CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY, ISLAMABAD

Impact of Team Resilience on Project Success with Mediating Role of Agile Response to Change and Moderating Role of Project Complexity

by

Maira Afzaal

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

in the

Faculty of Management & Social Sciences

Department of Management Sciences

2023

I want to dedicate this achievement my parents, teachers and friends who always encourage and support me in every crucial time.

CERTIFICATE OF APPROVAL

Impact of Team Resilience on Project Success with Mediating Role of Agile Response to Change and Moderating Role of Project Complexity

by

Maira Afzaal

Registration No: (MPM203048)

THESIS EXAMINING COMMITTEE

S. No.	Examiner	Name	Organization
(a)	External Examiner	Dr. Muhammad Sarmad	RIU, Islamabad
(b)	Internal Examiner	Dr. Mudassar Ali	CUST, Islamabad
(c)	Supervisor	Mr. Muhammad Irfan Mustafa	CUST, Islamabad

_____

Mr. Muhammad Irfan Mustafa
Thesis Supervisor
April, 2023

_____   _____

Dr. Lakhi Muhammad   Dr. Arshad Hassan
Head   Dean
Dept. of Management Sciences   Faculty of Management & Social Sciences
April, 2023   April, 2023

Author's Declaration

I, **Maira Afzaal,** hereby state that my MS thesis titled "**Impact of Team Resilience on Project Success with Mediating Role of Agile Response to Change and Moderating Role of Project Complexity**" is my own work and has not been submitted previously by me for taking any degree from Capital University of Science and Technology, Islamabad or anywhere else in the country/abroad.

At any time if my statement is found to be incorrect even after my graduation, the University has the right to withdraw my MS Degree.

(Maira Afzaal)

Registration No: (MPM203048)

Plagiarism Undertaking

I solemnly declare that research work presented in this thesis titled "**Impact of Team Resilience on Project Success with Mediating Role of Agile Response to Change and Moderating Role of Project Complexity**" is exclusively my research work with no remarkable contribution from any other individual. Small contribution/help wherever taken has been dully acknowledged and that complete thesis has been written by me.

I understand the zero tolerance policy of the Higher Education Commission and Capital University of Science and Technology towards plagiarism. Therefore, I as an author of the above-titled thesis declare that no part of my thesis has been plagiarized and any material used as reference is properly cited.

I undertake that if I am found guilty of any formal plagiarism in the above titled thesis even after award of MS Degree, the University reserves the right to withdraw/revoke my MS degree and that HEC and the University have the right to publish my name on the HEC/University website on which names of students are placed who submitted plagiarized work.

(Maira Afzaal)

Registration No: (MPM203048)

Acknowledgement

In the Name of **Allah**, the Most Gracious, the Most Merciful. Praise is to God, the Cherisher and Sustainer of the worlds. All thanks to **Almighty Allah**, The Lord of all that exist, who bestowed me with His greatest blessing i.e. knowledge and Wisdom to accomplish my task successfully.

Thousands of salutations and benedictions to the **Holy Prophet Hazrat Muhammad (PBUH)** the chosen-through by whom grace the sacred Quran was descended from the Most High. I am very thankful to **Mr. Muhammad Irfan Mustafa**, a great teacher, mentor and supervisor who made a difference in all aspect of my life. I am indebted to **Mr. Muhammad Irfan Mustafa** for his valuable guidance, encouragement and dedicated support that enabled me to complete my MS Degree Program.

I want to express my heartiest regards to my parents who always supported me morally, spiritually & prayed for my success.

Maira Afzaal

Abstract

This study aims to analyze the effect of team resilience on the project success. Moreover, this research also explores the mediating role of agile response to change and the moderating role of project complexity. Convenience sampling method was used to conduct the survey. Data was collected from 387 project team members working in IT Companies. Quantitative research was conducted. Questionnaires survey method was used, and the responses were from IT Companies. PROCESS Macro by Andrew F. Hayes 2021 was used in SPSS for analysis of data. Descriptive statistics test, correlation, mediation and moderation tests were run for the analysis of the data. Results of the study demonstrated that agile response to change is a significant mediator between team resilience and project success, while project complexity was found insignificant as a moderator. There are limitations that are discussed. Future research should consider time-lag studies with large sample size.

Keywords: Team Resilience, Project Success, Agile Response to Change, Project Complexity.

Contents

List of Figures

List of Tables

Abbreviations

ARC   Agile Response to Change

PC   Project Complexity

PS   Project Success

SPS   Statistical Package for Social Science

TR   Team Resilience

Chapter 1

Introduction

1.1 Theoretical Background

A project team is a group of people tasked with the responsibility of completing difficult tasks within a specified time frame (Cohen, Bailey, & E, 1997). They are comprised of individuals who complement one another's abilities, originate from diverse fields of study and/or functional divisions, and form a group solely for the intent of successfully finishing the project (Buvik & Rolfsen, 2015). Teams assigned to projects operate in an extremely difficult environment. Individuals have always been confronted with considerable insecurity. Walker, Davis, and Stevenson (2017) Indeed, the resilience approach emphasizes the need for flexibility, adaptability, and improvisation in times of change and uncertainty, as well as the necessity to locate inner strengths and resources in order to deal effectively (Ganor & Ben-Lavy, 2003; Youssef & Luthans, 2007).

Organizations are putting an increasing amount of emphasis on the performance of their teams (Gully, Incalcaterra, Joshi, & Beaubien, 2002), and attention will be paid to figuring out the traits and procedures that provide the synergistic advantages ascribed to by team-based work arrangements (West, Patera, & Carsten, 2009). Teams play a crucial role in businesses' daily operations, but little study has been done on their resilience. Even if resilience is relative and develops in response to particular conditions (Staudinger, Marsiske, & Baltes, 1995), resilience that is demonstrated and built in a particular situation can improve preparation for future

situations (Egeland, Carlson, & Sroufe, 1993). The present business environment is extremely demanding and unpredictable, introducing new challenges to organizational performance and long-term viability. The level of strategic adaptability and the dynamic skills acquired throughout the organizational transformation process will depend on how businesses respond to market instability and fluctuations, as well as their capacity to keep things in balance and make the necessary adjustments to meet the difficulties they face (Cameron & Dutton, 2003; Lengnick-Hall, 2011).

Organizational resilience may be described as a company's capacity to recover from adversity and unforeseen events in order to plan the best path to success (Cameron & Dutton, 2003; Gittell, Cameron, Lim, & Rivas, 2008). To take advantage of the transformational activities that are being undertaken to overcome challenges, particularly by reacting to events that threaten the viability and success of organizations (Amaral, Fernandes, & Varajão, 2015; Lengnick-Hall, 2011). Create excellent conditions for Face to develop new skills to sustain organizational resilience (Coutu, 2002).

Organizations projects are growing more complicated as their complexity grows, necessitating competent and motivated teams to complete tasks (Varajão & Cruz-Cunha, 2013). Teams thus play an important part in the growth of organizations by fostering the environment necessary for overcoming challenges and enhancing overall performance. In addition, project teams must develop competencies throughout the project lifecycle through ongoing interaction between team members (Veil & Turner, 2002), which can lead to operational cycle's inefficient or cruel behavior to boost the chances of producing a positive outcome, research on team resilience is becoming increasingly important (Stoverink, Kirkman, Mistry, & Rosen, 2020). In addition, project teams must develop competencies throughout the project lifecycle through ongoing interaction between team members (Alliger, Cerasoli, Tannenbaum, & Vessey, 2015; Hartmann, Weiss, & Hoegl, 2020).

In more stable and frequent settings, team resilience has been noticed to improve team performance in roles and leaders (Meneghel, Salanova, & Martínez, 2016), cohesion and coordination team collaboration (West et al., 2009), service recovery performance (Yang, Lee, & Cheng, 2015), and performance maintenance (Vogus

& Sutcliffe, 2012). Unlike other forms of teams, project teams must continue to function under demanding, challenging, or ambiguous situations (Chiocchio, Forgues, Paradis, & Iordanova, 2011; Walker et al., 2017). Understanding how to promote team resilience should help to increase the knowledge base around the formation, development, and performance of project teams. Individuals, groups, initiatives, organizations, and social systems at large have all been described as resilient. That have the ability to adapt and recover from pressures, adversities, difficulties or disturbance with had minimal effect on their stability and functional functioning (Williams, Gruber, Sutcliffe, Shepherd, & Zhao, 2017).

The popularity and interest in resilience in companies have risen as a result of rising levels of uncertainty in both social and business environments. A dynamic and expanding stream of research has resulted from this tendency, which is seen by the rise in publications that have sought to answer this topic (Chapman et al., 2020; Dumrak, Mostafa, & Hadjinicolaou, 2020). According to preexisting theories, resilience can be approached (state) process or perspective (Kossek & Perrigino, 2016; Williams et al., 2017), putting the emphasis on coordination efforts for resilience, or focusing on the conditions and resources that enable resilient organizations to develop as needed. Researchers have also made a distinction between foreseeing unfavorable outcomes or avoiding and recovering from failure (Dumrak et al., 2020; Cameron & Dutton, 2003).

According to the existing literature, researchers suggest that traditional project management practices no longer operate in today's project environment (Hertogh & Westerveld, 2010). As such, agile project management methodologies have been extensively developed in recent years (Serrador & Turner, 2015). Although the majority of software firms are embracing agile methodologies, there are still many agile's unexplored hidden features that need to be addressed, which contributes to the high failure rate of IT projects. The use of agile approaches and practices resulted in extremely effective and enhanced project quality, primarily in the software development phase of the projects.

The project managers can work to fix the project's flaws by evaluating it repeatedly during the project with the use of agile approaches. It helps in focusing on the project's core goals and requirements. It is very crucial to follow up customers

requirements to provide the right and appropriate quality items for future projects and project success.

In the new economy, which is characterized by more complex and uncertain project scenarios, new project management techniques have shown to be profitable. Complex projects need an extraordinary degree of project management, and standard techniques are no longer enough for the complexity of today's projects. Williams (1999) believes that having a project complexity definition is essential for dealing with project management problems. Although the word "project complexity" is often used, it lacks a defined meaning. According to Baccarini (1996) project complexity may be defined as anything marked by difficulty.

Four major factors that affect the difficulty of project management are listed in a white paper released by (Weaver, 2010):

1. The size assessed in terms of value.

2. The degree of technical complexity in producing the output due to project work and deliverable features, as evaluated by the time required to supply the deliverables.

3. The project's level of uncertainty.

4. The complexities of the connections within and beyond the project team.

While all four elements influence the degree of project complexity, the project manager can only control the final two, lowering uncertainty and enhancing stakeholder relationships, including the project team. The size and level of technical complexity are fixed and cannot be changed by the project manager.

Despite the fact that project size affects how challenging it is to reach project goals, large projects are not always challenging or complex. The term "mega-projects" has gained increased traction in the literature during the past ten years; it refers to initiatives that are big, complex, and valuable financially even if they are not always enormous enterprises. Due to their intricacy, they are usually split up into a number of smaller projects (e.g., politics and stakeholder participation). The technical complexity of a project is defined as the interaction between the work

needed to achieve project goals and the characteristics of the output (product, service, or outcome) being produced. Schedule restrictions and project duration are both important signs of technological challenges (Bergmann & Karwowski, 2018).

Every endeavour involves some level of uncertainty. What important in project management is the knowledge and control of uncertainty. An appropriate project delivery strategy, often known as a project plan, would either aim to avoid unneeded uncertainty or will embrace uncertainty by seeking for possibilities that come with it. Last but not least, the complexity factor also focuses on how successfully the project team communicates with other internal and external stakeholders. The size of the team, the location of the team, and the number of project sponsors all have an impact on how difficult the project.

