychometrically strong items to catch reliance on change efficacy, properness, management assistance, and personal power (Jo et al., 2023).

Relying on such readiness diagnostics supports condition change management (CM) as an extreme condition that moderates DLto PP and DLto DT correlates in our structure (RQ5), aligning indicators with our moderation concept.

Arguably ORC, an open-approach examination suggests an Organizational Digital Transformation Readiness (ODTR) structure including customs, leadership, capabilities, procedures, and technological clarity; the authors explains " address the constructs needed to define organizational digital transformation readiness" to minimize DT operational risk (Michelotto et al., 2024, p. 3284). For projects, this change management form is not a generic exercise but more so as an arrangement of readiness which lifts that condition whether digital leadership can change into digital transformation practices and eventually project performance.

In digital programs, readiness facilitates the translation of leadership concepts into changed practices, but it can also moderate the impact of leadership on performance. When readiness is high, leadership impulses are more likely to be endorsed at speed and scale, however, when low, even strong leadership signals may stall. Thus, considering change management (operationalized via readiness or related capability indicators) as a moderator is consistent with theory and measurement practice.

2.5 Interrelationships Among Digital Leadership, Digital Transformation, and Project Performance

Synthesizing the strands above, this study adopts the following logic. First, digital leadership to project performance (RQ1/H1): DL provides vision, resources, and psychological safety for digital work, aligning with evidence that DL behaviors relate to goal attainment and resilience (Zeike et al., 2019). In project contexts, such leader behaviors should translate into fewer coordination losses, faster issue resolution, and better stakeholder management—classic drivers of PP beyond the iron triangle (Naeem, 2021; Varajão et al., 2022).

Second, digital leadership to digital transformation (RQ2/H2): DL catalyzes DT by prioritizing platform investments, cross-functional collaboration, and experimentation; leaders "orchestrate" digital initiatives and capability building (Warner & Wäger, 2019), while the DBS perspective documents how leadership reframes strategy as a fusion of digital and business logics (Bharadwaj et al., 2013).

Third, digital transformation to project performance (RQ3/H3): DT is a process of improvement that leverages digital triggers to change processes and structures (Vial, 2019). Empirically, digitization improves integration, transparency, and decision speed—factors long tied to schedule, cost, and quality outcomes, and increasingly to benefit realization (Varajão et al., 2022).

Fourth, digital transformation as mediator (RQ4/H4): The above implies an indirect pathway in which DL affects PP by enabling DT routines, infrastructures, and mindsets that, in turn, shape execution quality. This logic is consistent with change-centric views of DT (Hanelt et al., 2021) and with capability perspectives that link leadership to performance through digitally enabled routines.

New empirical study clears out how digital leadership changes into digital transformation. In a modeled-equation work, Özkan Alakaş (2024) depicts digital transformation leadership is seen improving organizational agility with the mediating role of digital strategic functions in the pathway of digital leadership (DL) influencing digital transformation (DT) which is exactly the form of capability-chain that our structure proposes prior effects on project performance emerge. For testing our mediation (RQ4), this encourages particularly digital transformation as the pathway of leadership that influences performance results.

Sectoral proof also connects digital leadership with digital intensity with its wide and deep use of technology through ability comes in healthcare, suggesting that leadership creates transformation practices which then enhance an entity's outcomes (Kludacz-Alessandri et al., 2025). In projectized situations, this approach indicates digital leadership forms project performance via ability accumulation (DT), while change management

forms the slope of those impacts by aligning individuals and operations.

Finally, change management as moderator (RQ5/H5): The strength of DL's effect on PP depends on the organization's change readiness; when "change commitment" and "change efficacy" are high, DL's signals are more effectively converted into sustained DT and project-level behaviors; when low, the causal chain attenuates (Shea et al., 2014).

2.6 Pakistan's Project Context: Why These Relationships Matter

A Pakistan-specific lens further underscores the importance of DL, DT, and CM for PP. Recent evidence from Pakistan's construction sector—an engine of national development—finds persistent execution problems: "Project failure and cost overrun performance have been worrisome and common occurrences" with top causes including poor project management, design changes, and economic instability (Iqbal et al., 2024, p. 1898–1916). Related analyses list "ineffective management," "poor cost estimation," and "delays in the client's decision-making" as leading drivers of overruns (Iqbal et al., 2024). Such endemic frictions are precisely the kinds of problems DL and DT seek to remedy by improving information flows, accountability, and coordination.

At the public-sector governance level, Atique and colleagues diagnose a persistent strategy–execution gap in Pakistan's e-government trajectory: e-governance "did not match the vision it had" and "lacked the means to address digital divides," while "corruption, vague policies, and inefficient governance processes" undermined outcomes (Atique et al., 2024). These constraints accentuate the need for DL to prioritize inclusion and for CM to build readiness. In large public–private programs (e.g., the CPEC context), digital infrastructure and service delivery improvements depend on leaders who can mobilize DT while navigating institutional constraints—once again spotlighting the moderating salience of CM/readiness.

Pakistan-based data proves underscores activity performance ties. A new Sustainability research of 305 SME leaders in Sindh review that "social media, big data analytics, the IoT, and blockchain applications are shown to markedly enhance both economic and social value creation within SMEs." which automatically improves SME performance (Soomro et al., 2024, p. 20). While SME-aligned, these outcomes reinforce our context claims: where digital application increases, project portfolios raising targeted value generating results further from cost/time, forming the relatability of our digital leadership–digital transformation–project performance chain and encourage the use of change management as initiator.

2.7 Measurement Implication for the Study

The constructs in this study have recent, validated operationalizations suitable for Pakistan's project environment. Digital leadership can be measured using Zeike et al.'s (2019) scale, which explicitly operationalizes "individualized, innovative, and supportive digital leadership behavior" and provides initial evidence on criterion validity. Digital transformation can be operationalized at the project/organizational level using items grounded in Vial's (2019) process definition (e.g., changes to core processes, structures, and business models triggered by digital technologies), ensuring conceptual clarity. Change management (moderator) can be proxied with ORIC (Shea et al., 2014), capturing "change commitment" and "change efficacy" as enabling conditions for implementation. Finally, project performance should reflect multidimensional success including, but not limited to, time, cost, and quality (Atkinson, 1999; Naeem, 2021; Varajão et al., 2022).

