

# RECONCEPTUALIZING AGILE PROJECT MANAGEMENT AS A DYNAMIC CAPABILITY: THE ROLE OF CONTEXTUAL AGILITY AND PROJECT COMPLEXITY IN CONSTRUCTION PROJECT SUCCESS

## *RECONCEITUALIZANDO A GESTÃO ÁGIL DE PROJETOS COMO UMA CAPACIDADE DINÂMICA: O PAPEL DA AGILIDADE CONTEXTUAL E DA COMPLEXIDADE DO PROJETO NO SUCESSO DE PROJETOS DE CONSTRUÇÃO*

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### **Abstract**

Grounded in Dynamic Capabilities Theory (DCT), this study reconceptualizes agility as a strategic organizational capability that enables project-based firms to sense environmental changes, seize emerging opportunities, and reconfigure operational processes. Survey data from 389 construction professionals in Pakistan were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the effects of eight agile strategies on a

### **Resumo**

Com base na Teoria das Capacidades Dinâmicas (DCT), este estudo reconceitua a agilidade como uma capacidade organizacional estratégica que permite às empresas baseadas em projetos perceber mudanças ambientais, aproveitar oportunidades emergentes e reconfigurar processos operacionais. Os dados de uma pesquisa com 389 profissionais da construção civil no Paquistão foram analisados usando a Modelagem de Equações Estruturais de Mínimos



higher-order construct, Contextual Agility, and its subsequent influence on multidimensional Project Success, while accounting for the moderating role of Project Complexity. The findings demonstrate that Contextual Agility significantly mediates the relationship between agile strategies and project success, with stakeholder involvement, risk management, and change management emerging as the most influential dimensions. Moreover, project complexity strengthens the impact of stakeholder involvement on project success, underscoring its critical importance in complex project environments. This study contributes theoretically by integrating APM within DCT, offering a validated framework that positions agility as a dynamic capability within construction project management.

**Keywords:** Agile project management. Construction industry. Dynamic capabilities theory. Project success. Contextual agility. Project complexity.

Quadrados Parciais (PLS-SEM) para examinar os efeitos de oito estratégias ágeis em um constructo de ordem superior, a Agilidade Contextual, e sua influência subsequente no Sucesso do Projeto multidimensional, levando em consideração o papel moderador da Complexidade do Projeto. Os resultados demonstram que a Agilidade Contextual medeia significativamente a relação entre estratégias ágeis e sucesso do projeto, com o envolvimento das partes interessadas, a gestão de riscos e a gestão de mudanças emergindo como as dimensões mais influentes. Além disso, a complexidade do projeto reforça o impacto do envolvimento das partes interessadas no sucesso do projeto, ressaltando sua importância crítica em ambientes de projetos complexos. Este estudo contribui teoricamente ao integrar a APM à DCT, oferecendo uma estrutura validada que posiciona a agilidade como uma capacidade dinâmica dentro da gestão de projetos de construção.

**Palavras-chave:** Gestão ágil de projetos. Indústria da construção. Teoria das capacidades dinâmicas. Sucesso do projeto. Agilidade contextual. Complexidade do projeto

## 1 INTRODUCTION

The global construction industry is undergoing a profound transformation amid escalating uncertainty, driven by supply chain disruptions, regulatory volatility, client-driven customization, sustainability mandates, and rapid technological advancements. These interrelated pressures increasingly challenge the traditional dominance of rigid, linear, and sequential project management paradigms that prioritize control, predictability, and standardization over adaptability and responsiveness. Conventional project management approaches, particularly those rooted in the waterfall model, have proven increasingly inadequate in managing the complexity, dynamism, and ambiguity inherent in contemporary construction projects (Bastos *et al.*, 2025. Lepinoy *et al.*, 2022). As a result, the industry continues to experience chronic inefficiencies manifested in persistent schedule delays, cost overruns, scope creep, compromised quality, and growing stakeholder dissatisfaction (Rehman *et al.*, 2020).

These challenges are especially pronounced in emerging economies such as Pakistan, where structural, institutional, and contextual constraints further compound project delivery difficulties. The Pakistani construction sector operates within fragmented communication networks, inconsistent regulatory enforcement, limited technological infrastructure, constrained financial systems, and entrenched bureaucratic hierarchies (Akram *et al.*, 2023). Together, these conditions restrict information flow, delay decision-making, inhibit collaboration, and heighten uncertainty across project lifecycles. Consequently, project teams struggle to respond effectively to dynamic environmental demands, leading to recurring project failures, weakened client trust, and compromised industry credibility. Despite the sector's strategic importance for national economic development, infrastructure modernization, and employment generation, the persistence of these systemic inefficiencies indicates a fundamental misalignment between prevailing project management practices and the evolving complexity of construction environments in emerging markets.