The performance of a project may be negatively impacted by complexity, while on the other side, complexity may have a beneficial impact on project outcomes (due to additional qualities that may present new possibilities) (Vidal & Marle, 2008).

Agile approach was demonstrated to have a considerable influence on project success in many earlier studies. The agile scaling method defines the path that is necessary for the many issues that developers confront; hence, our study use agile methodologies to accomplish project success (Ambler, 2009). Projects have their own standards and complications that must be reduced in order to accomplish the type of project requested by the clients. Working on the reasons of project complexity boosts the project's chances of success (Gidado, 1996). One technique for reducing project complexity is to employ agile methodologies, which demonstrate one-on-one communication with clients.

In the past, project management has been linked to the engineering and construction industries, where the project success criteria are often measured by the traditional triangle criterion of time, money, and fulfillment to the customer's specifications, or quality. on the other hand, Project management is becoming increasingly popular in the service industry, as well as in disciplines such as capacity building and social work programmes (Diallo & Thuillier, 2005). According to the Project Management Institute (PMI), managing competing demands for the project's quality, scope, time, and money as well as taking into consideration the

diverse concerns and expectations of project stakeholders is necessary for project success.

According to Ika (2015) while the 'iron triangle' (money, time, and quality) defined the concept of project success criteria from the 1960s through the 1980s, many other criteria were later added. These include corporate benefits, customer satisfaction, stakeholder benefits, project staff benefits, organizational strategic goals advantages, and business success benefits. Despite the fact that there is no agreement on project success criteria in the project management literature, the studies by (Ika, 2015), are extensive and relevant for development projects. Impact, relevance, efficiency, effectiveness, and sustainability are among the criteria used by these writers. Relevance refers to how well the project corresponds with the aims of the recipient, giver, and target audience.

The extent to which a project uses the least expensive resources required to achieve its objectives is referred to as efficiency. The degree to which a project achieves its goals is referred to as its efficacy. The term impact refers to the positive and negative changes brought about by the project, whether they are direct or indirect, planned or unplanned. The word "sustainability" refers to whether the project's benefits are likely to persist if donor money is removed. The definition of project success is up for controversy, and there is no well-established method for quantifying it in the project management literature (Ika, 2009; Joslin & Müller, 2015; Ngacho & Das, 2014).

As an example, some studies Kissi, Dainty, and Tuuli (2013) utilize composite measures of project success criteria, whereas (Diallo & Thuillier, 2004; Dvir, Raz, & Shenhar, 2003), use disaggregated measures of project success criteria. This study offers a composite measure of a multi-dimensional construct of project success based on project managers' assessments of certain criteria. This strategy is consistent with earlier research (Bryde, 2008; Mir & Pinnington, 2014; Pinto & Pinto, 1990; Suprapto, Bakker, & Mooi, 2015). There are 14 components in this project success metric, including time, cost, performance, client use, satisfaction, and effectiveness.

The literature contains contentious discussions on project success. Some individuals who adhere to the conventional methodology view it as a one-dimensional

construct focused on satisfying budget, schedule, and quality requirements (Brown & Adams, 2000; Müller & Turner, 2007) and Others (Atkinson, 1999; Mir & Pinnington, 2014) view it as a multifaceted, complicated concept with many more characteristics than just budget, time, and quality. There is evidence that initiatives fail to achieve their goals, hence it is important to pinpoint the variables that contribute to a project's success. Few problems in the world of project management are as frequently debated and yet as infrequently agreed upon as that of the idea of project success, according to (Pinto & Slevin, 1988). In the subject of project management, Schultz, Slevin, and Pinto (1987) developed the first systematic classification of critical success elements. They separated project performance elements into two categories: strategic considerations and tactical aspects. Project mission, top management support, and project schedule were classified as strategic variables, whereas client consulting, staff selection, and training are included in the tactical group. According to research, the effect of success variables might change depending on where a project is in its lifespan (Alexandrova & Ivanova, 2012). Additional study added three additional aspects to the first three (time, cost, and quality): Achieving the client organization's strategic goals:

1. End-user satisfaction

2. Meeting the needs of all other stakeholders (Baccarini, 1999; Shenhar, Dvir, Levy, & Maltz, 2001)

Finally, in order for a project to succeed, all stakeholders must be completely happy (Baker, Murphy, & Fisher, 1997; Bakhshi, Ireland, & Gorod, 2016). It is acknowledged that this is dependent on the viewpoint of each stakeholder. Another technique is that of who changed the initial dimensions by integrating scope changes without affecting workflow, without having a negative influence on company culture, and having the client completely embrace the project results (Kerzner, 2017). The degree to which a project achieves its goals is referred to as its efficacy. The term impact refers to the positive and negative changes brought about by the project, whether they are direct or indirect, planned or unplanned. The word "sustainability" refers to whether the project's benefits are likely to persist if donor money is removed.

1.2   Research Gap

The effect of agile methodologies on project success has been empirically investigated in numerous studies using a variety of factors. Recently Nguyen and Mohamed (2020) have experimentally investigated the effect of agile response to change on project performance, but there is still a need to empirically investigate the relationship between agile response to change and Agile Project Success in the software development/IT sector, particularly in the context of Pakistan. This study's key factors include team fortitude, agile reaction to change, and Agile Success.

There have been few studies that investigate the effect of Team Resilience on Agile Project Success with the mitigating function of project complexity. In general, project complexity is regarded as one of the main variables that have a detrimental impact on project outcomes (Butler, Vijayasarathy, & Roberts, 2020).

However, some researchers contend that project complexity is an essential element for any project and has a beneficial impact on it (Ruoslahti, 2020). In order to determine whether project complexity influences agile response to change, team resilience, and agile success in project-based organisations from the software and IT sector in Pakistan, this research will also investigate whether it does. This research also suggests that project complexity is a key moderator of the relationship between team resiliency and agile performance.

1.3   Problem Statement

In the amid of challenging demands and market dynamics organizations are shifting their focus on the project based work as project based organizations yield better results. However, the project environment is complex and project teams are facing unprecedented challenges, especially in IT organizations, where due to technological advancement and rapid transformation, project team members are dealing with more challenges. They are working in stressful environment. This results in a decrease in their power to combat the stressors they face, which causes them to fall behind in terms of their performance and hence affecting the overall

project success. The performance of the team is dependent on how they deal with the problems in a better way; hence resilience is one of the most important assets. If not being created will lead to poor project health and organizations overall will not maintain the competitive advantage.

While team resilience and agile response to change can have many benefits for project success in IT companies, there are also several challenges that teams may face when trying to implement these strategies. Some of these challenges include:

- Resistance to change: Not all team members may be open to adopting agile methodologies, which can create friction and slow down the adoption process.

- Lack of clarity and communication: Agile methodologies rely heavily on communication and collaboration, which can be challenging when team members are distributed across different locations or time zones. It's important to ensure that everyone on the team is on the same page and that communication channels are open and effective.

- Unrealistic expectations: Agile methodologies require teams to work quickly and iteratively, but this can sometimes lead to unrealistic expectations about how much work can be completed in a given time frame. It's important to set realistic goals and timelines, and to communicate openly with stakeholders about what is achievable.

- Limited resources: Agile methodologies often require additional resources, such as specialized tools or training, which can be costly and time-consuming to implement.

- Resistance to failure: While failure is a natural part of the agile process, some team members may struggle to accept failure and learn from it. It's important to create a culture where failure is seen as an opportunity for learning and growth, rather than something to be avoided at all costs.

- Overall, while team resilience and agile methodologies can have many benefits for project success in IT companies, it's important to be aware of these challenges and to proactively address them to ensure that teams are able to work effectively and efficiently.

1.4 Research Questions

On the basis of the stated problems, the present study is indented to find answers for some questions, brief summary of the questions are as follows:

1. Does the relationship exist between Team Resilience and Agile Project Success?

2. Does the relationship exist between Team Resilience and Agile Response to Change?

3. Does the relationship exist between Agile Response to Change and Agile Project Success?

4. What is role of Agile Response to Change, and the between Team Resilience and Agile Project Success?

5. What is impact of Project Complexity on the relationship between Team Resilience and Agile Response to Change?

1.5 Research Objective

The overall objective of the study is to examine the team resilience on Project success with Mediating Role of agile response to change and Moderating Role of project complexity.

The specific objectives of the study are stated below:

1. To examine the impact of Team Resilience on project success.

2. To explore the relationship between Team Resilience and Agile Response to Change.

3. To explore the relationship between Agile Response to Change and Agile Project Success?

4. To explore the mediating effect of Agile Response to Change between Team Resilience and Agile Project Success.

5. To examine the moderating effect of Project Complexity on the relationship of Team Resilience and Agile Response to Change.

1.6   Significance of the Study

The atmosphere is getting more active and difficult as the world keeps changing. Therefore, organisations are putting a lot of effort into getting and keeping a competitive edge by strengthening team resilience, reducing complexity, and encouraging team members to adapt to change. This research study will be helpful in adding to the body of knowledge about project management, but it will also be useful in demonstrating how team resilience and agile response to change in project-based organisations in the software industry/IT industry can be crucial in enhancing project success. The current study helps fill a theoretical gap that exists in the previous literature. Research on the impact of team resilience on the success of agile projects by teaching agile responses to change and reduced project complexity is focused on the domain of project management. The current framework also provides a detailed analysis of existing empirical gaps and the basis for suggestions for future research directions.

1.7   Supporting Theory

Several basic ideas underpin the model in this study. Agile Governance Theory, which encompasses all of the factors analyzed in this research article, is the best fit for this study model.

1.7.1   Agile Governance Theory

Agile governance is a newer field of IT projects that focuses on organizational performance. Luna, Kruchten, and de Moura (2015) expressed the theory by offering constructs, laws of interaction, boundary-determining conditions, and system

states. Agile governance is described as "the 'means' by which strategic competitive advantages should be established and enhanced on the organizational environment, using an agile methodology to offer quicker, better, and cheaper value to the business."

Better governance system leads to more favorable economic outcomes (Porter & Advantage, 1985). The majority of businesses are using agile approaches under the control of agile governance theory in order to avoid problems (Barton, 2013). According to agile governance theory, the systems must be properly planned and integrated in order to satisfy the demanding requirements of today. Because customer needs change so quickly, it is hard to satisfy them without utilizing agile methodologies. The six Meta principles put forward in the theory state that the degree of governance is chosen in accordance with the organizational context, demonstrating how organizational performance influences a project's potential to be agile.

Organizations are becoming more and more conscious of the necessity of coordinating all of their business divisions and components as they attempt to implement large-scale agile techniques to their operations. It is crucial to make sure that governance systems, such as regulatory compliance and business operations alignment, adapt in order to enable organizations to respond to continuous difficulties, such as the requirement to react more swiftly and sustainably to changes. New knowledge and methods are needed to address emerging circumstances. Governance has shown to be a cornerstone that supports organizational effectiveness in a number of situations (Janssen & Shu, 2008).

In keeping with this business requirement, we use the definition of agility offered by Kruchten (2013) "the capacity of an organization to adapt to changes in its environment at a pace quicker than the rate of these changes." We acknowledge that whereas agility focuses on responding quickly to changes, lean focuses on reducing waste, despite the fact that both are integrally linked to creating value.