For implementation, a 2024 paper of Business study article evolve a comprehensive digital transformation categorization and analysis model that includes six core dimensions and sub-dimensions, pointing out defined and measurement irregularity that usually frustrates mediation exams (Kao, Chiu, Lin, Hung, & Lu, 2024). Matching that with micro-structural apprehensions—e.g., "having the right digital-savvy leaders in place is a root for improving digital maturity and for digital transforming capability." (Sousa-Zomer et al., 2020, p. 18) provides us with a defensible standard scaffold for digital

transformation and digital leadership that relates with our hypotheses about digital transformation mediating digital leadership through project performance and change management moderating the digital leadership and project performance connection.

2.8 Synthesis and Research gap

Three interlocking observations define the research gap. First, the DT literature remains conceptually "diverse and fragmented," with calls to adopt an organizational change lens (Hanelt et al., 2021). However, empirical project-level tests that tie digital leadership to project performance through digital transformation are scarce—particularly in emerging economies. Second, although valid scales exist for DL (Zeike et al., 2019) and change readiness (Shea et al., 2014), few studies in Pakistan's project ecosystem have combined these measures to test simultaneous mediation–moderation models predicting multidimensional PP. Third, context-specific evidence indicates persistent execution problems ("worrisome and common occurrences" of failure and overrun) and governance frictions ("did not match the vision," "lacked the means") that DL, DT, and CM may jointly address, but this triadic configuration has not been rigorously tested in Pakistan's project settings (Iqbal et al., 2024; Atique et al., 2024).

Accordingly, this study advances the literature by: (a) positioning digital transformation as a mediator that channels the effect of digital leadership to project performance, consistent with process-based DT theory (Vial, 2019); (b) modeling change management/readiness as a moderator that conditions leadership effects, following implementation science; and (c) validating these relationships with Pakistan-based project data where performance improvement is sorely needed. This design directly responds to the theoretical call for change-centric DT research and the practical imperative to improve project outcomes under digital turbulence.

CHAPTER 03
RESEARCH METHODOLOGY

This chapter follows the exemplary model used in Project Management scholarships—covering research structure, population and sample, implementation, and data examination—while tailoring each variable to the present research on digital leadership (DL), digital transformation (DT), project performance (PP), and change management (CM).

3.1 Research Design

3.1.1 Nature/Type of Study

The study adopts a quantitative, explanatory design with a cross-sectional time horizon. We test causal paths from DL to PP, the mediating role of DT, and the moderating role of CM. A structured survey approach is appropriate for modeling latent constructs and evaluating indirect and conditional effects in one coherent framework, aligning with best practice in project studies where "relationships between independent and dependent variables [are] empirically" investigated via surveys.

This explanatory, cross-sectional survey is analyzed in SPSS to test a priori hypotheses. The plan comprises scale reliability, exploratory factor analysis (EFA) for structure checks, descriptives/correlations, multivariate OLS regressions for direct effects (DL to PP; DL to DT; DT to PP), bootstrapped mediation (PROCESS Model 4: DL to DT to PP), and moderation (PROCESS Model 1: DL effect on CM to PP). Bootstrapping (5,000 resamples; 95% CIs) strengthens inference without strict normality assumptions (Field, 2018; Hayes, 2018).

3.1.2 Research Philosophy

A positivist and deductive stance underpins the work. Hypotheses derived from the digital leadership and dynamic capabilities/organizational readiness literatures are subjected to statistical tests using measurement and structural models. This approach is consistent with rigorous reviews in the DT/leadership domain that combine systematic evidence gathering with quantitative analysis to answer

sharply defined questions (Cortellazzo, Bruni, & Zampieri, 2019).

3.1.3 Study Setting

The empirical setting is project-based organizations located in Islamabad/Rawalpindi and other major Pakistani cities (public and private). The Pakistani project context is well suited, given documented volatility in project delivery and the salience of digitalization agendas in sectors such as infrastructure, services, and public administration (Naeem, 2021).

3.1.4 Unit of Analysis

The unit of analysis is the individual project professional (e.g., project managers, team leads, engineers, coordinators) reporting on a recent focal project (completed or in advanced execution within the last 24 months). This mirrors standard practice in Pakistani project studies where individuals report on specific projects and related governance/leadership practices. Respondents select one typical recent project and anchor all items to that focal project (e.g., 'In this project, …'). This instruction reduces halo effects and improves comparability across participants; scale scores are computed as construct means.

3.1.5 Time Horizon

Cross-sectional. Data are collected once via online and paper surveys.

3.2 Population and Sample

3.2.1 Population

Project professionals working in project-based organizations in Pakistan form the target population. Examples include IT, construction, engineering, development, telecom, and public-sector projects—domains where digital pressures and structured change programs are common (Naeem, 2021).

3.2.2 Sampling Technique and Sample Size

A nonprobability, purposive approach—augmented by snowballing through professional associations (e.g., PMI local chapters, LinkedIn groups) and organizational contacts—is used to reach active project professionals. This approach is customary in project research where formal sampling frames are unavailable and where professional networks yield qualified respondents. Sample adequacy is justified for multiple regression and PROCESS. Rules of thumb recommend $N \geq 50 + 8m$ (where m is the number of predictors) for testing individual predictors and $N \geq 104 + m$ for overall model tests (Green, 1991; Tabachnick & Fidell, 2019). With controls plus focal predictors, the present $N \approx 400$ exceeds these thresholds. For mediation, bootstrapping achieves adequate power for small-to-moderate indirect effects at $N \geq 148–300$ (Fritz & MacKinnon, 2007; Hayes, 2018); thus the final sample is more than sufficient.

3.2.3 Data Collection Procedure

Data will be gathered via web-based questionnaires. In Pakistan, web-based questionnaires disseminated through email/LinkedIn are standard and ethically manageable, with consent and confidentiality emphasized at the outset; data will be analyzed in SPSS following the plan in §3.6. This research is based on a survey-based study of digital leadership and project performance, providing the introduction of the study, its title, and the investigation of Digital Leadership's impact on Project Performance. Moreover, this study investigates the mediating and moderating roles while ensuring confidentiality. The survey records the participant's email address (mainly used to differentiate withdrawals and deduplication), followed by a consent form that includes voluntary participation, anonymity and confidentiality, academic/research use of data, and an agreement to participate. The following items include demographics of the participants including role (Project Manager/Team Lead/Scrum Master/Analyst/Other), Experience (years), Gender (Male/Female/Prefer not to say), Organizational size (1–49; 50–249; 250–999; 1000–4999; 5000+), and Primary PM methodology (Traditional/Agile/Hybrid/Others). Once the demographics are provided, the survey includes constructs based on a 5-point Likert scale. Digital Leadership (6 items; Zeike et al., 2019), Digital Transformation (5 items), Project Performance (5 items), and Change Readiness,

ORIC (10 items; Shea et al., 2014). The data is solely gathered online. Once the data is collected, responses will be exported to a data sheet. Email fields are kept in a separate folder, which is solely used for deduplication. Once confirmed, these fields are deleted. All files are stored in a password-protected, encrypted storage, and access is restricted to the researcher and the supervisor.