In response to these challenges, Agile Project Management (APM) has emerged as a potentially transformative framework. Originally developed within the software development domain, APM emphasizes iterative delivery, adaptive planning, cross-functional collaboration, continuous stakeholder engagement, and rapid responsiveness to change (Dugbartey & Kehinde, 2025). Unlike traditional plan-driven methodologies, agile approaches privilege flexibility, learning, and decentralized decision-making, enabling project teams to manage uncertainty and complexity more effectively. Over the past decade, agile principles have increasingly been explored across diverse industries, including manufacturing, healthcare, education, and logistics, demonstrating promising improvements in productivity, innovation, quality, and stakeholder satisfaction.

However, despite its theoretical relevance and demonstrated benefits, the adoption of agile principles within the construction sector remains limited, fragmented, and uneven (Moreno *et al.*, 2024). Construction projects are traditionally characterized by rigid contractual structures, sequential task dependencies, heavy regulatory oversight, and deeply embedded professional norms that emphasize predictability, risk minimization, and hierarchical authority. These institutionalized practices create significant resistance to agile transformation, particularly in contexts where power distance is high and organizational cultures are predominantly control-oriented (Lepinoy *et al.*, 2022).

Papadopoulos *et al.*, 2016). Consequently, while isolated agile practices—such as collaborative planning sessions, incremental scheduling, or visual management tools—have been selectively implemented, comprehensive agile frameworks remain largely absent from mainstream construction project governance, particularly in emerging economies.

Recent advances in project management research increasingly conceptualize organizational agility as a dynamic capability rather than a mere collection of tools, techniques, or managerial practices. Grounded in Dynamic Capabilities Theory (DCT), organizational agility is defined as a higher-order capability that enables firms to sense environmental changes, seize emerging opportunities, and reconfigure internal and external resources to sustain competitive advantage under conditions of uncertainty (Gong & Ribiere, 2025. Tariq *et al.*, 2024). From this perspective, agility transcends operational flexibility and encompasses strategic responsiveness, organizational learning, leadership adaptability, and continuous capability renewal. DCT thus offers a powerful theoretical lens for understanding how agile strategies can be embedded within organizational routines and structures to produce sustained performance outcomes.

Despite the growing scholarly consensus regarding agility as a dynamic capability, its conceptual integration within construction project management literature remains underdeveloped (Bechtel *et al.*, 2023). Existing studies predominantly treat agile practices as discrete operational techniques rather than as interdependent strategic capabilities embedded within organizational systems (Magistretti & Trabucchi, 2025. Pacheco-Cubillos *et al.*, 2024). Moreover, empirical investigations into agility in construction contexts often adopt fragmented conceptualizations, focusing on isolated dimensions such as team collaboration, lean principles, or digital tools, without adequately capturing the holistic, systemic, and capability-based nature of agility. As a result, current scholarship lacks an integrative framework that explains how multiple agile strategies collectively interact to generate contextual agility and, in turn, enhance project performance outcomes.

Furthermore, the overwhelming majority of empirical research examining agile practices in construction has been conducted within developed economies, where institutional environments, technological maturity, regulatory systems, and organizational cultures significantly differ from those prevailing in emerging markets

(Badran & Abdallah, 2025). The direct transplantation of agile frameworks developed in Western contexts into emerging economies without theoretical adaptation or empirical validation risks producing contextually misaligned insights. Developing countries present distinct institutional, cultural, regulatory, and technological configurations that fundamentally shape project dynamics, managerial behaviors, and stakeholder relationships (Obeidat & Hatamleh, 2026). However, systematic empirical evidence examining how agile strategies function within such environments remains remarkably scarce (Akbar *et al.*, 2023. Fissalma *et al.*, 2025). This geographical and contextual imbalance represents a critical gap in the global project management literature, limiting both theoretical generalizability and practical relevance.