A sensible balance between these techniques, in accordance with (Wang, Conboy, & Cawley, 2012), can produce a cohesive "agile strategy that can generate greater outcomes than if they are used independently, despite the fact that these approaches occasionally appear to clash.

In reality, according to Luna et al. (2015) governance is a collection of guiding abilities based on three dimensions:

- Strategic planning: having a long-term perspective, strategic planning, and overall alignment.

- Control: create methods to guarantee that the strategy plan is carried out.

- Multi skilling: enhance your ability to recognize and respond to change.

Without neglecting the previous two dimensions, agile governance appears to be more focused on the third: the ability to respond to changes in the organization's environment so that coordinated steering activities may occur quicker than the rate of change. Once the fundamentals of the agile governance phenomena are better understood, it will be possible to map their constructs, mediators, moderators, and disturbing factors to assist organizations in improving the outcomes of their application, including lowering costs and time and raising the standard and success rate of their work. In the context of IT Governance, this study focuses on companies that must function (sense and respond) in challenging and/or competitive situations, as well as those that must sustainably expand, respond as a unit, achieve higher enterprise agility, and support their overall strategy.

Methodology

This study is part of a larger collection of research that aims to understand the nature of agile governance phenomena. It incorporates theory-building research with the objective of constructing a theory to analyze and characterize these phenomena using a multi method or mixed methodology. The research framework depicts the steps of this larger study. This part is organized as follows: it includes an overview of the theory-building techniques comparison that lead the authors to select Dubin's method, as well as the changes and clarifications made to this approach to address deficiencies identified by other writers.

1.7.1.1   The Theory Emergence

At step 1, we add two additional theoretical sample sources to complement data from the systematic literature review presented by (Luna et al., 2015), two more

theoretical sampling sources are added: an ensemble of social networks comprised of governance, management, and agile methodologies scholars and practitioners, containing 12 governance-related professional and research organizations (Müller & Turner, 2007; Wood & Ashton, 2010).

We add two additional theoretical sample sources to the insights of the comprehensive literature review presented by (Luna et al., 2015). The first source is an ensemble of social networks comprised of governance, management, and agile methodologies researchers and practitioners which contains 12 professional and research organizations related to governance.

The Theory Assessment

We carried out the conceptual development of the theory in Stage 2, following the first four phases of Dubin's methodology for theory-building research (Dubey, Jain, & Mantri, 2015), identifying and defining the main components of the emergent conceptual theoretical framework:

i. Units (constructs)

ii. Laws of interaction

iii. Boundaries and

iv. System states

Organizational competitiveness can only be satisfied through strong governance. There are just a few firms that have successfully implemented the agile approaches that have been proven by several theories (Qumer et al., 2009). However, agile governance techniques are becoming increasingly important. Many firms have achieved success by implementing agile governance practices.

Foundational Premises of the Theory

The agile governance phenomenon, which is eight years old and arises in the setting of organizational environments, encourages employees to integrate governance skills with agile skills in order to create business agility (Luna et al., 2015).

Their main priority is to provide the business with value in cycles that are quicker, better, and less expensive. In the framework of the organization, governance is

the cornerstone for achieving the necessary participation of all organizational units achieve increased business agility, and promoting its overall plan.

Premise 1

As a result, our approach defines agile governance as the application of agility to the system in charge of sensing, responding, and coordinating the whole organizational body: the governance or steering) system. Unlike specialized agile approaches widely held on businesses such as agile software development or agile manufacturing, where the impact is restricted to a localized outcome, generally few stages of the organization's chain value (Porter & Advantage, 1985; Luna et al., 2015).

Premise 2

We may characterize agile governance as socio-technical a phenomenon that occurs in a chaordic spectrum between the innovation and emergent practises of agile (and lean) philosophy and the status quo of best practices imposed and required by governance difficulties. Our understanding of the interconnections between technical and social factors supports the socio-technical nature of agile governance: perceiving people as change agents in enterprises in situations where technology is a critical component (Luna et al., 2015).

Premise 3

The third and final premise is the description of agile governance as a broad concept and its recommended meta-principles, meta-values, and (Luna et al., 2015).

Meta Principles

We suggested the six meta-principles for agile governance below to guide future research and, more importantly, to drive practices (Luna et al., 2015).

i. Good enough governance: Depending on the organizational situation, the amount of governance must always be adjusted.

ii.Business driven: Every choice and activity must be motivated by the business.

iii. Human focused: People must feel respected and rewarded for participating creatively.

iv. Based on quick wins: Fast victories must be recognized in order to enhance

motivation and outcomes.

v. Systematic and Adaptive approach: Teams need to learn how to handle change methodically from inside.

vi. Simple design and continuous refinement: Teams must deliver quickly and continually improve.

Competitiveness in the organization can only be met by good governance. There are a rare number of organizations who have yet succeeded to deploy the agile methodologies proved by many theories (Qumer & Henderson-Sellers, 2008, 2008). But it's the need of the hour to apply agile governance strategies. This study adds further that necessary to make stronger the relationship between team resilience and agile response to change when there is project complexity. Moreover, this study was conducted within the framework of IT Companies and therefore contributed in the context of Pakistan as well.

Laws of Interaction

1st Law Agile of Governance:

When agile capabilities [A] are incorporated and linked with governance capabilities [G], an increase in the degree of business operations [B] is activated or intensified, which in turn enhances the value delivery [R]"

2nd Law Specific Agile Approach:

"A particular agile strategy develops when agile capabilities [A] which are not governance capabilities [G] are applied to various corporate contexts, triggering or enhancing an increase in business operations [B], which in turn enhances the value delivery [R].

3rd Law of Moderator Factors Effects:

There are internal moderator variables whose impacts [M] can restrict or impede agile capabilities [A] and governance capabilities [G], or even lower business operations [B], which in turn reduces the delivery of value [R].

4th Law of Environmental Factors Effects:

There are environmental variables that have effects [E] can disrupt the corporate context, affecting things like agile capabilities [A], governance capabilities [G], and operations [B], which in turn influence value delivery [R] to some extent.

5th Law of Sustainability and Competitiveness:

6th Law of Value Delivery:

Influence on business operations [B] will generate directly proportional effects on value delivery [R].

Boundaries

The Open Boundary

Insofar as it pertains to a team, project, business unit, company, or a multi-organizational setting, this theory only encompasses those units and rules of interaction that are relevant to the organizational settings of the Agile Governance in IT collaboration viewpoint.

The Closed Boundary

Only corporate strategies that come under the category of IT Governance are covered by this theory.

Chapter 2

Literature Review

2.1   Team Resilience

Researchers and practitioners have used the term "resilience" to describe relatively routine adaptive processes in the context of organizations and management when confronted with unexpected, unfavorable circumstances brought on by either major disturbances or the accumulation of numerous minor disruptions (Sutcliffe, 2003). It is possible to think about resilience as both an individual trait and a social factor for groups and organizations. This study expands our knowledge of resilience, as well as its causes and effects at the team level. Individuals identify with and internalize team ideals and standards, which results in uniformity of attitudes and behavior and is consistent with social identity theory (Hogg & Turner, 1985). There is evidence that individuals acting as a team are likely to exhibit regular patterns of behavior and processes, as are individuals acting alone.

Totterdell (2000) made the claim that "team members might behave similarly to shared occurrences and consequently wind up feeling the same way" in our example, sharing the same degree of team resilience in order to offer a potential explanation for this. As a result, the emphasis of our study is on team resilience, which is described as "the ability to recover from failure, setbacks, disputes, or any other danger to their welfare that they may suffer" (West et al., 2009). It should be emphasized that team resilience differs from other similar components such as team potency and team efficiency because these building blocks can be viewed as

precursors or indicators of a team's resilience. It is intended to help teams face adversity" (Gully et al., 2002).

Team resilience was considered in terms of progression or capacity, depending on the nature of the problem under investigation. Based on the team effectiveness theory Mathieu, Maynard, Rapp, and Gilson (2008) the perspective of the team's resilience process is consistent with work on the team's process (Marks, Mathieu, & Zaccaro, 2001). This includes an interactive, collaborative, synergistic team interaction process that describes the team's actual behavior in dealing with adversity (Hartmann et al., 2020). On the other hand, in terms of capacity, team resilience is conceptualized as a new state in which the availability and mobilization of the resources that make up resilience are important as the team's potential ability to deal with adversity and recession (Chapman et al., 2020; Stoverink et al., 2020). Therefore, the resilience of team is defined as "the ability of the team to recover from process losses caused by adversity" (Stoverink et al., 2020).

According to an empirical study, the process and capacity perspectives were hardly combined in the same study due to the differences between the team process and the emergency, as well as the different research methodologies utilized to address both phenomena (Mathieu et al., 2008). Depending on the goals of their study and the theoretical contributions they want to make, researchers choose a certain strategy (Hartmann et al., 2020). In order to develop a useful theory at the appropriate depth, this study uses a capacity viewpoint (which sees team resilience as a new condition). We contend that the complexity and ambiguity of the project environment are the root causes of the adversities and challenges faced by project teams (Kutsch & Hall, 2016). Therefore, we define the resilience of a project team as the ability to anticipate, contain, and recover from adversity and failure caused by the uncertainty and complexity of the project environment.

2.2 Project Success

As Pinto and Slevin (1988) pointed out a few years ago, "There are few issues in project management that are often debated but seldom agreed upon as a concept of project success." Traditional Measures of Project Success we focused on creating

projects of sufficient quality (functionality) while meeting the twin constraints of project time and budget goals: the so-called triple constraint (Atkinson, 1999). However, project success is often broader Munns and Bjeirmi (1996) found that much of the contemporary literature "ends when the project is handed over to the customer criteria". Jugdev and Müller (2005) examined the project success literature over the last 40 years and discovered that a more holistic approach to assessing success has grown more prevalent. Researchers have come to measure success in terms of organizational impact beyond meeting the three constraints.

Müller and Turner (2007) identified ten aspects of project success as part of a series of studies on project manager skills and project success. However, Dvir et al. (2003) also found that "four measures of success (achievement of plan objectives, benefits to end users, benefits to contractors, and overall project success) are seen as successful and highly connected." It means that a project that is involved is successful in all respects to its stakeholders". According to Prabhakar (2008) this is presented in a different way: "There is also a common consensus that although schedule and budget performance alone are deemed inadequate as indicators of project success, they are also important components of the entire construct. Technical performance, specifications, and the achievement of functional objectives are all related to quality, and it is the fulfillment of these criteria that will be most susceptible to differences in perception by a variety of project stakeholders."

A similar point was made by repeated Kloppenborg, Manolis, and Tesch (2009) he found that all measures of project success include the traditional success factors of time, cost, and performance. Serrador and Turner (2015) found a significant correlation between project efficiency and overall project success, suggesting that efficiency should be the ultimate measure of success and should not be ignored.

2.3   Agile Response to Change

Agile technique was proposed by 17 specialists in the Agile Manifesto (Beck & Beedle, 2001), comprising of 12 principles and core values (Ćirić & Gračanin, 2017). Agile is a flexible and suitable method that is frequently used to complete software

tasks (Dumrak et al., 2020). Agile methodologies are typically used in technology initiatives (Lindvall et al., 2002) because they can handle the difficulties and challenges posed by big, dynamic initiatives in constantly changing and evolving environments. (Serrador & Turner, 2015). The four agile principles outlined in the Agile Manifesto are:

i. People and their interactions with systems and technologies.

ii. Software Acting as a Replacement for Detailed Documentation.

iii. Cooperation from the customer before contract discussions.

iv. Reacting to change instead than adhering to a plan. (Beck et al., 2001).