3.3 Sample Characteristics (to be reported in Chapter 4)

The examination of demographics, such as gender, age, education, and tenure/experience, will focus alongside project attributes, including sector, size, and lifecycle stage. The present study encompasses the skill-based quantification of age, gender, level of education, and work experience, which is mandatory to provide individual-based work experience.

3.4 Instrumentation

3.4.1 Scale Development, Adaptation, and Pretest

All constructs have been operationalized using proven scales that have received peer reviews. In instances where items lack context-specific relevance to the projects in Pakistan, the phrasing is modified in the smallest way possible (e.g., 'in my project/organization'). Content validity will be assured through an expert panel (faculty + two senior PMs) and a pilot test ($n \approx 30$) for clarity and timing. This panel, along with the pilot test, will constitute a 'think-aloud' procedure that follows established methods for scaling development in the field (e.g., pretesting and cognitive interviews in leadership scale research) (Zeike et al., 2019).

3.4.2 Constructs and Measures

Digital Leadership (DL). In this current research study, Zeike et al. (2019) 'Digital Leadership Scale' will be used to measure DL. The authors explicitly note: "We could not find a validated scale that captured the different aspects of digital leadership. Thus, we developed a new scale and validated it on executives leading digitalization. Their research additionally documents survey protocol and ethics that enhance the applicability of the results to organizational contexts. Example items include vision for digital, support for innovation, and empowerment behaviors (we will use a 5-point scale).

Digital Transformation (DT). Across the organization, technology-driven change can be classified as digital transformation. Vial (2019) defines digital transformation as "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies" (p. 3). Digital transformation is categorized by three essential elements: (1) reevaluating and redefining firm boundaries, (2) the introduction of products and services to community contribution, as well as diminishing property rights, and (3) redesigning organisational and product characteristics (Parmentier and Mangematin, 2014). A digital transformation scale consisting of 5 items, using a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), is used to measure this construct (AlNuaimi et al., 2022).

Project Performance (PP). PP is seen as a multidimensional outcome that goes beyond traditional boundaries. We base the construct on Atkinson's (1999) critique that "cost, time and quality (The Iron Triangle), over the last 50 years have become inextricably linked," yet "time and costs are at best, only guesses… quality is a phenomenon" (p. 337). Consistent with recent synthesis, success should also include stakeholder satisfaction and business impact (e.g., benefits realization) (Varajão et al., 2022). Therefore, Um and Kim (2018) scale for PP items will assess delivery and outcome performance (stakeholder satisfaction, benefits/impact) based on time, cost, quality, and scope, using reflective indicators (5-point Likert scale).

Change Management (CM) as Moderator. The moderator considers organizational readiness for change in projects, measured by the ORIC instrument proposed by Shea et al. (2014), in which the authors define as a shared state composed of change commitment and change efficacy: ORIC includes 'change commitment' (members' shared resolve to pursue the implementation) and 'change efficacy' (shared belief in their collective ability to do so). The

content validity and psychometric adequacy of ORIC have been established. This aligns with moderation expectations in digital programs, where, as in this case, readiness factors can either amplify or mitigate the leader's impact on performance.

For each construct, compute the mean of its items (all coded 1–5). Prior to moderation, mean-center DL and CM and create the interaction term DL effect on CM (centered products). Assumption checks will rely on item-total statistics, residual diagnostics, and multicollinearity indices. Analyses treat Likert means as approximately interval, consistent with common practice in organizational research at this sample size (Field, 2018).

3.5 Procedures to Reduce Bias and Enhance Quality

3.5.1 Procedural Remedies

To mitigate common method bias, the researcher takes proactive steps such as anonymizing responses, stressing that no answers are 'right' or 'wrong,' counterbalancing item order, separating predictor and criterion blocks in the instrument (proximal separation), and incorporating the 'instrument' approach (Podsakoff et al., 2003).

3.5.2 Statistical Remedies

Post-hoc checks include: (a) Harman's single-factor test (unrotated EFA; <50% variance by the first factor indicates CMV is unlikely), (b) multicollinearity diagnostics (VIF < 5, tolerance > .20) in all regressions, (c) residual normality/homoscedasticity via plots and tests (and bootstrapping for indirect effects to reduce normality assumptions), and (d) Durbin–Watson for residual independence in the PP regressions (Podsakoff et al., 2003; Field, 2018).

3.6 Data Analysis Strategy

The analysis section will employ theory-guided pattern matching and matrix displays, as applied manually to completed questionnaires, tailored to our five research questions (i.e., H1–H5). Each multi-item construct will be defined in the codebook as High, Medium, or Low, according to some logical division rules (i.e., if a respondent marks "Agree/Strongly agree" on most DL items, DL will be classified as High; this logic will also apply for DT, CM, and multidimensional PP). The researcher will also ensure that the PP rubric incorporates delivery (time, cost, quality/scope) and outcome (stakeholder/benefit) sub-rubrics, rather than focusing solely on the Iron Triangle in relation to the rubric (Atkinson, 1999; Varajão et al., 2022).

Next, the researcher will construct the tables containing the case orders. For the first table, the researcher will do a DL to PP display (compare PP levels across DL = High vs. Low to assess H1). The second table will be DL to DT display (H2). The final table will be displayed as DT to PP (H3). For each hypothesis, the PP (or DT) modal value is taken as the supporting value whenever the PP modal value appears to be in the "High" tier in the DT or PP case (leadership-enabled, in capability building, in digital contexts) (Warner & Wäger, 2019; Bharadwaj et al., 2013).