In light of these limitations, a comprehensive research gap emerges. First, there is a lack of integrative theoretical models that conceptualize agile strategies as dynamic capabilities embedded within organizational contexts. Second, there is insufficient empirical evidence from emerging economies examining how agile strategies function under conditions of institutional uncertainty, regulatory fragmentation, and infrastructural constraints. Addressing these gaps, the present research reinterprets agile strategies through the lens of Dynamic Capabilities Theory (DCT), proposing that agile strategies collectively cultivate Contextual Agility, a higher-order dynamic capability, that enables construction firms to adapt, learn, and reconfigure resources in response to environmental turbulence.

## **2 LITERATURE REVIEW**

### **2.1 Agile project management: from methodology to capability**

The Agile Manifesto (Beck *et al.*, 2001) contributed to a transition from a predictive, plan-oriented approach to a more adaptive and value-focused execution strategy. Agile Project Management (APM) focuses on brief feedback loops, incremental outputs, and cooperative engagement among all stakeholders. Originally limited to software industry, APM has expanded into sectors such as manufacturing, healthcare, education, and, more recently, the construction industry (Conforto *et al.*, 2016. Li, 2025). Empirical research indicates that agility improves responsiveness and aligns stakeholders

effectively in uncertain circumstances (Gemino *et al.*, 2021). Various studies that came before this one look at APM as a set of tools instead of a system of capabilities. Recent academic contributions (e.g., Conforto & Amaral, 2016. Gong & Ribiere, 2025) indicate that project agility could serve as a fundamental element of dynamic capabilities, allowing project-based organizations to refresh routines and modify governance structures. This theoretical evolution positions APM as a mechanism by which firms implement the sensing, seizing, and transforming aspects of DCT (Dugbartey & Kehinde, 2025. Teece, 2018).

## **2.2 Dynamic capabilities theory and contextual agility**

The Dynamic Capabilities Theory (DCT), as proposed by Teece *et al.* (1997), suggests that the sustained success of firms hinges on their capacity to integrate, develop, and reorganize both internal and external competencies in response to swiftly evolving environments. DCT distinguishes between standard capabilities that maintain operational efficiency and dynamic capabilities that facilitate strategic renewal and innovation (Larabi, 2025).

In project-based environments, agility can be viewed as a contextual dynamic capability that helps organizations adapt to environmental change by recognizing opportunities and adjusting project processes. In the realm of construction, contextual agility is evident through various mechanisms, including flexible design iterations, decentralized decision-making authority, and adaptive management of stakeholders (Davies & Brady, 2016. Sun *et al.*, 2024). These mechanisms promote adaptability while ensuring oversight in high-stakes, capital-heavy initiatives. This comprehensive perspective connects APM and DCT, framing agility not just as operational flexibility but as a process of organizational learning that is deeply embedded within project ecosystems.

## **2.3 The moderating role of project complexity**

Project Complexity (PC) serves as a significant contextual element within the construction domain, stemming from various influences including technological innovation, the diversity of stakeholders, and regulatory limitations (Ghaleb *et al.*, 2022.

Lafhaj *et al.*, 2024). Complexity increases unpredictability, information processing needs, and coordination issues. From the dynamic capability theory point of view, the effectiveness of dynamic capabilities such as agility may depend on specific environmental conditions. Although agility is seen to be advantageous in complex environments, the relative significance of certain agile strategies may change. For example, engaging stakeholders may become increasingly essential in complex projects to deal with interdependencies and ensure alignment (Müller, 2019). This research suggests that Project Complexity influences the relationships among agile strategies and the development of Contextual Agility.

#### **2.4 Agile practices in construction: challenges and gaps**

The translation of agile concepts into the construction sector has presented significant challenges. The fragmented supply chains within the sector, along with contract-based governance and hierarchical labor structures, frequently hinder rapid iteration and decision-making autonomy (Elseknidy *et al.*, 2024). Research conducted in developing contexts (Gul, 2021. Rehman *et al.*, 2020) indicates that although agile tools like stand-ups, sprints, and visual workflows are somewhat implemented, the essential cultural and structural supports necessary for true agility are often lacking.

Recent empirical investigations have delved into hybrid frameworks, including Agile-Lean Construction and Integrated Project Delivery (IPD), aiming to harmonize agility with the construction industry's requirements for coordination and compliance (Özener & Büyüktopcu, 2025. Thibodeau *et al.*, 2019). Nevertheless, there is a scarcity of research that breaks down the particular agile strategies that most effectively contribute to project success, models their combined impact on dynamic capabilities, or investigates how project-level factors such as complexity influence this relationship.