Agile approaches are frequently used in technology projects because they directly address the difficulties that come with dynamic projects in quickly changing environment (Lindvall et al., 2002; Serrador & Turner, 2015). The project management team's capacity to address these challenges determines whether the project will succeed or fail. One of the crucial elements of the framework for managing stakeholders in large building projects is AR (Park, Kim, Kim, & Kim, 2017). According to Serrador and Turner (2015) projects perform better the more agile methods are implemented.

2.4   Project Complexity

The team member's awareness of the task and circumstances in which they meet the scoped definition, project objectives, and deadlines all contribute to the complexity. Project complexity defines as "the number of various parts, e.g. tasks, specialists, components; and interdependence or connectivity the degree of connectivity between these elements (Baccarini, 1996). One of the crucial elements of every project is its complexity (Baccarini, 1996).

According to Geraldi, Maylor, and Williams (2011); Hanisch and Wald (2014) complexity in a project is seen as a rich construct that is connected to the many project components (Lessard, Sakhrani, & Miller, 2014).The term project complexity has categorized into two broad aspects, the first one is taxonomy i.e. the number of interconnected parts or elements in a project and their interdependency

on each other, and the second one is uncertainty involved in a project (Williams, 1999).

Complexity is defined as "the property of a project that makes it difficult to comprehend, forecast, and maintain control over its overall behavior, even when given acceptable detailed information about the project system" in the context of complicated projects (Vidal & Marle, 2008). Theoretically, the complexity of a project depends on both its unique traits and the ability of its project management teams to address the variety of elements that affect project outcomes (Nguyen & Mohamed, 2020).

Since complexity is an intrinsic quality of projects, researchers have tried to measure and quantify it (Vidal & Marle, 2008); studies on project complexity have been carried out for years (Aitken & Crawford, 2007; Dao, Kermanshachi, Shane, Anderson, & Hare, 2017; Vidal & Marle, 2008; Dao et al., 2017).

TOE framework has been proposed in by Bosch, Jongkind, Mooi, Bakker, and Verbraeck (2011) consisting of technical, organizational, and environmental factors to measure the complexity in a project. The term is further defined by Vidal and Marle (2008) "Even with sufficiently full knowledge on the project system, the nature of the project makes it difficult to analyze, anticipate, and regulate the overall behavior of the project.

2.5   Hypothesis of Study

2.5.1   Team Resilience and Project Success

As Pinto and Slevin (1988) pointed out a few years ago, There are few issues in project management that are often debated but seldom agreed upon as a concept of project success. Traditional Measures of Project Success we focused on creating projects of sufficient quality (functionality) while meeting the twin constraints of project time and budget goals: the so-called triple constraint (Atkinson, 1999). However, project success is frequently measured in a broader context. Munns and Bjeirmi (1996) discovered that most of the current literature "ends when the project is handed over to the customer" (Jugdev & Müller, 2005) examined

the project success literature over the last 40 years and discovered that a more holistic approach to assessing success has grown increasingly widespread. Beyond achieving the three limitations, researchers have come to define success in terms of organizational impact.

This includes staying within budget and time constraints, as well as the level of workmanship, stakeholder satisfaction, technology transfer, and health and safety. Many projects are innovative in nature, necessitating a high level of team tenacity to keep working toward their objectives despite obstacles. Many initiatives are inventive in nature, requiring a high level of team tenacity to keep working toward their objectives despite obstacles. However, for a number of reasons, resilient teams are capable of producing greater project results. First of all, resilient teams are better able to handle the pressure of unforeseen difficulties, bounce back and carry on as usual after them, as well as gain knowledge and experience from them (Cameron & Dutton, 2003).

Additionally, resilient teams are more likely to create a variety of responses as well as recognize and take advantage of extra opportunities to succeed in challenging circumstances (Carmeli, Friedman, & Tishler, 2013). In the other claims, resilient teams show a greater ability for improvisation as well as greater adaptability and flexibility in the face of danger, allowing them to perform at a higher level (Meneghel et al., 2016; West et al., 2009). Based on these logics, we claim that team resilience promotes project success.

H1: Team resilience is positively and associated with project success.

2.5.2 Agile Response to Change and Agile Project Success

The term project is referred as a distinctive and short-term undertaking carried out individually or on organizational level that lead towards a new product, service, or outcome (PMI, 2013). According to Collins and Baccarini (2004) project performance success is often defined as project success, product success, and overall project management success. Over time, approaches to evaluating project performance, referred as project success". Project performance is evaluated using a variety of factors. Effectiveness, effects on project teams and clients, business

success, etc (Tam, Shen, & Kong, 2011; Turner & Zolin, 2012). Researchers have discovered a significant link between project efficiency and overall success of the project. (Chow & Cao, 2008), defined project success in software development projects using four attributes:

Scope: Achieving all project objectives

i. Time: Completion of the task on time.

ii. Cost: Completion of project within budget.

iii. Quality: (Delivery of high quality and superior product or project outcomes to client).

Delivery of high quality and superior product or project results to customer. According to Popaitoon and Siengthai (2014) Project performance is defined by how successfully project outputs and deliverables fulfill schedule and budget goals, operational and technical standards, and client business demands.

In this age of increased competition, rapid technological advancement, and diversifying market demands, agility is essential (Conforto, Amaral, da Silva, Di Felippo, & Kamikawachi, 2016; Lee & Xia, 2010). Agility is thus essential for maintaining originality and achieving competitive performance in the dynamic and unpredictable world of today (Denning, 2013). It's been noticed that innovation and organizational performance require agility (Sambamurthy, Bharadwaj, & Grover, 2003). Balocco, Cavallo, Ghezzi, and Berbegal-Mirabent (2019) has stated that the agility concept has been emerged from the software-based development projects, but slowly moved to the multifaceted business models development and complex services. The positive effect of agile methods has been observed particularly for managing the processes that are said to be innovative (Meyer & Marion, 2010). Agility plays a critical role in enhancing project performance in situations where business conditions are dynamic and changing fast (Haider & Kayani, 2020).

Agile methodologies positively impact project performance and avoid schedule delays and budget overruns (Nguyen & Mohamed, 2020). Agile principles emphasize adaptable planning, continuous improvement, progress, and project completion as soon as possible (Mendez, 2018). Agile approaches are demonstrated through communication with people, targeted customer participation, using software, and adapting to change (Papadopoulos, 2015). The agile methodology of the software

industry is to deliver the project quickly, take customer feedback, use it to improve the project, and improve the project, rather than risking complete failure we provide a better version (Beck & Beedle, 2001). Agility allows projects to achieve high quality, novelty, flexibility, ability to quickly respond to changes and to meet customers' needs and desires in a change market (Ravichandran, 2018).

Agility is essentially the best possible compromise between the necessity for stability and a sufficient degree of flexibility (Ciric et al., 2019). Agile approaches promise range of benefits like; on-time project delivery, stakeholder satisfaction and delivering other business values with quick iterations (Papadopoulos, 2015). However, commitment, collaborative communication, and a culture willing to take new challenges is required while adapting agile methodologies (Marks et al., 2001). According to agile approaches are expected to reflect today's business instability and technology changes. The constantly changing demands from customers and strong industrial competition have forced organizations to look for innovative alternates and approaches (Young, Ganguly, & Farr, 2012). Being Agile is one of the creative techniques to project management that recognizes changes, deals with uncertainty, and capitalizes on new or emerging possibilities (Ćirić & Gračanin, 2017).

A significant change has been observed by the researchers, when organizations are adapting agile approaches to manage, organize and execute their projects (Stettina & Hörz, 2015).

H2: there is positive association between agile response to change and agile success

2.5.3 Team Resilience and Agile Response to Change

The idea of agile methodology was projected in Agile Manifesto by 17 experts (Beck & Beedle, 2001), comprising of 12 principles and core values (Ćirić & Gračanin, 2017). Agile is a responsive and adequate approach which is widely used in delivering software projects (Dumrak et al., 2020).

In technology projects agile methods are generally applied Lindvall et al. (2002) because they have the ability to tackle the problems and challenges associated

with the large scale and dynamic projects in continuously evolving and changing environment (Serrador & Turner, 2015).

In the 21st century, the agile philosophy is a best fit with the business reality (Denning, 2015), since agile approaches directly address the issues associated with projects in rapidly changing contexts. The success or failure of a project is heavily influenced by the project management team members' capacity to adapt to issues and challenges (Serrador & Turner, 2015). However, for a number of reasons, resilient teams are proficient at producing greater project results. First of all, resilient teams are better able to handle the pressure of unforeseen difficulties, bounce back and carry on as usual after them, as well as gain knowledge and experience from them (Cameron & Dutton, 2003).

Additionally, resilient teams are more likely to create a variety of responses as well as recognize and take advantage of extra opportunities to succeed in challenging circumstances (Carmeli et al., 2013). Other claims indicate that resilient teams have a larger capacity for improvisation, as well as more adaptability and flexibility in the face of risk, allowing them to execute at a higher level (Meneghel et al., 2016; West et al., 2009). Based on these logics, we claim that team resilience improves team performance.

H3: team resilience is positively and significantly associated with agile response to change

2.5.4 Agile Response to Change Mediate the Relation between Team Resilience and Agile Success

The term project is referred as a distinctive and short-term undertaking carried out individually or on organizational level that lead towards a new product, service, or outcome (PMI, 2013). According to Collins and Baccarini (2004) project performance success is often defined as project success, product success, and overall project management success. Over time, approaches to evaluating project performance, referred as project success" and how to accomplish the project success have gradually evolved (Tam, Oliveira, & Varajão, 2020).

Chow and Cao (2008) defined project success in software development projects are measure by using four attributes:

Scope: Achieving all project objectives

Time: Completion of the task on time

Cost: Completion of project within budget

Quality: Delivery of high quality and superior product or project outcomes to client.

Agile concepts emphasis adaptive planning, continuous improvement, evolution, and project delivery as early as possible (Mendez, 2018). Agile methodologies are manifested through interaction with individuals, focused collaboration with customers, working with software, and responding to change (Papadakis & Tsironis, 2018). The agile methodology of the software industry is to deliver the project quickly, take customer feedback, use it to improve the project, and not risk complete failure. We provide a better version (Beck et al., 2001).

According to Beck et al. (2001) agile approaches are expected to reflect today's business instability and technological changes. Customers' ever-changing needs and severe industrial rivalry have compelled firms to seek out creative alternatives and approaches (Young et al., 2012). Being Agile is one of the creative techniques to project management that recognizes changes, deals with uncertainty, and capitalizes on new or emerging possibilities (Ćirić & Gračanin, 2017).

H4: agile response to change plays a mediating role between team resilience and agile success

2.5.5 Project Complexity Moderates the Relation Between Agile Response to Change and Agile Success

Complexity is the most crucial subject in the context of project management, but it is also very debatable (Bakhshi et al., 2016). When a project is complex, it has "characteristics that make its overall behaviour difficult to assess, forecast, and manage, even when given generally appropriate knowledge about the project system (Vidal & Marle, 2008). Complex projects, specifically, are more likely to have

schedule. According to Chapman et al. (2020), a project is deemed complex when it is highly dependent on its environment (political, economic, or legal), when stakeholder demands and requirements are constantly changing, when stakeholder interests are at odds, and when there is a lack of adequate information and too many variables are present at once. The key element affecting project performance has been identified as project complexity (Floricel, Michela, & Piperca, 2016). A project's complexity is also a result of the interactions between the various organizations that make up the project organization, the cooperation and interaction of the various components within the same organization, the necessity of coordination between various project components, and the wide variety of project management techniques that are employed. Understanding project complexity is crucial for the project manager and team members.