To operationalize mediation (H4), we will use a chain-evidence table. Rows will represent cases with DL = High; columns will represent DT and PP. Mediation is supported when DL = High coincides with DT = High and PP = High, and the DL–PP difference decreases significantly when DT-matched cases are compared (where DT functions as the processual change mechanism) (Vial, 2019). For moderation (H5), a 2×2 grid will analyze PP across DL (High/Low) by CM (High/Low). Moderation is supported if the DL to PP difference is most significant when CM = High, which corresponds with readiness as "change commitment" and "change efficacy" for implementation support (Shea et al., 2014).

Hypotheses 1 and 3 are supported when the data analysis indicates high DT or PP where predicted (e.g., DL High rows). The 4th hypothesis, which means mediation, is concluded when DL, DT, and PP are high and co-occur, and the DL and PP differences are among cases matched on DT. H5 is the moderation that is concluded when DL and PP contrasts are highest under CM High in a 2*2 grid. All the conclusions will be triangulated with theory and recent available literature (Bharadwaj et al., 2013; Shea et al., 2014; Vial, 2019; Warner & Wäger, 2019; Zeike et al., 2019).

3.8 Validity, Reliability, and Model Fit

Content validity is supported by the use of validated instruments (Zeike et al., 2019; Shea et al., 2014) and expert/pilot review. Internal consistency is assessed via Cronbach's α (target ≥ .70). Construct validity is examined with EFA (adequate KMO/Bartlett; salient factor loadings; limited cross-loadings). Convergent validity is indicated by substantial within-factor loadings and average inter-item correlations in the recommended .15–.50 range. Discriminant validity is supported when inter-construct correlations remain < .85 and when EFA favors distinct factors. Model adequacy for regressions is evaluated through residual diagnostics, multicollinearity, influence statistics, and explained variance ($R^2/\Delta R^2$) (Field, 2018; Kline, 2016). Inference for mediation and moderation relies on bootstrap confidence intervals (Hayes, 2018).

3.9 Ethical Considerations

The survey will obtain informed consent, ensure voluntary participation, and maintain confidentiality/anonymity. The survey will gather informed consent while making sure that participation is voluntary and participants can withdraw at any time they want to up to two weeks after submitting it. Moreover, the data will be kept entirely confidential and will only be accessible to the supervisor and the researcher.

3.10 Limitations of Methodology

Concerns regarding the use of crossed self-report instruments include common method bias and temporal order effects. The researcher addresses these using procedures and statistical definitions, constructs paths built theoretically (DL to DT to PP; CM as a moderator). Although ideal and aimed at probability sampling, practical situations in Pakistan often lead to purposive or snowball sampling; hence, the results should be interpreted with caution, and replication across sectors is recommended.

3.11 Summary

In summary, the methodology integrates a rigorous measurement model—using validated scales for DL, DT, PP, and CM—with a PLS-SEM structural model to analyze direct, mediated, and moderated relationships within Pakistani project contexts. This approach integrates validated scales for DL, DT, PP, and CM with SPSS-based reliability/validity checks, OLS regression for direct effects, and PROCESS bootstrapping for mediation and moderation, aligning performance assessment beyond the Iron Triangle to include stakeholder and benefit considerations.

CHAPTER 04
DATA ANALYSIS AND DISCUSSION

4.1 Data Analysis

Through this chapter, we will discuss all the findings gathered using IBM SPSS. It will contain standard deviations and mean of the research variables. It will also include correlation analysis, linear aggression, mediation analysis and lastly moderation analysis performed on the data. The findings were computed and gathered thoroughly based on the established hypothesis. This chapter also contains the findings about the hypothesis and whether they were accepted or rejected depending upon the outcomes. This chapter only focuses on the results and efficiency of this particular study. This particular research aims to study the impact of digital leadership on project performance with the mediating role of digital transformation and moderating role of change management.

4.2 Demographics

Table 1

Demographics Frequency

Gender	Male / Female / Prefer not to say	218 142 0	60.6% / 39.4% / 0
Role	Project Manager	92	25.55%

	Team Lead	141	39.16%
	Scrum Master	45	12.5%
	Analyst	50	13.88%
	Other	32	8.88%
Organizational Size	1-49	98	27.3%
	50-249	132	36.8%
	250-999	88	24.5%
	1000-4999	32	8.9%
	5000+	9	2.5%
Project management Methodology	Agile	249	69.16%
	Hybrid	111	30.83%

4.2.1 Gender

Gender is a primary aspect of demographic analysis, specifically because it plays a vital role in mending societal dynamics and impact of various parts of life. Studying gender dynamics is important for fostering inclusivity and value in diverse contexts, enabling for the full use of specialties and perspectives within groups and communities.

Table 1 shows the collection of participants' gender which was classified into three alternatives as Male, Female and Prefer not to say. From the collected data, there were 60.6% males and 39.4% were females. Since, all the participants chose a certain option therefore, there were 0 participants in prefer not to say.

4.2.2 Role

The demographics also consisted of participant's professional roles. This was based on the how respondents identify as in their organization such as Project Managers, Team Leads, Scrum Masters, Analysts and holding Others for relevant positions. This component plays an essential role in demographic analysis because it tells us whether the respondent was directly or indirectly involved in the project. Their role would identify their interaction with digital tools putting them at the middle of digital leadership practices and digital transformation. Studying the distribution of respondent roles will help the contextual reliability of results by making sure that the sample shows individuals with operational and managerial expertise. This demographic characteristic will help to increase the accuracy of the work, and it will ensure that the application of digital transformation and project performance is established in practical project environment.

4.2.3 Organizational Size

This research included collecting data on organizational size, classifying organizations into sections ranging from 1-49 members to large firms with 5000+ employees. Including this component in the demographic analysis will help us understand how scale of a firm directly affects its ability to adapt technology leading to digital transformation. Smaller organizations might be flexible and adaptive in nature.

Table 1 shows that 27.3% of the participants are part of firms that are the size of 1-49. 36.8% of the respondents are a part of firms with 50-294 number of employees. 24.55% of the respondents worked in organizations with 250-999 employees. 8.9% of the sample shows participants employees of larger firms with 1000-4999 members. Only 2.5% of the participants worked in very large firms with 5000+ employees.

4.3 Covariates

The concept of applying a One-Way ANOVA is to find out the controlling variables to check if they have any effect on the research variables. Each demographic component is independently tested with the dependent variable. This helps to determine the significance of the variables being assessed. If any demographic component has a significant effect on our dependent variable, it is essential that we control it, since it could potentially impact the overall outcomes. Typically, a p-value is considered insignificant if it is above

0.05, however it is statistically considered significant for us if it is below 0.05.