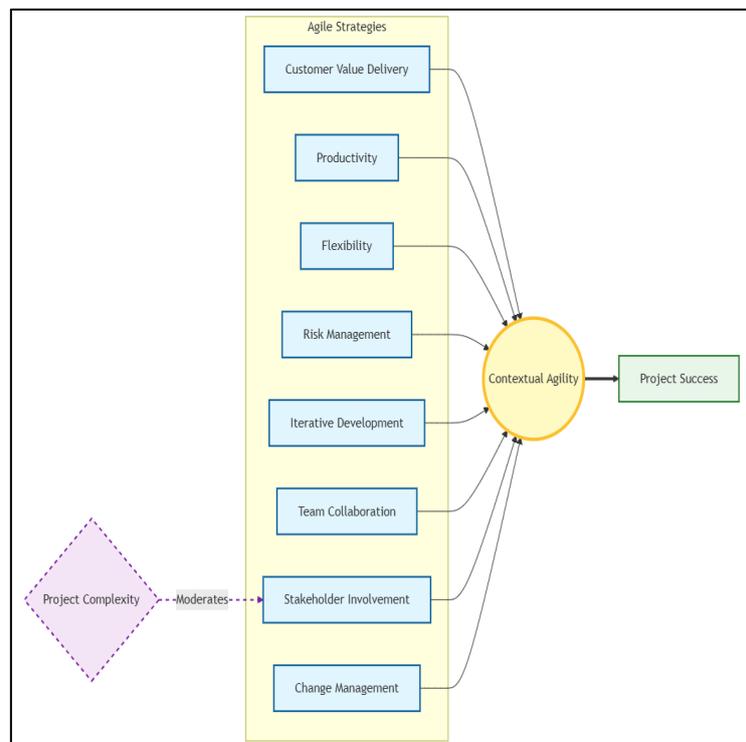
### 3 CONCEPTUAL MODEL AND HYPOTHESES

#### 3.1 Conceptual model

Building on Dynamic Capabilities Theory (DCT), this study conceptualizes Contextual Agility (CA) as a project-level dynamic capability. It is modeled as a second-order formative construct comprised of eight inter-related first-order agile strategy constructs including (i) customer Value Delivery (CVD), (ii) productivity (PRD), (iii) flexibility (FLX), (iv) risk management (RM), (v) Iterative Development (ID), (vi) team collaboration (TC) (vii) stakeholder involvement (SI) and (viii) Change Management (CM). These first-order reflective constructs are formatively combined to create the higher-order Contextual Agility capability, which is hypothesized to directly impact Project Success (PS). Furthermore, Project Complexity (PC) is hypothesized to moderate the direct effects of the agile strategies on PS. The research model is depicted in Figure 1.

**Figure 1**

*The Research Model*



### 3.2 Hypotheses

Main Effect Hypothesis:

H1: Contextual Agility has a significant positive effect on Project Success.

Moderation Hypotheses:

Project Complexity is expected to strengthen the positive relationships between agile strategies and project success, particularly for strategies related to external coordination and adaptation.

H2a–H2h: Project Complexity positively moderates the relationship between (a) CVD, (b) PRD, (c) FLX, (d) RM, (e) ID, (f) TC, (g) SI, (h) CM and Project Success.

## 4 METHODOLOGY

### 4.1 Research design

This research utilized a quantitative, cross-sectional survey methodology. Considering that data for all constructs were gathered from a single source, both procedural and statistical remedies were employed to mitigate the potential for common method bias (CMB), in accordance with established guidelines (Podsakoff *et al.*, 2003). In terms of procedure, we ensured respondent anonymity, maintained clarity and conciseness in item wording, and varied scale anchors to mitigate evaluation apprehension and consistency patterns. The questionnaire was organized into four sections covering respondent demographics, agile strategies, project success, and project complexity. Agile strategy items were developed through an extensive literature review, while project success and complexity measures were adapted from established scales by Khan *et al.*, (2013) and Lin *et al.*, (2023) respectively. All items were refined to ensure clarity and contextual relevance to the Pakistani construction industry. Using purposive sampling, 389 valid responses were obtained from Pakistani construction professionals (response rate 86.4%).

### 4.3 Data analysis

The analysis was conducted using a two-stage PLS-SEM approach as outlined by Hair *et al.*, (2021), employing SmartPLS 4 for the process. The initial phase assessed the reflective measurement model. The second stage involved an evaluation of the formative second-order Contextual Agility construct and an examination of the structural model, which included moderation analysis. A bootstrapping procedure involving 5,000 subsamples was employed for the purpose of significance testing.