A complexity is determined by how challenging it is and how much time, effort, and expertise are needed to do it (Kermanshachi, Dao, Shane, & Anderson, 2016). Complexity in a project can have a detrimental impact on project performance, but it can also have a beneficial impact on project results/outcomes (due to emergent qualities that can generate new possibilities) (Vidal & Marle, 2008).As a result, rather than focusing on how to reduce or prevent project complexity entirely, the primary focus should be on how to manage it constructively. Only those project-based businesses in the software development industry that can cope with project complexity and increase project performance will prosper in today's dynamic climate. A high percentage of project failure is a characteristic shared by both advanced and emerging countries, particularly in the software sector (Ebad, 2016).

Four dimensions of agility are described by (Goldman, Nagel, & Preiss, 1995):

i. Customer enrichment

ii. Collaborating to improve competitiveness

iii. Organizational capacity to manage change and uncertainty

iv. Maximizing the impact of individuals and information.

Agile methodologies were developed to improve project performance; it can be more flexible and responsive to changing project conditions (Beck et al., 2001).

H5: project complexity moderates the relationship between Team resilience and agile response to change in such a way that this relationship will be stronger when project complexity is high.

2.6 Research Model
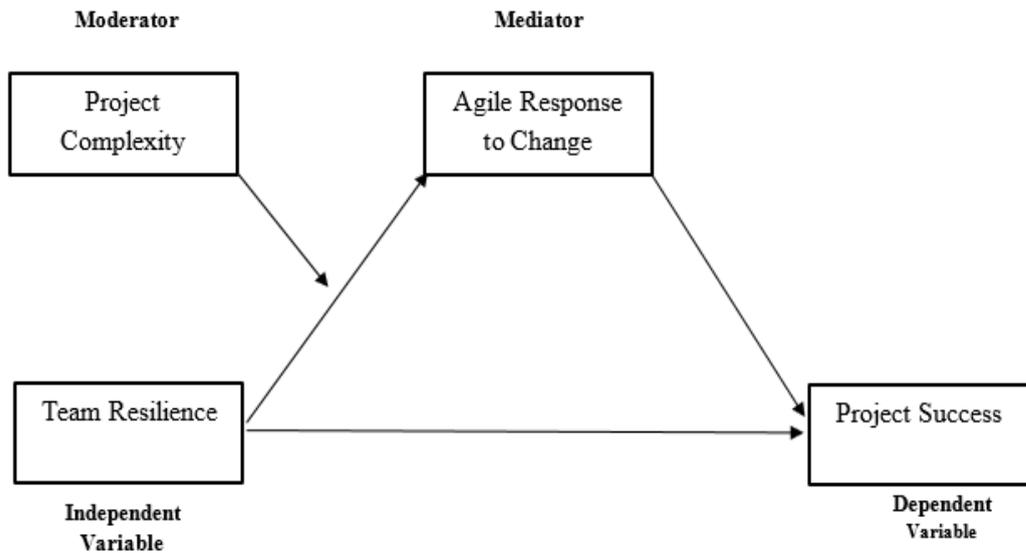
FIGURE 2.1: Research Model

2.7 Hypothesis of the Study

In the light of literature review, five hypotheses are developed to study:

H$_1$: Team Resilience is positively and significantly associated with Agile Project Success.

H$_2$: There is a positive association between agile response to change and agile success.

H$_3$: Team Resilience is positively and significantly associated with agile response to change.

H$_4$: Agile Response to Change plays a mediating role between team resilience and agile success.

H$_5$: Project Complexity will moderate the relationship between Team Resilience

and Agile Response to Change in such a way that this relationship will be stronger when Project Complexity is high.

Chapter 3

Research Methodology

This chapter describes the methodology used to determine the relationship between team resilience and project success, with the mediating role of agile response to change and moderating role of project complexity.

3.1 Research Design

A research design is a framework for the conduct of research describes research design as a plan of the scholar that defines the procedure and method for gathering and analyzing the necessary information.

3.1.1 Types of Study

This study is an explanatory research type, as the main purpose is to find out the causal relationship between project team resilience and project success via agile response to change in IT sector.

3.1.2 Study Setting

The project team members that work for an IT company are the contributors of this research. They received the forms to fill. They received assurances that the

information they provided would be kept private, enabling them to share it without hesitation. In order to get replies from the respondents, 450 questionnaires were primarily distributed; but, 387 genuine responses were received.

3.1.3   Time Horizon

On the basis of time span, there are two kinds of research: longitudinal and cross sectional. A longitudinal research is one in which changes are monitored over time. Cross sectional study is used to investigate a specific phenomenon in a specific time period, i.e. one shot study. A cross sectional study collects data from respondents only once to address the research queries. Given time and funding constraints, a cross-sectional study was used to gather data. Within two and a half months, the intended data was gathered.

3.1.4   Unit of Analysis

For this study my unit of analysis is project team members working in IT industry, all these project team members were requested to participate in this study. All those project team members that are involved in any kind of projects in IT industry were included in this study. IT industry were selected because these industries are involved in different projects and for these projects, they have different project team members who are assigned with different responsibilities.

3.2   Population and Sample

A population is any complete group from which a researcher wishes to make inferences. A sample is an identifiable person from whom data will be gathered. In other terms, the sample is the subset of the population. This study's population consisted of all project team members working in IT companies.

The sample was collected from IT Companies who's where project team members are actively involved in project activities. Survey method was adopted to collect the data as it is an easy practice for data collecting from the number of individuals

at the same time. The questionnaires were distributed in English. 450 project team members were approached for data collection, however 387 responses were received.

3.3 Sample and Sampling Techniques

Population is being defined as the entire group that is being targetedto obtain information and for which conclusion is inferred. Sample is the reprehensive part of the population. Employees in project-based organisations provided the data,related to IT sector, operating in twin cities.

3.4 Procedure for Data Collection

For calculating data from respondents self-administered questionnaires were developed in Google forms and then they were distributed among project team members of different IT Companies. Respondents filled these questionnaires and returned them without worrying about their confidential information. They were told that this data is for academic research only and it will be kept confidential. Survey method was adopted to collect the data as it is an easy practice for data collecting from the number of individuals at the same time. The questionnaires were distributed in English. 450 project team members were approached for data collection, however 387 responses were received.

3.5 Contribution of Study

Only effective governance can ensure organisational competitiveness. Few firms, as evidenced by several theories, have yet to be successful in implementing agile approaches (Qumer & Henderson-Sellers, 2008).But implementing agile governance methods is urgently needed. Agile governance solutions have been used by several businesses with success. Agile governance, a more recent area of IT projects, is concerned with improving organizational performance. Luna et al. (2015) provided

constructs, rules of interaction, boundary-defining conditions, and system states to illustrate the theory.

In light of the theory's highlighted elements, governance is a crucial component of any agile project and is composed of three primary elements. This study adds further that necessary to make stronger the relationship between team resilience and agile response to change when there is project complexity. Moreover, this study was conducted within the framework of IT Companies and therefore contributed in the context of Pakistan as well. This study will be useful because the impact of team resilience on project success directly with mediating role of agile response to change and moderating role of project complexity contributes towards higher project success rate and will be beneficial for project team members as well as for companies. According to the theory's points that were emphasized, governance is an essential component of agile projects and primarily has three dimensions. Better system governance leads to more favorable economic outcomes (Porter & Advantage, 1985).

The majority of businesses are using agile approaches under the control of agile governance theory in order to avoid problems (Barton, 2013). According to agile governance theory, the systems must be properly planned and integrated in order to satisfy the demanding requirements of today. Organizations are becoming more and more conscious of the necessity of coordinating all of their business divisions and components as they attempt to implement large-scale agile techniques to their operations. It is crucial to make sure that governance system, such as regulatory compliance and business operations alignment, adapt in order to enable. Organizations to respond to continuous difficulties, such as the requirement to react more swiftly and sustainably to changes. New knowledge and methods are needed to address emerging circumstances.

Once the fundamentals of the agile governance phenomena are better understood, it will be possible to map their constructs, mediators, moderators, and disturbing factors to assist organizations in improving the outcomes of their application, including lowering costs and time and raising the standard and success rate of their work. In the context of IT Governance, this study focuses on companies that must function (sense and respond) in challenging and/or competitive situations,

as well as those that must sustainably expand, respond as a unit, achieve higher enterprise agility, and support their overall strategy.

The secret to sustained development is competitiveness, which calls for agility at the organizational and business levels. To offer value to the business more quickly, more effectively, and more affordably, this environment must be adaptable and adjustable in terms of IT. This study adds further that necessary to make stronger the relationship between team resilience and agile project to change when there is a high project complexity. Moreover, this study was conducted within the framework of IT Companies and therefore contributed in the context of Pakistan as well.

3.6   Research Instrument

In this quantitative study for gathering data, I will be using close ended questionnaires. These questionnaires will contain close ended questions that will ask participants to choose from some pre-defined responses. Questionnaire will contain five sections and participant will be required to fill out all the questions in these sections. Sections will include;

- Demographic Variables (Gender, Age, Qualification and Experience)

- Team Resilience

- Agile Response to change

- Project Complexity

- Project Success

Scales for measuring these variables were adopted from existing literature. All four constructs are rated on five point Likert scale type scale which ranges between 1 (strongly disagree) to 5 (strongly agree). Description about the scales used for each variable in this study is given below:

3.6.1   Project Success

This will be measured through 14 items scale which was developed by (Aga, Noorderhaven, & Vallejo, 2016). A five-point Likert scales, with 1 indicating strongly disagree to 5 indicating strongly agree.

3.6.2   Project Complexity

A seven-item questionnaire was adapted for Project Complexity is constructed by (Nguyen & Mohamed, 2020). Each item was rated on a five-point Likert scale, with 1 indicating strongly disagree to 5 indicating strongly agree

3.6.3   Agile Response to Change

A six-item questionnaire was adapted for Agile Response to Change constructed by (Nguyen & Mohamed, 2020). A five-point Likert scales, with 1 indicating strongly disagree to 5 indicating strongly agree.

3.6.4   Project Team Resilience

A Four items were adapted from (Sinclair & Wallston, 2004), a five-point Likert scale, with 1 indicating strongly disagree to 5 indicating strongly agree.

3.7   Scale Summary

The summary of the scale used in the present study is given below and questionnaire:

TABLE 3.1: Summary of Scale

Variables	Source	Items
Team Resilience	Sinclair and Wallston (2004)	4
Agile Response to change	Nguyen & Mohamed(2020)	5
Project Complexity	Nguyen & Mohamed(2020)	6
Project Success	Aga and Vallejo (2016)	14

3.8 Method of Analysis

Data was collected using survey questionnaires. After collection of data it was entered, cleaned and processed by using Software Package for Social Science-20 (SPSS-20). For analyzing this data in SPSS-20 PROCESS macro by Andrew and Hayes (2021) was used. PROCESS macro was used because many types of models can be analyzed by using PROCESS macro like: Mediation, multi-mediation, mediation-moderation, and moderation-mediation. List of tests that were conducted using SPSS are given below:

- Test of descriptive statistics for finding Frequencies of demographic variable.

- Test of descriptive statistics for finding mean, and standard deviation.

- Correlation Analysis and Reliability Analysis

- Regression, moderation (Model 1) and mediation (Model 4) were tested using PROCESS macro version 4.0 by Andrew F Hayes.