Table 2

Covariates

One-Way ANOVA			
		F	**Sig.**
Gender	Between Groups	0.88	.349
Role	Between Groups	11.3	.001
Organizational Size	Between Groups	3.6	.006
Project Management Methodology	Between Groups	12.7	.001

Since there are demographic components that represent a significant p value with our research variables, because of time constraint we will not add a controlling variable unless there is a requirement for it.

4.4 Reliability Analysis of Scale

Reliability analysis is a process where a specific element is tested repeatedly in order to generate consistent results. Performing a reliability analysis in a study is an important step because it helps to figure out the dependability and reliability of the scale being adapt in the study. Standard approach for testing reliability is by Cronbach Alpha, which analyzes the consistency of variables and their interdependencies. The measures for Cronbach alpha range from 0 to 1, defined by Cronbach in 1951. Reliability of the scale is directly determined by Cronbach Alpha. With the increase in the value of Alpha, the scale's reliability also increases and vice versa. Standard value for reliability of Cronbach Alpha is usually 0.7 or higher but, a value ranging 0.6 is also acceptable given that the number of items of the variable are less than 10.

Table 3

Reliability Analysis

Variables	Cronbach Alpha	No. of Items
Digital leadership	.773	6
Project Performance	.783	5
Digital Transformation	.725	5
Change Management	.788	10

4.4.1 Digital Leadership

There were only six items in this variable, and the Cronbach Alpha measured .773 which is good. Hence, the reliability of the scale shown in Table 3 is acceptable.

4.4.2 Project Performance

There were only five items in this variable, and the Cronbach Alpha measured .783 which is good and acceptable. Hence, the reliability of the scale shown in Table 3 is good.

4.4.3 Digital Transformation

There were only five items in this variable, and the Cronbach Alpha measured .725 which is good. Since the value of the coefficient is equal to 0.7, the reliability of the scale shown in Table 3 is good.

4.4.4 Change Management

There were ten items in this variable, and the Cronbach Alpha measured .788 which is good. The value of the coefficient is equal to 0.7, the reliability of the scale shown in table 3 is good.

4.5 Descriptive Analysis

The descriptive analysis usually consists of all the essential information regarding data points of the research. It is necessary to do an analysis for descriptive statistics. It is necessary to perform a descriptive analysis of our current research as it consists of the analysis of different processes. The data set consists of two limits, minimum and maximum range for each item of each variable. It also comprises of the total number of participants along with mean and standard deviation of the data set. The average of all values in the data set is called mean and the length of expansion to which data is deviated from the mean is called standard deviation. Table 4 has 6 columns. The first one represents the name of variables in our research; the second one represents the number of participants who responded to our questionnaire is denoted by 'N'. The third and fourth columns show minimum and maximum values. The last two columns show mean and standard deviation of each variable. Each item was tested based on five-point Likert scale. Table 4 highlights an overview of data collected which outlines the variables of the research, total number of respondents, minimum and maximum values, mean and standard deviation of the data set.

Table 4

Descriptive Analysis

Descriptive Statistics					
Variables	N	Min	Max	Mean	Std. Deviation
Digital leadership	360	1.00	5.00	4.21	.516
Project Performance	360	1.00	6.00	4.61	.682
Digital Transformation	360	1.00	5.00	3.86	.592
Change Management	360	1.00	5.00	3.98	.474

Note. Table 4 depicts the total number of participants on our questionnaire of our research that was 360. All the variables included Digital Leadership, Project Performance, Digital leadership and Change management which were tested using a five-point Likert scale.

Mean and standard deviation are showing the core of the data set as they display the opinion of the participants regarding these specific variables. Mean of digital leadership is 4.21 along with standard deviation of .516. Mean of project performance is 4.61 with standard deviation of .682. The value of mean for digital transformation is 3.86 with standard deviation of . 592 and the mean value of change management is 3.98 with standard deviation of .474.

4.6 Correlation Analysis

The process of correlation analysis is used to understand the relationship between variables. The aim of this research is to undertake a correlation analysis to study the relationship between project performance and digital leadership with the mediating role of digital transformation and moderating role of change management. Studying the correlation between two variables proves if they move in a parallel direction. Compared to regression analysis that helps to find out the relationship between variables and only concentrates on the movement and course of the research variables. Common method of performing a correlation analysis is usually Pearson correlation analysis. There are two types of correlation, positive correlation known by (+) sign which depicts that the relationship between two variables is direct. The negative correlation known by (-) symbol which shows an inverse relationship between two variables. Pearson correlation analysis quantifies the magnitude along with the direction among two variables which ranges from -1 to +1. If the Pearson correlation coefficient deviates from 0 then it shows a strong relationship between two variables (either positive or negative). However, if the value of the coefficient is equal to 0 then it shows that there is no relationship among the two variables. Positive value of coefficient shows that the relationship between two variables is directly

proportional and increase effect in one variable will directly result in the increased effect of the other variable. However, a negative value of the coefficient means that the relationship between two variables is inversely proportional which will mean that increased effect in one variable will cause the other variable to have decreased effect and vice versa.

The correlation analysis of this study is shown below in Table 5.

Table 5

Correlation Analysis

Correlation Analysis				
	DL	**PP**	**CM**	**DT**
Digital Leadership	1	.115*	.081	.288**
Project Performance	.115*	1	.252**	.299**
Change Management	.081	.252**	1	.362**
Digital Transformation	.288*	.299**	.362**	1

Note. *P<0.05, **P<0.01, ***P<.0001 where value of N is equal to 360. The two ** show significance of the correlation at 2-tailed level and one * shows the significance of the correlation at 2-tailed 0.05 level.

Table 5 depicts the correlation analysis which tells us about the association between the variables listed above. Digital leadership and project performance have a correlation coefficient of 0.115 which shows that this is a weak but positive relationship. Thus, it suggests that different levels of digital leadership are connected with increase in project performance. The value of correlation coefficient between digital leadership and digital transformation is 0.288 which means the relationship is strong and positive. The coefficient between project performance with change management is 0.252 which means it is a weak moderate and positive relationship. These values show that the project performance will increase with effective change management and digital transformation incorporation. The coefficient value between change management and digital transformation is 0.362 which means it is a moderate and strong positive correlation. The coefficient value between project performance and digital transformation 0.299 which is a moderate positive relationship.