#### Common Method Bias Assessment

The single-factor test proposed by Harman was employed as a diagnostic evaluation in a statistical context. The unrotated exploratory factor analysis indicated several factors with eigenvalues exceeding one, with the primary factor explaining 43.15% of the total variance, falling short of the widely recognized threshold of 50%. This outcome suggests that no individual factor significantly influences the covariance structure and implies that CMB is unlikely to constitute a substantial threat to the validity of the results. The comprehensive findings of the test are detailed in Table 1.

**Table 1**

*Harman's Single-factor Test Result*

Component	Eigenvalue	% of Variance	Cumulative %
1	25.46	43.15	43.15
2	2.98	5.05	48.20
3	2.09	3.55	51.75
4	1.88	3.18	54.93
5	1.73	2.93	57.86
Total (First 5 Factors)	—	—	57.86

## 5 RESULTS

### 5.1 Measurement Model Evaluation

All constructs demonstrated good reliability and convergent validity (Table 2). Cronbach's alpha ( $\alpha$ ) and Composite Reliability (CR) were  $> 0.70$ , and Average Variance Extracted (AVE) was  $> 0.50$  for all constructs. Discriminant validity was established via

the Fornell-Larcker criterion (Table 3) and Heterotrait-Monotrait ratio (HTMT < 0.90) (Table 4).

**Table 2**

*The Reliability and Convergent Validity of the Measurement Model*

Items	Outer loadings	VIF	Cronbach's alpha	CR	AVE
CM1	0.856	1.806	0.828	0.897	0.745
CM2	0.89	2.277			
CM3	0.843	1.836			
CVD1	0.801	1.988	0.884	0.915	0.683
CVD2	0.865	2.609			
CVD3	0.838	2.262			
CVD4	0.852	2.469			
CVD5	0.775	1.967			
Flex1	0.846	2.440	0.887	0.914	0.640
Flex2	0.792	1.913			
Flex3	0.773	1.953			
Flex4	0.803	2.031			
Flex5	0.803	2.157			
Flex6	0.779	2.039			
ID1	0.769	2.264	0.740	0.830	0.551
ID2	0.75	2.013			
ID3	0.779	1.692			
ID4	0.665	1.073			
PC_1	0.858	2.304	0.884	0.920	0.742
PC_2	0.858	2.356			
PC_3	0.846	2.215			
PC_4	0.884	2.480			
PS10	0.753	2.532	0.944	0.950	0.503
PS12	0.764	2.878			
PS13	0.524	1.439			
PS14	0.721	2.323			
PS15	0.754	2.637			
PS17	0.74	2.765			
PS18	0.764	2.634			
PS19	0.737	2.238			
PS21	0.644	2.353			
PS22	0.591	2.068			
PS23	0.688	2.11			
PS24	0.73	2.786			
PS25	0.727	2.617			
PS3	0.654	2.406			
PS4	0.658	2.112			
PS6	0.741	2.57			
PS7	0.774	3.046			
PS8	0.701	2.147			
PS9	0.759	2.981			
Prod1	0.801	1.821	0.842	0.894	0.678
Prod2	0.851	2.207			
Prod3	0.821	1.874			
Prod4	0.821	1.926			
RM1	0.74	1.886	0.900	0.923	0.667

RM2	0.82	2.571			
RM3	0.846	2.937			
RM4	0.876	3.132			
RM5	0.801	2.169			
RM6	0.811	2.251			
SI1	0.756	1.494	0.806	0.873	0.634
SI2	0.832	2.068			
SI3	0.832	1.979			
SI4	0.761	1.510			
TC1	0.837	1.949	0.832	0.888	0.664
TC2	0.832	1.959			
TC3	0.814	1.884			
TC4	0.775	1.735			

Note: CVD=Customer Value Delivery. PRD=Productivity. FLX=Flexibility. RM=Risk Management. ID=Iterative Development. TC=Team Collaboration. SI=Stakeholder Involvement. CM=Change Management. PC=Project Complexity. PS=Project Success.