3.9   Characteristics of Sample

3.9.1   Gender

The **Table 3.2** given below out of 387 respondents, 240 respondents was male and 147 were females. According to this data 62% respondents were male and 38% were female. According to the results of these tests, number of male respondents are higher in number than female respondents.

TABLE 3.2: Frequency by Gender

Gender	Frequency	Percentage
Male	240	0.62
Female	147	0.38
Total	387	1

3.9.2   Education

By looking at the Table 3.3 we can see that 9 respondents were qualified from school which is2.3% percent of total number of respondents. 14 responses were from respondents who have a college level qualification which 3.8 percent. The highest numbers of responses 198 were from individuals who had a bachelor's degree their percentage is 51.2% out of total respondents. 39% respondents had a master's degree with a frequency of 153. And total 13 respondents were PHDs and their percentage was 3.4%.

Gender
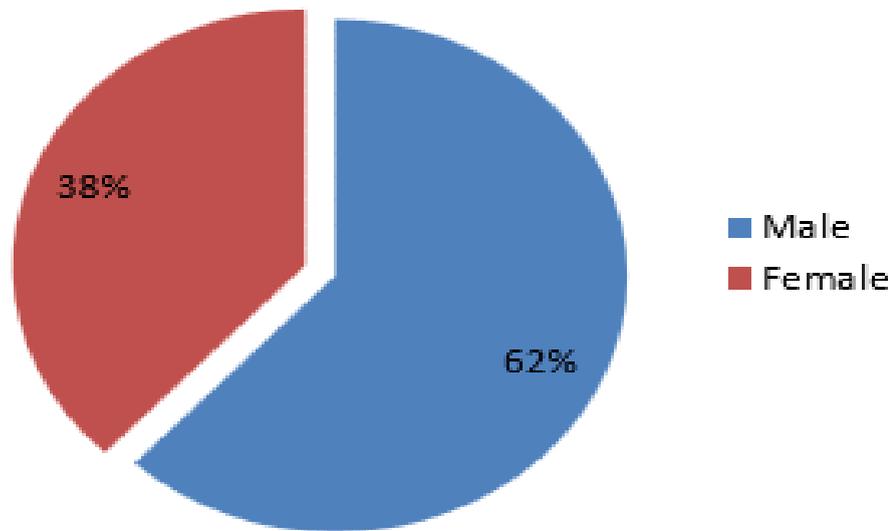
FIGURE 3.1: Gender of Respondents

TABLE 3.3: Frequency by Education

Education	Frequency	Percentage
School	9	0.023
College	14	0.036
Bachelors	198	0.512
Masters	86	0.222
MS / M.Phil	67	0.173
PhD	13	0.034
Total	387	1

3.9.3   Age

The table 3.4 given below illustrates those 148 respondents out of 387 were between ages 18-25. This is 38.2 % of the total number of respondents. The highest number of respondents that is 148 was between an ages 18-25 that is 38.2%. 116 respondents were of ages 26-33 that are about 30%. 51 respondents were of ages 35-41 that is 13.2 % .35 respondents were of ages 42-49 that is 9.6 %and 37 respondents were of ages 55-above that is 9.6 %
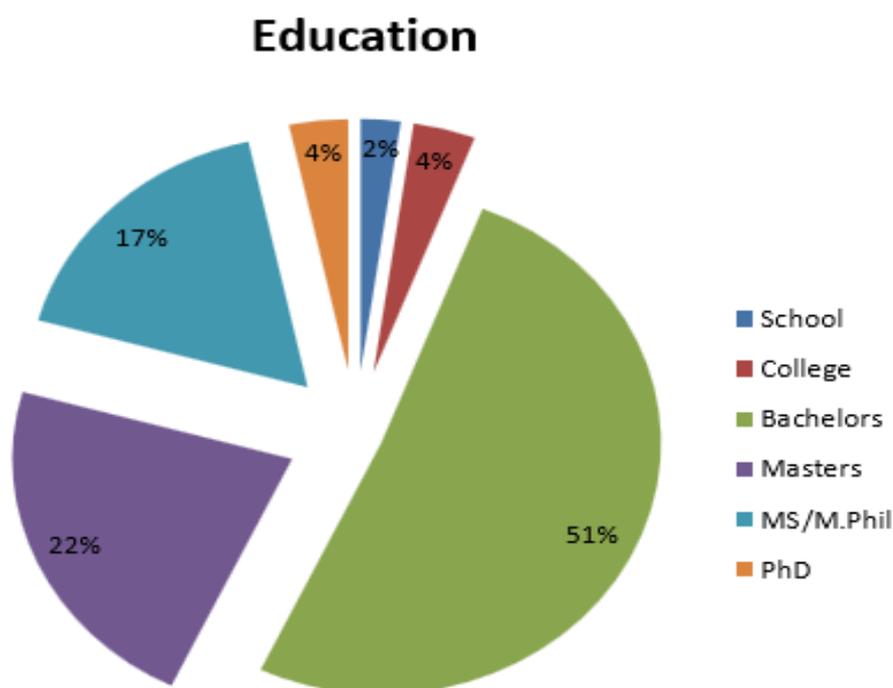
Education

FIGURE 3.2: Education of Respondents

TABLE 3.4: Frequency by Age

Age	Frequency	Percentage
18-25	148	0.382
26-33	116	0.3
34-41	51	0.132
42-49	35	0.09
55 - above	37	0.096
Total	387	1

3.9.4 Experience

Respondents with experience of 0-5 years were highest in number that is 222 which is 57.4 %. Respondents with experience of 6-10 years were 63 which is 13.7%. 53 respondents have experience of 11-16 years that is 13.7%. 25 respondents had an experience of 17-22 years which is 6.5%. 12 respondents had an experience of 23-28 years which is 3.1% and 12 respondents had an experience of 29 and above years which is 3.1%

Age
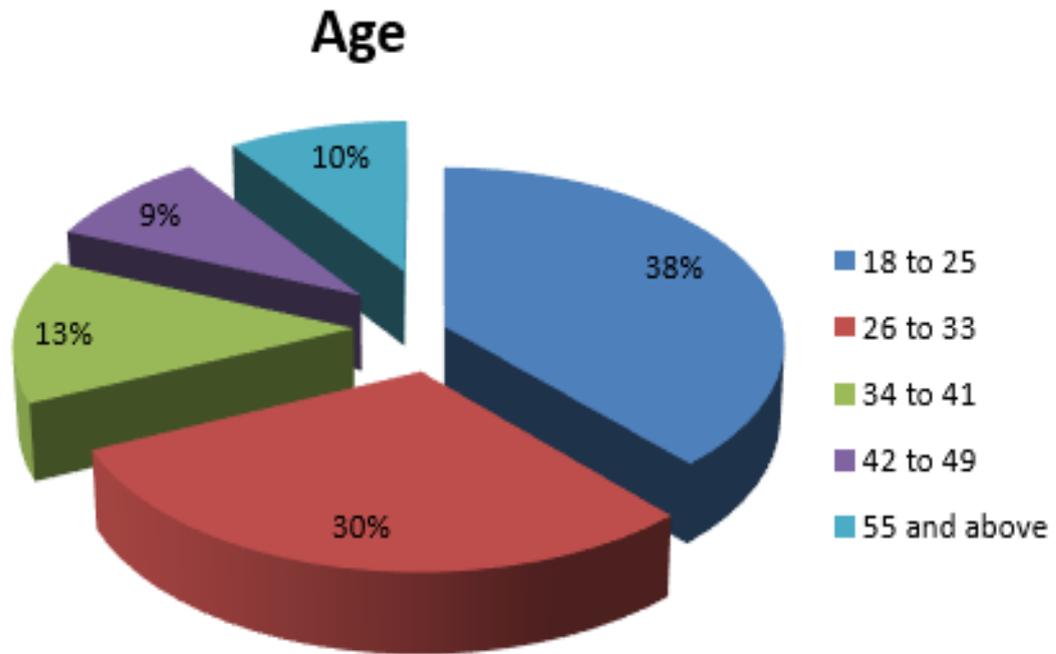
FIGURE 3.3: Age of Respondents

TABLE 3.5: Frequency by Experience

Experience	Frequency	Percentage
0-5	222	0.574
44840	63	0.163
42675	53	0.137
17-22	25	0.065
23-28	12	0.031
29 and above	12	0.031
Total	387	1

3.10 Pilot Testing

An initial study of small scale that is carried out to examine a planned research study before a complete analysis is preformed is called a pilot study. This study typically trails the precise similar procedures and methods that are used in the
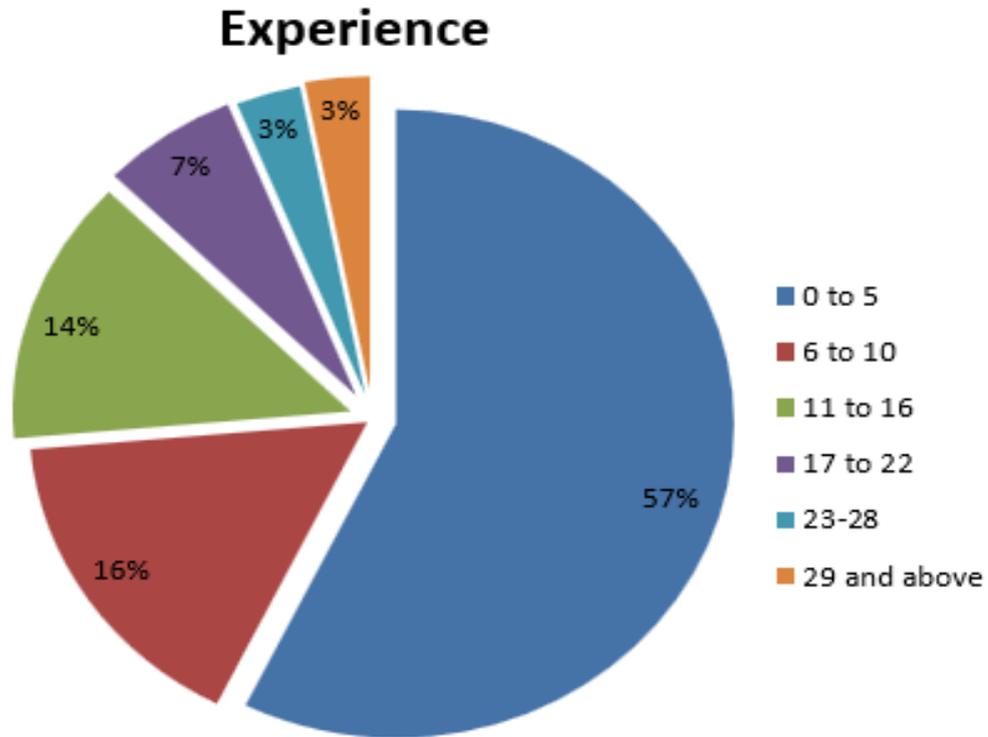
FIGURE 3.4: Experience of Respondents

full-scale data analysis of original study. Pilot study can help in examining the validity of the variables (Van Teijlingen & Hundley, 2001). It is carried out before gathering the actual data, to see the respondent's opinion and to check if the items of scale are easily understood by respondents or not.

According to the previous literature pilot testing is done on 10 % of the total sample size it is mostly more than 40 respondents and of these responses' reliability is checked. According to (Haider & Kayani, 2020), Cronbach's Alpha's value above 0.7 is acceptable. After performing the pilot study, I was able to identify that reliability of the scales was in acceptable range. Results of this pilot study gave indication that I can continue with my research study.