4.7 Regression Analysis

The correlation analysis was done to establish the presence of a connection between the variables present in this study. However, it only indicated the dependency without any further knowledge of causality, which is why it is necessary to run a regression analysis. Regression analysis will help us establish the dependency between variables. It will also help with establishing the level of dependency and independence between the variables present in this research. Regression analysis is the most efficient and reliable way to test the correlation and effect of one variable on another. The purpose of linear regression analysis is to test the relation between the dependent and independent variables which are present in this research. The linear regression is followed by a mediation and moderation regression analysis. This research is performing linear regression analysis using Andrew Hayes' method along with a mediation and moderation analysis. Mediation is performed using PROCESS Model 4 and moderation analysis was done with PROCESS Model 1. Regression analysis will give us crucial information about the relationship between the variables X (independent) and Y (dependent).

4.7.1 Linear Regression

Hypothesis 1: Digital Leadership has a positive effect on Project Performance

Table 6

Model summary of relation between Digital Leadership and Project Performance

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of Estimate**
1	.115[a]	.013	.011	.679

a. Predictors: (Constant), DL

The Coefficient of determination (R Square) showed that 13% of the variability in response variable (Project Performane) is explained by the independent variable (Digital Leadership) and the rest is due to some unknown factors which have not been included in the model.

Table 7

Anova test for relation between Digital Leadership and Project Performance

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.220	1	2.220	4.811	.029[b]
	Residual	165.233	358	.462		
	Total	167.4533	359			

a. Dependent Variable: Project performance (PP)

b. Predictors: (Constant), Digital Leadersip

Note. The ANOVA Table 7 showed that independent variable has statistically highly significant dependent variable (P-value<0.05).

Table 8

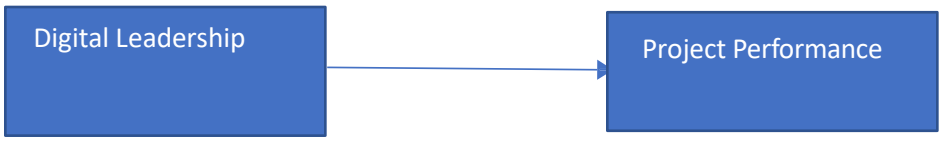
Results for coefficient between Digital Leadership and Project Performance

Coefficients[a]

Model		Unstandardized Coefficients		Standard Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.975	.252		13.483	.000
	DL	.152	.069	.115	2.193	.029

a. Dependent Variable: PP

Note. The coefficient Table 8 also presented that the individual effect of DL on PP is statistically highly significant (P-Value<0.001) by using t-test.



Hypothesis 2: Digital leadership has a positive impact on digital transformation

Table 9

Model summary for relation between Digital Leadership and Digital Transformation

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.288[a]	.083	.080	.45541

a. Predictors: (Constant), Digital Leadership (DL)

Note. Table 9 shows the description of model summary for the relationship among digital leadership and digital transformation, and the value shows that it is a positive significant effect.

Table 10

Anova test for relationship between Digital Leadership and Digital Transformation

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6.705	1	6.705	32.331	.000[b]
	Residual	74.248	358	.207		
	Total	80.953	359			

a. Dependent Variable: Digital Transformation (DT)

b. Predictors: (Constant), Digital Leadership (DL)

Note. Table 10 describes the Anova test for the relationship among digital transformation and digital leadership which suggests that there is a significant relationship among digital transformation and digital leadership.

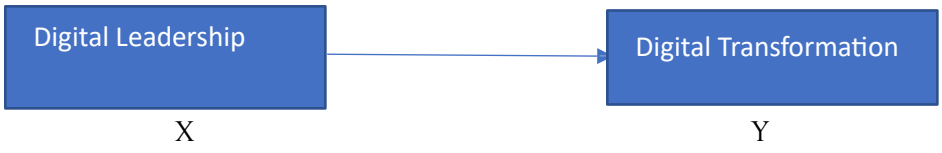
Table 11

Coefficients test for relation between Digital Leadership and Digital Transformation

Coefficients[a]						
Model		Unstandardized Coefficients		Standard Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.869	.198		14.516	.000
	DL	.265	.047	.288	5.686	.000

a. Dependent Variable: Digital Transformation (DT)

Note. Table 11 displays the correlation test among digital transformation and digital leadership. The value of Beta which is the standard coefficient measure, is .288 shows a positive significant relationship among the two variables.



Hypothesis 3: Digital transformation has a positive impact on project performance

Table 12

Model summary for relation between Digital Transformation and Project Performance

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.299[a]	.089	.087	.65270

a. Predictors: (Constant), Digital Transformation (DT)

Note. Table 12 shows the description of model summary for the relationship between digital transformation and project performance, and the value shows that it is a positive significant effect between the two variables.

Table 13

Anova test for relationship between Digital Transformation and Project Performance

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	14.940	1	14.940	35.068	.000[b]
	Residual	152.514	358	.426		
	Total	167.453	359			

a. Dependent Variable: Project Performance (PP)

b. Predictors: (Constant), Digital Transformation (DT)

Note. Table 13 describes the Anova test for the relationship among digital transformation and project performance which suggests that there is a significant relationship among digital transformation and project performance. The p value is 0.00 which is surely less than 0.05 shows that the relationship is definitely significant.

Table 14

Coefficients test for relation between Digital Transformation and Project Performance

Coefficients[a]

Model		Unstandardized Coefficients		Standard Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.906	.291		9.982	.000
	DT	.430	.073	.299	5.922	.000

a. Dependent Variable: Project Performance (PP)

Note. Table 14 displays the correlation test among digital transformation and project performance. The value of Beta which is the standard coefficient measure is .299 shows a positive significant relationship between project performance and digital transformation.

Hypothesis 4: Digital transformation mediates the relationship between digital leadership and project performance.

To analyze the effect of our mediator that is digital transformation, we are going to perform a mediation analysis. The successful outcomes gained though SPSS using model 4, it was safe to claim that hypothesis 4 received partial support. This analysis included researching the relationship between independent variable with the mediator and from the mediator with the dependent variable. This process is necessary in the testing of mediation analysis since it acts like a connection between the dependent variable and the dependent variable.