**Table 3**

*Fornell and Larcker criterion Results*

	CM	CVD	Flex	ID	PC	PS	Prd	RM	SI	TC
CM	0.863									
CVD	0.544	0.827								
Flex	0.613	0.671	0.800							
ID	0.527	0.485	0.514	0.742						
PC	0.728	0.613	0.675	0.522	0.861					
PS	0.721	0.697	0.747	0.626	0.715	0.709				
Prod	0.595	0.718	0.679	0.492	0.635	0.716	0.824			
RM	0.657	0.605	0.746	0.536	0.646	0.783	0.630	0.817		
SI	0.548	0.512	0.554	0.428	0.579	0.678	0.514	0.567	0.796	
TC	0.633	0.580	0.662	0.611	0.725	0.699	0.587	0.683	0.565	0.815

Note: square root of AVE is shown on the diagonal of the matrix in bold. Customer value Delivery = CVD. Risk Management = RM. Team Collaboration = TC. Iterative Development = ID. Stakeholder Involvement = SI. Change Management = CM. Project Complexity = PC. Project Success = PS. Productivity. Flexibility, , Prod = Productivity, Flex = Flexibility

**Table 4**

*Hetrotrait-Monotrait Criterion Results*

	CM	CVD	Flex	ID	PC	PS	Prod	RM	SI	TC
CM										
CVD	0.632									
Flex	0.712	0.754								
ID	0.618	0.545	0.560							
PC	0.843	0.691	0.757	0.579						
PS	0.810	0.755	0.810	0.695	0.774					
Prod	0.710	0.831	0.781	0.562	0.733	0.795				
RM	0.759	0.677	0.837	0.592	0.720	0.845	0.723			
SI	0.669	0.604	0.650	0.507	0.684	0.772	0.621	0.665		
TC	0.756	0.677	0.770	0.691	0.848	0.783	0.698	0.787	0.689	

The foundational second-order Contextual Agility (CA) construct has been validated. All first-order constructs, except for Team Collaboration (TC), exhibited significant outer weights (p < 0.05), thereby affirming their importance in the development of the capability (Table 5, Stage 1). The Variance Inflation

Factor (VIF) values were less than 3.3, there was no critical multicollinearity. The model demonstrated acceptable fit with the data (Standardized Root Mean Square Residual, SRMR = 0.079) (Hu & Bentler, 1999).

**Table 5**

*Evaluation of the Formative Second-Order Construct (CA) and Structural Model*

Analysis Stage	Path / Indicator	$\beta$ / Weight	t-value	p-value	VIF	Result
Stage 1: Formative Weights (CA)	CVD → CA	0.127	2.91	0.004	1.82	Significant
	PRD → CA	0.111	2.80	0.005	1.75	Significant
	FLX → CA	0.116	1.97	0.049	2.01	Significant
	RM → CA	0.186	3.51	0.000	2.34	Significant
	ID → CA	0.113	2.66	0.008	1.58	Significant
	TC → CA	0.033	0.65	0.516	1.71	Not Significant
	SI → CA	0.175	3.52	0.000	2.45	Significant
	CM → CA	0.161	3.75	0.000	2.22	Significant
Stage 2: Structural Path	CA → PS	0.823	28.45	0.000	–	H1 Supported
Stage 3: Direct Effects	CVD → PS	0.127	2.91	0.004	2.67	Significant*
	PRD → PS	0.111	2.80	0.005	2.68	Significant*
	FLX → PS	0.116	1.97	0.049	3.25	Significant*
	RM → PS	0.186	3.51	0.000	3.25	Significant*
	ID → PS	0.113	2.66	0.008	1.79	Significant*
	SI → PS	0.175	3.52	0.000	1.86	Significant*
	CM → PS	0.161	3.75	0.000	2.68	Significant*
	TC → PS	0.033	0.65	0.517	3.30	Not Significant
	PC → PS	0.051	0.93	0.350	3.30	Not Significant

While the formative weight of Team Collaboration (TC) did not reach statistical significance, the construct remains included in the model. In alignment with the principles of formative measurement, it is permissible to retain indicators that are underpinned by robust theoretical justification, even if their statistical contribution is minimal. Collaboration within teams is a fundamental aspect of agile philosophy and is conceptually vital for encompassing the entire scope of Contextual Agility.

**5.2 Structural model and hypotheses testing**

The relationship between Contextual Agility and Project Success was found to be highly significant ( $\beta = 0.823$ ,  $p < 0.001$ ), offering robust evidence in favor of H1. The model accounts for 82.3% ( $R^2 = 0.823$ ) of the variance in Project Success, demonstrating remarkable explanatory capability. The effect sizes ( $f^2$ ) for the notable agile strategies varied from medium to large. The model demonstrated high predictive relevance, with a  $Q^2_{predict}$  value of 0.79 for Project Success, well above the threshold of 0, indicating strong out-of-sample predictive power.