TABLE 3.6: Reliability of Pilot Testing

Variables	No. of items	Cronbach's Alpha
Team Resilience	4	0.8
Agile Response to change	5	0.9
Project Complexity	6	0.9
Project Success	14	0.9

N = 40

3.11   Reliability of Scales

The purpose of reliability analysis is to check the internal consistent the items of a variable are. It explains about how items of different variables are closely related. According to past research a scale is accepted as a reliable scale if Cronbach's alpha's value is above 0.7.

TABLE 3.7: Reliability Analysis

Variables	No. of Items	Cronbach's Alpha
Team Resilience	4	0.8
Agile Response to change	5	0.9
Project Complexity	6	0.9
Project Success	14	0.9

N = 387

According to the table 3.7 given below Cronbach's alpha is more then 0.7 for each variable. Cronbach's alpha value Team Resilence for is 0.8 with 4 items. Cronbach's alpha's value for Agile Response to change is 0.9 with 5 items. Cronbach's alpha's value for Project Complexity is 0.9 with 6 items. Cronbach's alpha's value for Project Success is 0.9 with 14 items. According to this data all the values are in acceptable range (i.e., above 0.7) which Means that we can continue further with our analysis.

Chapter 4

Results and Analysis

4.1 Descriptive and Normality Analysis

Descriptive analysis gives a conclusion of the dissemination of data; it helps in detecting mistakes and outliers, and allows recognizing resemblances among variables, which helps in finding out whether the data is good enough for conducting further statistical analyses. Descriptive Analysis helps in explaining and summarizing data points in a helpful way such that patterns might appear that justify every condition of the data. The mean values enlighten about the inclination of the data. It gives a clear understanding about the responses, that where most of the responses lie. In the table 4.1 given below it is clearly visible that the mean values of each variable are in range of 4, clarifying that large numbers of respondents were Agree. Similarly, according to the table mean value Team Resilience is 4.26, Agile Response to change is 4.21, Project Complexity is 4.30 and Project Success is 4.33 meaning that most of the respondents agree with questions.

Table 4.1 the next column is of Standard deviation it talks about the shape of our distribution, how near the specific data values are from the mean value. Standard deviation explains about how near our sample mean is to the true mean of the general population. Both of them can help in providing a clearer picture than the mean alone. The purpose of measuring Standard deviation is to check the range or spreading around the mean of a data set. Negative standard deviation never occurs. Standard deviation is high when there is presence of outliers. A solitary

outlier can increase standard deviation and in turn, misrepresent the data. The value of standard deviation must be lesser then 1. From table number 4.1 it is clear that all the values of standard deviation are in range of 0.8to 0.9.

TABLE 4.1: Descriptive and Normality Analysis

Variables	Mean	Std. Deviation
Team Resilience	4.26	0.896
Agile Response to change	4.21	0.928
Project Complexity	4.3	0.848
Project Success	4.33	0.83

4.2   Correlation Analysis

I have used Pearson correlation test it basically describes about the association between the variables. It is a single number which describes relationship, from this test I am able to explain that how strongly variables are related to each other. The satisfactory value for correlation is in range of -1 to +1. Values that range from 0.10 to 0.29 shows that there is a weak or smaller correlation between variables but there is association between variables. Values that range from 0.30 to 0.49 shows that there is a moderate correlation and values that range from 0.5 to 0.8 explain that there is a strong correlation (P. Cohen, West, & Aiken, 2014). Values that are above 0.8 shows that the variables are highly correlated this mean that the relationship between variables is so strong that they can be represented as a single variable. This means that there is an error of multicollinearity. Therefore this error must be dealt accordingly by running different tests so that it can be minimized. Otherwise, error of multicollinearity can affect the correlation of other variables.

TABLE 4.2: Correlation Analysis

Variable	Team Resilience	Agile Response to Change	Project Complexity	Project Success
Team Resilience	1			
Agile Response to change	.795**	1		
Project Complexity	.791**	.875**	1	
Project Success	.788**	.868**	.916**	1

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

According to the table given below the relationship between Team resilience and agile response to change is 0.795 that is significant because it lies in range of 0.5 to 0.8 which mean that there is a strong correlation between these variables. It is a positive value which means that increasing Team resilience will increase agile response to change. The correlation between team resilience and project complexity is 0.791 which means that there is a strong correlation between these variables. This means that increase in Team resilience will increase project complexity. The correlation between Team resilience and project success is 0.788 which means that there is a Strong relationship between these variables.

The correlation between agile response to change and project complexity is 0.875 which means that they are highly correlated, this mean that the relationship between variables is so strong that they can be represented as a single variable. The positive value indicates that increase in ARC will increase project complexity.

The relationship between ARC and PS is 0.868 indicating they are highly correlated, relationship exists between these variables. The relationship between project complexity and project success is a strong relationship. The positive value indicates that increase in project complexity will increase project success. P value indicates the significance value, and it demonstrates about chance of error that might occur in data. If P value is lesser the 0.01 its means that there is a 1% chance of error in data. In the table given above values with less than 1% error are symbolized with "**". These values are representing that the correlation is 99% significant if values are less the 0.01.

4.3   Testing Theoretical Relationships

For testing the theoretical relationship between variables, I have used PROCESS Macro by Andrew F. Hayes 2021. This tool uses the technique of bootstrapping, in this technique random sample are made from data for calculation of anticipated statistics in each sample (Preacher & Hayes, 2008; Shrout & Bolger, 2002). For testing the link among team resilience and project success, for testing the relation among team resilience and agile response to change, for testing the effect of mediator on the relationship between team resilience and agile response to change , process macro's model number 4 is used, and for testing effect of moderator on the link among TR and PS and for testing if moderated mediation exists in the model I have used model 7 of process macro.

4.3.1   Direct Effect of TR on PS

In the first step the relationship between the team resilience variable and dependent variable project success is considered, this is known as the path "c" in my case this is the direct effect of team resilience on project success. According to

Table 4.3 given below the variable of team resilience is denoted by alphabet "X" and project success is denoted by alphabet "Y".

TABLE 4.3: Direct Effect of X on Y

Predictor	Effect	SE	t	p	LLCI	ULCI
X to Y	0.2475	0.366	6.7596	0.000	0.1755	0.3194

N=387 Confidence Interval = CI, UL= Upper limit, LL= Lower Limit

According to the **Table 4.3** and **Figure 4.1** the p value is 0.00 which is less than 0.05 represents that the relationship between the values is significant. And similarly there is a zero between values of LLCI i.e., 0.1755 and ULCI i.e., 0.3194 which mean that direct effect of team resilience is not significant on project success. This means that our first hypothesis that "team resilience is positively related to project success" is supported.
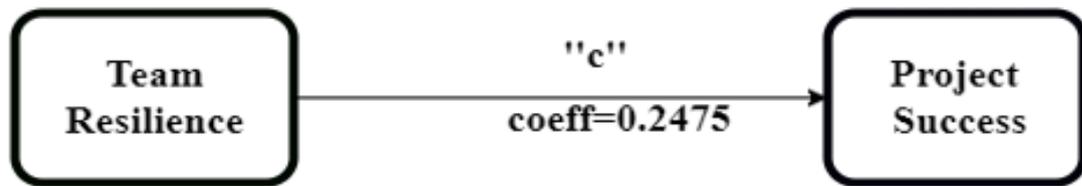
FIGURE 4.1: Direct effect of X on Y

4.3.2 Mediation Analysis

In the second step the association between team resilience and agile response to change is considered also known as path "a". According to the **Table 4.4** and Figure 4.2 given below the p value is lesser then 0.01 and there is zero between the values of LLCI and ULCI which means that the relationship between these variables is in-significant. The value of SE i.e., 0.0320 suggests that the team resilience will bring a change of 3.2 units in agile response to change. It means that with every one unit increase in team resilience, project success will increase by 3.2 units. Positive value of SE indicates that if team resilience will increase, agile response to change will also increase. This means that our second hypothesis that "team resilience is positively related to agile response to change" is supported.

TABLE 4.4: Direct Effect

Predictor	Coeff	SE	t	p	LLCI	ULCI
X to M	0.8236	0.320	25.732	0.000	0.7607	0.8865
M to Y	0.5858	0.0353	16.573	0	0.5163	0.6553

X=Team Resilience, Y= Project Success M= Agile Response to Change, N=387, Confidence Interval = CI, UL = Upper Limit, LL = Lower Limit

FIGURE 4.2: Direct Effect of X on M

In the third step also known as path "b" is considered. According to **Table 4.4** and **Figure 4.3** given below the p value is 0.00 which is less than 0.001 and accordingly if we look at the values of LLCI and ULCI there is no zero between the 2 values i.e., 0.516 and 0.655 which means that the relationship is significant and the value of SE 0.035 suggests that agile response to change will bring a 3.5 unit change in project success. It means that with every 1 unit increase in agile response to change the project success will increase by 3.5 units. The positive value indicates that with increase in agile response to change, project success will also increase. This means that our third hypothesis that "agile response to change is positively related to project success" is supported.
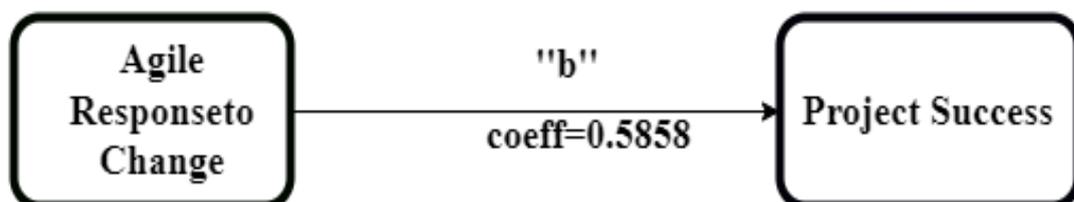
FIGURE 4.3: Direct Effect of M on Y

The indirect effect of team resilience on project success through agile response to change also known as path "c" is significant as bootstrapping values (i.e., BOOT

LLCI = 0.3841 and BOOTULCI = 0.5815) of indirect effect doesn't have a zero between them. Accordingly, both values are positive which confirm that there is mediation in model. Total effect is calculated by adding direct effect and indirect effect. In my case the value (i.e., .4825) of indirect effect is positive which means that with the presence of mediator the values of total effect will increase.