To study our mediation hypothesis, Model 4 was used by Hayes (2013). It is necessary to analyze the mediation effect path which is independent variable to mediator to dependent variable. The path is important because it will help us to find out the insignificance which would show if there was no mediation effect. Therefore, an extensive test is conducted for all paths. The outcomes of this test will show whether there was a mediation effect or not.

The mediation analysis is shown below in the table, the effect of digital transformation between digital leadership and project performance is the aim of this analysis.

Table 15
Mediation Analysis

	B	se	P	R^2
Mediator variable Model DT				.082
Constant	2.86	.1976	.0000	
DL	.2645	.0465	.0000	
Dependent Variable Model				.090
Constant	2.78	.3573	.0000	
DL	.0421	.0697	.5464	
DT	.4164	.0758	.0000	
	Effect	**se**	**LLCI**	**ULCI**
Indirect effect of DT on PP				
DT	.1101	.0604	.0210	.2529

Note. The table above presents the mediation analysis, with digital leadership as the mediator between digital transformation and project performance. In the mediation analysis, digital leadership predicts digital transformation with a value of .082. In the dependent variable model, we see that DT and DL are predicted with coefficients of .0421 and .4164, respectively.

Looking at the analysis interpreted above, H4 shows a direct impact of digital leadership on project performance reduces when digital transformation acts as a mediator. The outcomes show total impact of digital transformation on project performance is significant with β= .1101, p < .001. but, including digital transformation in the model, it is clear that the direct impact decreased β = .0421 and turned not significant with p= .090. This decrease added with the significant indirect impact, supports that digital transformation completely mediates the relationship.

4.7.2 Moderation Analysis

Hypothesis 5: Change management positively moderates the impact of digital leadership on project performance

The table below will represent the moderation analysis using Model 1 of Hayes method. The outcomes will help us understand the significant interaction between change management, digital leadership and project performance. The outcomes tells us a significant connection between project performance and (b=.3166, se=.0655, t=-4.831, p<.000). This result is representing change management significantly moderates digital leadership and project performance. This also depicts that change management maneuvers the strength on digital leadership to project performance.

Table 16
Moderation Analysis

Change Management	B	P	Se	LLCI	ULCI
Change management moderates the relationship between digital leadership and project performance.	-.3166	<.0000	.0655	-.4455	-.1877

4.8 Summary of Hypothesis

Sr. No	Hypothesis	Status
H1	Digital leadership has a positive influence on project performance	Supported
H2	Digital leadership has a positive impact on digital transformation	Supported
H3	Digital transformation has a positive impact on project performance	Supported
H4	Digital transformation mediates the relationship between digital leadership and project performance.	Supported
H5	Change management positively moderates the impact of digital leadership on project performance	Supported

CHAPTER 05
DISCUSSION AND CONCLUSION

There are two sections in this chapter. Each of these sections will address key elements of our research. In the first section, we will review in detail the discussions related to the formulated hypothesis, evaluating them in the context of theoretical frameworks. This section will address the conclusion whether to accept or reject the formulated hypothesis supported by measurable evidence and provide a detailed understanding of the findings. Additionally, we will examine the results in terms of theoretical contributions and practical applications, offering valuable insights for future practitioners.

The second section will address a crucial assessment of the study's limitations, acknowledging the constraints within which the research was conducted. This section will also provide potential paths for future researchers, identifying areas where further exploration can be conducted to provide a more detailed and better understanding of the study variables. This chapter will act as an overview of the findings, theoretical and applied outcomes, as well as the constraints and limitations for future research.

5.1 Discussion

The main objective of the current research was to analyze the relationship between project performance and digital leadership within the Tech industry, specifically in the context of our country, Pakistan. Furthermore, the research looked into the influence of digital transformation and change management on the relationship between project performance and digital leadership. The conceptual model explored the possible mediating role of digital leadership on the relation between project performance and digital leadership, and the moderating role of change management on the dependent and independent variables, especially in project-based organizations in the major cities of Pakistan. The conceptual framework development led to the formulation of an exceptional hypothesis highlighting the relationships between the research variables.

Utilizing data from project-based development sector organizations of Pakistan, the research findings assist the field of project management, which offers insights applicable to project teams seeking to improve effectiveness and better performance in their projects. The research presented five hypotheses, each supported by a mix of data-driven and relevant theories.

The outcomes of this research show that there is a positive significant effect of digital leadership on project performance. It can also be seen that digital leadership positively forecasts digital transformation ($\beta = .288$, $p < 0.001$; $R^2 = .083$). There is a significant indirect mediation effect of digital leadership on digital transformation and project performance. All hypotheses are discussed in detail below section by section to give an elaborate understanding of this research and its application.

5.1.1 Hypothesis 1: Digital Leadership has a Positive Effect on Project Performance

The result of our first hypothesis is strongly backed by an elaborate data collect and analysis. This process gave us R^2 = 13% which suggest that digital leadership have a strong positive link with project performance. This shows that digital leadership have a stronger impact through the process it structures work, team anatomy and set expectations (Pacheco et al., 2023). Project performance in this research is combined with delivery and result indicators, that is the single direct correlation coefficient with digital leadership. Reliability analysis of project performance is α = .783 shows the heterogeneity in the construct. The literature predicted exactly this that when project performance shows delivery and efficiency (Varajão et al., 2022). The result clearly shows that project performance is directly contributes by digital leadership.

5.1.2 Hypothesis 2: Digital Leadership has a Positive Impact on Digital Transformation

The outcomes of this hypothesis are also supported by an elaborate data collection and analysis that suggests that digital transformation is significantly predicted by digital leadership. Hypothesis 2 implied that there is a favorable relationship among the two digital leadership and digital transformation. This also signifies the incorporation of project performance as an important and significant impact on digital transformation. The outcomes of hypothesis 2 as we saw in the table that the R square was .083 meaning that the dependent variable is 8.3% effected by independent variable. The beta value was .265 which indicates that a change of one percent in digital leadership will change .265 percent of digital transformation. This also shows a positive relation between digital leadership and digital transformation. Digital transformation suggests that digital leadership should orchestrate cross-operational decisions to enhance their capabilities (Warner & Wäger, 2019). New competence strategies from mapping to ecosystem collaboration also places digital leadership as an encourager that defines digital initiatives into digital transformational practices (Schiuma, Santarsiero, Carlucci, & Jarrar, 2024).