### 5.3 Moderation analysis (H2a-H2h)

The analysis revealed that Project Complexity had a positive and significant moderating effect solely on the relationship between Stakeholder Involvement and Project Success ( $\beta = 0.198$ ,  $p = 0.001$ . see Table 6), thereby offering support for H2g. This interaction suggests that the positive impact of Stakeholder Involvement on Project Success is enhanced in projects regarded as particularly complex. No notable moderating effects were identified for the other relationships. consequently, H2a–H2f and H2h did not receive support.

**Table 6**

*Moderating Effects of Project Complexity (PC)*

Interaction Term	$\beta$	t-value	p-value	95% Confidence Interval	Result
PC $\times$ CVD $\rightarrow$ PS	-0.017	0.301	0.764	[-0.120, 0.099]	Rejected (H2a)
PC $\times$ PRD $\rightarrow$ PS	-0.061	1.242	0.214	[-0.152, 0.041]	Rejected (H2b)
PC $\times$ FLX $\rightarrow$ PS	-0.056	0.785	0.433	[-0.198, 0.084]	Rejected (H2c)
PC $\times$ RM $\rightarrow$ PS	0.087	1.306	0.192	[-0.050, 0.216]	Rejected (H2d)
PC $\times$ TC $\rightarrow$ PS	-0.033	0.631	0.528	[-0.127, 0.081]	Rejected (H2e)
PC $\times$ SI $\rightarrow$ PS	0.198	3.351	0.001	[0.066, 0.299]	Supported (H2g)
PC $\times$ CM $\rightarrow$ PS	-0.074	1.854	0.064	[-0.147, 0.009]	Rejected (H2h)
PC $\times$ ID $\rightarrow$ PS	-0.025	0.493	0.622	[-0.141, 0.066]	Rejected (H2f)

## 6 DISCUSSION

The findings offer robust empirical evidence for the suggested capability-oriented framework of agility within project-based settings. The findings indicate that distinct agile strategies serve as foundational elements that, when combined, create a more comprehensive Contextual Agility capability, which significantly impacts Project Success. These results are interpreted in light of project complexity, the contextual reality of the construction industry, and Dynamic Capabilities Theory in the discussion that follows.

The results strongly support the central argument: agile strategies in construction collectively form a superior Contextual Agility capability, which serves as a key factor in achieving project success. The considerable explanatory power highlights the effectiveness of this capability-based perspective. The formative weights indicate that

Stakeholder Involvement (SI), Risk Management (RM), and Change Management (CM) (Akbar *et al.*, 2021. Mansoor *et al.*, 2023) are the primary factors contributing to this capability. This triad aligns seamlessly with the DCT framework (Sun *et al.*, 2024) that SI for perceiving evolving demands, RM for capitalizing on opportunities while addressing threats, and CM for restructuring processes. The finding regarding the non-significant role of Team Collaboration (TC) in the development of Contextual Agility is both critical and rich in context. This illustrates the limiting influence of elevated power-distance and hierarchical frameworks commonly found in Pakistan's construction industry (Masood *et al.*, 2025. Rasheed *et al.*, 2025). This indicates that in such cultures, the collaborative concept of agility must be intentionally structured through formal integration roles and leadership, rather than presumed to arise spontaneously from self-organizing teams (Tuczek *et al.*, 2022).

The notable positive moderation effect identified for Stakeholder Involvement represents an important contribution. It implies that complex projects have the significance of identifying and coordinating with stakeholders is not constant but rather increases consistent with prior studies (Ali & Haapasalo, 2023. Siems *et al.*, 2023). Proactive stakeholder engagement becomes a crucial strategy for lowering uncertainty, gaining support, and resolving emerging difficulties in complex systems with many interdependent parties and unclear needs (Iandolo *et al.*, 2025. Müller, 2019). The resultant finding is consistent with and expands upon contingency theory within the realm of project management (Patanakul, 2023). The lack of significant moderating effects noted for the other agile strategies indicates that their impact on Project Success might remain consistent regardless of varying levels of project complexity. This suggests that although these strategies enhance performance, their effectiveness may not solely rely on complexity conditions and could be influenced by other contextual or organizational factors that are not explicitly addressed in the current model.