5.1.3 Hypothesis 3: Digital transformation has a Positive Impact on Project Performance

This hypothesis tells us that digital transformation has a positive significant effect on project performance. The third hypothesis is supported by the elaborate data collected and regressive analysis performed on it. The outcomes of the hypothesis confirm that by (β=.299, t=5.19, p<.001). This means that the hypothesis aligns with the results and shows a significant positive impact of digital transformation on project performance.

Table 14 shows that model summary that includes the value of R square .89. This means that there will be a .089 positive impact of digital transformation on project performance. The beta value indicates that with every unit of change in digital transformation, there will be a .430 unit change in project performance.

5.1.4 Hypothesis 4: Digital Transformation Mediates the Relationship Between Digital Leadership and Project Performance

The second last hypothesis is to analyze the mediating effect of digital transformation on digital leadership and project performance. The fourth hypothesis indicates that digital transformation acts like a mediator which is tested through comprehensive data collection and analysis. To examine the impact regressively two mediation paths were analyzed. Independent variable to mediator and mediator to independent variable were investigated and the outcomes are highlighted in table 15.

The results in table 15 show the mediator model that digital transformation significantly predicts digital leadership (R^2=.082, p=.546), the constant, digital leadership and digital transformation are all significant predictors. Since, the value of p is greater than 0,it confirms that the mediation effect is significant and supports the fourth hypothesis.

5.1.5 Hypothesis 5: Change Management Positively Moderates the Impact of Digital Leadership on Project Performance

The last hypothesis of the research examines the moderating effect of change management on project performance and digital leadership. The fifth hypothesis indicates change management as a moderator that is investigated regressively with the data collected and analyzed. The effects were examined, and outcomes were highlighted in Table 16.

Table 16 shows a significant interaction between project performance and change management (b=.3166, se=.0655, t=4.831, p<.000). These outcomes conclude that the relationship between project performance and digital leadership weakens when change management comes into the picture. The level of ORIC (Shea, Jacobs, Esserman, Bruce, & Weiner, 2014) matches with the digital leadership and project performance because it varies within organizations. Change management might create a condition where leadership generates the ability to change only when there is an increase in readiness. Hence, this hypothesis is supported.

5.2 Research Limitations

Limitations are part of every research; this study is no exception. However, it is contributing valuable insights to academic and practical work in the industry but it has its challenges. Time and resource constraints have impacted the reach of this study and was not done more elaborately and comprehensive coverage of all factors in a single research.

When we consider the economic and market situation of IT field in the major cities of Pakistan and specially the twin cities, contacting organizations in person to clarify the purpose of this survey was one of the biggest challenges faced. Therefore, we decided to collect our data through online platforms such as Google docs which came along with its own limitations i.e. participants who filled out the form with random data effected the results of this research.

This research investigates empirically managing project performance on digital leadership with the mediating role of digital transformation and moderating role of change management. It mildly conditioned the research to certain aspects of change management in mediating the relationship between project performance and digital leadership, however digital transformation have a positive significant impact on digital leadership and project performance directly. There can be different moderating factors. This indicates that future studies can dive into other elements of change management in future including more compatible variables for a differnt moderation impact.

The time and resource limitations of this research also restricted us to gather data mostly form twin cities of Pakistan which is one more constraint of this research. Future fellow researchers can conduct this study from IT organizations which are geographically diverse. For future research, a bigger data set can be gathered to further generalize the results of this research. It was also due to the limitation of time that we choose convenience sampling and this sample size does not allow us to generalize the outcomes. The future fellow researchers can apply different sampling methods. This research only includes single questionnaire survey distributed once which has an impact on the causality among project performance and digital leadership. It is necessary to understand that this research was conducted within the IT sector of Pakistan, mainly from twin cities that are Rawalpindi and Islamabad.

5.3 Future Research Directions

Continuous innovation is necessary in any study; this research has uncovered paths for future fellow researchers into advanced avenues for studies. Numerous new elements can be investigated to enhance our knowledge in this industry of project management. However, this research aims to explore the effect of project performance on digital leadership with the mediating role of digital transformation and moderating role of change management. New researchers can explore about alternative techniques for a stronger moderation effect on the variables present in this study. New researchers can also explore different dimensions of change management and techniques with the IT industry in pursuit to better project performance.

Moreover, this research aims only on software and IT organizations in the twin cities, which uncovers the path to analyze the variables on a bigger scale with different cities and new geographic areas outside of Pakistan to extend and help in the knowledge of accomplishing better project performance in the IT industry (Skare et al., 2023). Furthermore, the examination on the mediating role of digital transformation allows for new researchers to involve different dimensions and techniques of digital innovation or to investigate the outcomes new incorporating a new mediator (Warner & Wäger, 2019; Sousa-Zomer, Neely, & Martinez, 2020). The incorporation of a new mediator can further advance our knowledge of the relationship between project performance and digital leadership, by analyzing different factors that can effect and contribute further for a detailed analysis.

To generalize the outcomes of this current research, it is highly recommended to further analyze comprehensive data collection and methods. To conclude, this current research with its inherent range of improvement has paved the path for future potential research plans which allows better opportunities for filtering and developing similar research.

5.4 Conclusion

The primary aim of this study was to investigate systematically the enhancement of project performance from digital leadership with the mediating role of digital leadership and moderating role of change management. Currently, modern world runs at a very fast pace with innovative environment combined with dynamic changes. This study focuses on improving project performance in the IT sector, incorporate digital leadership and digital transforming in achieving this goal. This analysis is particularly relatable as project management flourishes in Pakistan, particularly in IT industry where substantial numbers of regional and international projects and shareholders have been undermined for the past decade. This research uses a construct that introduces the mediating role of digital transformation and moderating role of change management in the relation between project performance and digital leadership. Data was gathered through online questionnaire survey distributed between different companies operating in Rawalpindi and Islamabad. The aim is to contribute to real world to proof of the impact of project performance on digital leadership.

In the IT field, project managers and leads hold a vital position, accountable for the timely delivery of projects, managing project expectations, performance, and failure. This research aims to help project managers and leads enhance their adaptability to digital leadership, ultimately improving the path to better project performance in the IT field. This research offers valuable academic and practical insights for project teams to move closer to better project performance. Statistical analyses were performed to ensure the validity and reliability of the variables being used in the study model. The study was guided by five hypotheses that provided a thorough investigation of the relationship between project performance and digital leadership.

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