## 6.1 Theoretica implications

This study makes several important theoretical contributions to the literature on project management, agility, and dynamic capabilities. First, it advances theory by developing and empirically validating an integrated Agile Project Management–Dynamic

Capabilities Theory (APM–DCT) framework, which reconceptualizes agile practices as foundational components of a project-level dynamic capability, termed Contextual Agility. In contrast to prevailing studies that primarily conceptualize agility as a collection of managerial tools, procedural routines, or operational techniques, the present research demonstrates that agile strategies collectively function as a higher-order capability that enables organizations to sense, adapt, and reconfigure project processes in response to environmental turbulence. Second, the study contributes a comprehensive, multidimensional perspective on agility by empirically operationalizing Contextual Agility as a second-order formative construct composed of Stakeholder Involvement, Risk Management, Change Management, and Team Collaboration (Makhijaa & Akbarb, 2019). Linking rewards and creative performance: Mediating role of intrinsic and extrinsic motivation and moderating role of rewards attractiveness. *International Journal of Innovation, Creativity, and Change*, 8(12), 36-51.. Third, the study enriches contingency-based perspectives in project management by empirically demonstrating the moderating role of Project Complexity. The results reveal that the effectiveness of certain agile strategies, particularly Stakeholder Involvement, is contingent upon the level of project complexity, thereby identifying complexity as a critical boundary condition shaping agility–performance relationships. This finding deepens the application of Dynamic Capabilities Theory within project environments by highlighting that adaptive capabilities do not yield uniform performance outcomes across all contexts. Instead, their effectiveness is shaped by situational demands and environmental uncertainty. By integrating complexity into the agility-performance framework, this research advances a more refined theoretical understanding of when and how agile strategies create value, thereby addressing longstanding debates regarding the contextual limits of agile applicability in construction projects.

## 6.2 Managerial implications

The findings of this study offer several important managerial insights for construction organizations operating in uncertain, dynamic, and complex environments, particularly within emerging economies. Foremost, the results underscore the strategic necessity of cultivating Contextual Agility as a core organizational capability rather than

treating agility as a set of isolated project management techniques. Managers should therefore prioritize the systematic development of competencies in Stakeholder Involvement, Risk Management, and Change Management, as these elements constitute the foundational pillars of contextual agility.

The findings further suggest that Team Collaboration may not emerge organically within hierarchical and high power-distance cultural contexts. Consequently, managers should adopt hybrid governance approaches that leverage formal authority structures to institutionalize collaboration across functional and organizational boundaries. This may involve clearly defined cross-functional roles, formal coordination protocols, and leadership-driven integration mechanisms that promote collective accountability. By embedding collaborative practices within formal project governance systems, managers can overcome cultural and institutional barriers that constrain spontaneous teamwork, thereby fostering more effective coordination and knowledge sharing.

### **6.3 Limitations and future research directions**

Despite its theoretical and empirical contributions, this study is subject to several limitations that warrant careful consideration and provide fertile ground for future research. First, the study employs a cross-sectional research design, which restricts the ability to capture the dynamic and evolving nature of agility and its impact on project outcomes over time. Agility, particularly when conceptualized as a dynamic capability, is inherently temporal, involving continuous sensing, adaptation, and reconfiguration processes. Future studies could adopt longitudinal research designs to explore how Contextual Agility develops across different project phases and how its influence on Project Success evolves throughout the project life cycle. Second, the empirical context of the study is limited to the construction sector in Pakistan. While this context offers a valuable lens for examining agility within emerging economies characterized by institutional volatility, infrastructural constraints, and hierarchical organizational cultures, it may limit the generalizability of the findings to other national, cultural, or industrial contexts. Future research could extend the proposed framework to other emerging and developed economies, enabling cross-cultural and cross-sectoral comparisons. Third, the study relies primarily on perceptual, self-reported data collected

through structured questionnaires, which may introduce potential concerns related to common method variance and response bias. Although procedural and statistical remedies were employed to mitigate these effects, future research could incorporate objective performance indicators, archival project data, and multi-source assessments to triangulate findings and strengthen empirical robustness. Fourth, while the study models Contextual Agility as a second-order formative construct comprising Stakeholder Involvement, Risk Management, Change Management, and Team Collaboration, future research could explore alternative conceptualizations or refined measurement models.

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### **Authors' Contribution**

All authors contributed equally to the development of this article.

### **Data availability**

All datasets relevant to this study's findings are fully available within the article.

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