TABLE 4.5: Indirect Effect

Predictors	Coeff	SE	LLCI	ULCI
Agile Response to Change	0.4825	0.495	0.3841	0.5815

X=Team Resilience, Y= Project Success M= Agile Response to Change, N=387, Confidence Interval = CI, UL = Upper Limit, LL = Lower Limit.
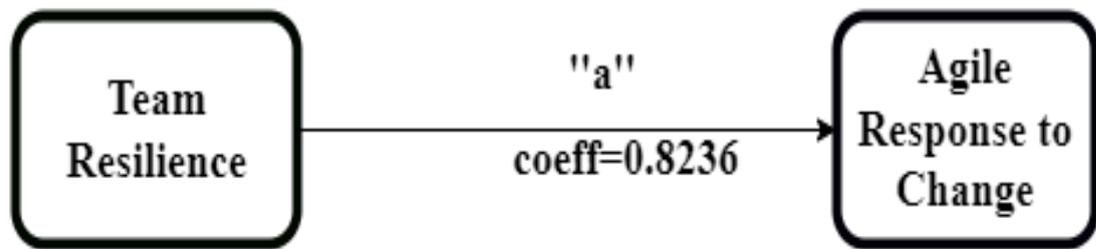
Hence according to Table 4.5 and Figure 4.4 given above the values of indirect effect are significant hence my fourth hypothesis that agile response to change mediates the relationship between team resilience and success e is supported.
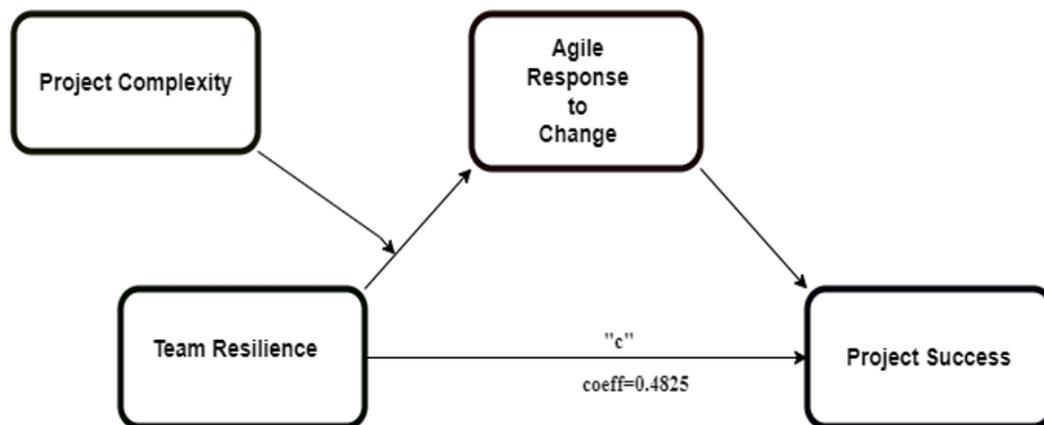
FIGURE 4.4: Direct Effect of X on Y

4.3.3   Moderation Analysis

For testing project complexity as a moderator, I have used model 7 in process macro. If we look at **Table 4.6** that is given below, we will come to know that the values of LLCI and ULCI are (-.0673) and (.0264) respectively that there is zero exists between these two values. Along with that p value show the insignificance

of moderator because in my case the p value is .3915 that is greater than 0.01. This means that my fifth hypothesis is not supported.

TABLE 4.6: Moderation Analyses

	Coeff	SE	t	p	LLCI	ULCI
Constant	-0.374	0.349	-1.074	0.283	-1.061	0.311
Int-term	-0.205	0.238	-0.857	0.391	-0.673	0.026

N = 387, Int- term = Team resilience x Project complexity

Furthermore, according to **Table 4.7** which demonstrates the index of moderated mediation suggests that moderated mediation is not exist in the model. Along with that p value show the insignificance of moderator because in my case the p value is 0.3915 that is greater than 0.01. This means that my fifth hypothesis is insignificant not supported.

TABLE 4.7: Index of Moderated Mediation

	Index	Boot SE	Boot LLCI	Boot ULCI
Project complexity	-0.0120	0.0141	-0.0408	0.0149

N= 387, Confidence Interval = CI, Upper Limit = UL, Lower Limit = L.
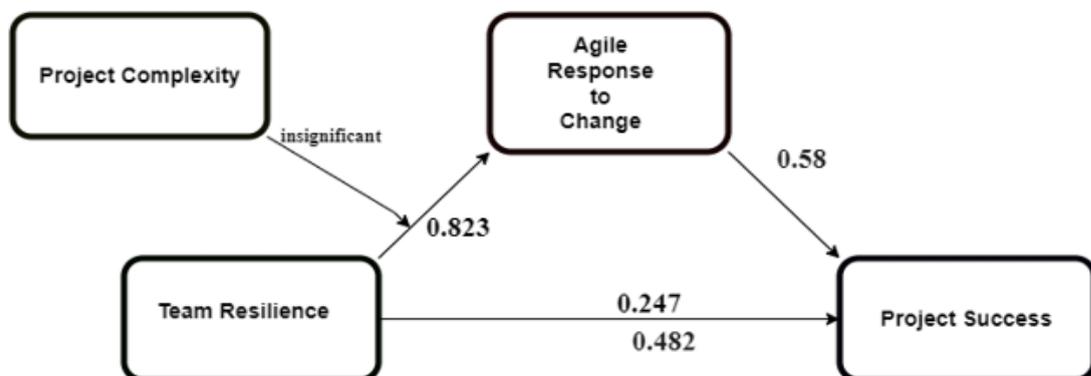
FIGURE 4.5: Research model with results

4.4 Hypothesis Results Summary

TABLE 4.8: Summary of Hypothesis Results

Hypothesis	Statement	Status
H1	Team resilience is positively and significantly associated with agile project success.	Supported
H2	There is a positive association between agile response to change and agile success	Supported
H3	Team resilience is positively and significantly associated with agile response to change.	Supported
H4	Agile response to change plays a mediating role between team resilience and agile success	Supported
H5	Project complexity will moderate the relationship between Team resilience and agile response to change in such a way that this relationship will be stronger when project complexity is high.	Insigificant/Not Supported

Chapter 5

Discussion and Conclusion

5.1 Discussion

In this chapter, I will explain importance and relevance of research to existing literature. This chapter will explain that what we have found from the results, how this study contributes to existing literature, and how it contradicts existing literature. The research study was conducted with an aim, to test the hypotheses that were based on theoretical background. Main reason of my study was to look into the link between team resilience and project success. In this study agile response to change was considered as the mediator and project complexity was taken as a moderator. This chapter basically debates the results and findings that were displayed in the previous chapter. If we read chapter 4 of this thesis we will come to know that relationship between team resilience and project success is not significant, relationship between team resilience and project success is significant, relationship between agile response to change and project success is significant, agile response to change as mediator is significant, and project success as a moderator is not significant. In this chapter discussion are made on these results in light of existing literature.

Accordingly, this chapter will discuss in detail the relationship that were found and the result that were created after the analysis of data. As a hole this chapter will link my study with the previous studies that are undertaken and will help us in knowing that how much the findings of our study are similar to the finding

of previous study and if the result deviate what can be the reason. At the end previously discussed objectives with tested for giving direction to our discussion so that theoretical contributions and practical implications can be drawn.

5.1.1 Does the Relationship exist between Team Resilience and Agile Project Success?

The first hypothesis proposed for study states that "team resilience is positively related to project success" it is not supported according to the finding of studies. Individually, resilient team members are able to deal with challenging situations, and their performance is rarely negatively impacted. This gives teams more chances to work together effectively on activities that need a focus on cooperation as well as during challenging situations. We also agree that unfavorable occurrences might interfere with team operations and force teams to change their methods in order to accomplish their objectives. However, resilient teams argue that they are able to withstand the negative effects of adverse events with minimal impact on performance can be made unnecessary. According to (Vogus & Sutcliffe, 2007), "Resilience is the maintenance of positive coordination in difficult circumstances."

In the additional statements, resilience is a critical instrument for project groups working in high environments fraught with risk and uncertainty. Teams that are less resilient in such challenging situations are even less able to think creatively about long term problems and challenges, lowering their ultimate likelihood of succeeding. We define combined cognition more generally as "connecting individual thoughts and experiences in ways that both redefine and address the needs of developing conditions" (Hargadon & Bechky, 2006). This occurs as a result of members interacting mindfully (directing attention and exerting effort) in ways that allow them to reflect on and perceive continuing perspectives in order to formulate effective responses (Roberts & Weick, 1993).

5.1.2 Does the Relationship exist between Team Resilience and Agile Response to Change?

Our second hypothesis that "team resilience is positively related to agile response to change" is supported.

The Agile concept is the best fit with business realities in the twenty-first century (Denning, 2015), since agile methodologies directly address the issues associated with projects in fast changing contexts The capacity of project management team members to adapt to project challenges and obstacles is essential to the project's success or failure (Serrador & Pinto, 2015). On the other hand, for a number of reasons, resilient teams can produce better project results. First off, resilient teams are better able to handle the pressure of unforeseen problems, bounce back and go on as normal after them, and learn and develop as a result of them (Vogus & Sutcliffe, 2007). In the other statements, resilient teams show a greater capacity for improvisation as well as greater adaptability and flexibility in the face of danger, allowing them to perform at a higher level (Meneghel et al., 2016; West et al., 2009).

Team resilience competencies can be developed over period and 40 team-level behaviors' were identified and classified into three major strategies (Alliger et al., 2015):

i.Reduce - actions that deal with pre-crisis circumstances and serve as a form of anticipatory control.

ii.Regulate- the responses employed to cope with the situation as it arises.

iii.Restore- the actions that were employed to recover team morale and resources during a crisis.

More especially Morgan, Fletcher, and Sarkar (2013) investigated the psychosocial enabling factors and methods for team resilience development and identified five major themes:

i. Motivate, empower, and encourage team members to achieve continual improvement.

ii. Establish an ownership- and accountability-based framework for team regularity.

iii. Create a team identity and sense of belonging based on a "selfless" culture.

iv. Make it known that the team is attempting to overcome training and unforeseen events; and Encourage satisfaction and a positive mindset during times of stress.

Capacity to deal effectively with unforeseen events by concentrating on a series of actions designed to mitigate the persistence of adverse situation, necessarily requires a distinct set of abilities, experiences, and attitude (Vogus & Sutcliffe, 2007). Thus, resilience reduces the time required for individuals to recover and ensures a strengthened will, as well as a more expansive repository of useful information for future situations (Lauer, Lauer, & Kerr, 1990), which is crucial for human working and organizational reliability.

When we begin concentrating on team resilience, this situation changes rather than solely on single resilience. In general, the mechanisms that contribute to a team's resilience are similar to those that contribute to an individual's resilience. However, the collaborative aspect of the organization and the interactions among its members introduce new variables that must be adequately considered when calculating the team's dependencies and impacts on performance (Klein et al., 2009).

5.1.3 Does the Telationship exist between Agile Response to Change and Agile Project Success?

Our third hypothesis that "agile response to change is positively related to project success" is supported.

In today's world, when competition is high, technology innovation is quick, and market needs are diverse, adaptability is critical, as a result, unpredictable world, agility is one of the pillars of continuous originality. Noticed necessary for organizational performance competitiveness and innovation (Sambamurthy et al., 2003).

In dynamic and frequently changing corporate environments, agility plays a critical role in optimizing project success (Haider & Kayani, 2020). Agile approaches improve project performance by reducing overruns (Nguyen & Mohamed, 2020).

5.1.4 Does Agile Response to Change Mediating to the Relationship between Team Resilience and Project Success?

My fourth hypothesis of study states that agile response to change mediates the relationship between team resilience and project success. This hypothesis is supported, Agile methodologies in the software industry provide a project, get customer feedback, and use it to improve the project to produce a better version rather than finishing and delivering the project all at once and risking catastrophic failure (Beck et al., 2001).

5.1.5 Does Project Complexity Moderate Relationship between Team Resilience and Agile Response to Change?

My fifth hypothesis of study states that "PC moderate the relationship between TR and agile ARC such PC support will strengthen the relationship this hypothesis is not supported.

The results of the current research it is consistent with earlier findings that some independent and dependent variables' relationships are mediated by project complexity. According to (Vidal & Marle, 2008), complexity in a project has a negative effect on overall project performance but a positive influence on project results/outcomes (as a consequence of emergent qualities that might generate new chances for a project).

5.2 Theoretical Implications

This study has facilitated the present evolving field called project management recently getting popularity as the projects requirement is increasing day by day. This research contributed crucial factors: Firstly, this study hypothesizes the association between TR and PS, and the relationship was supported by the results. Secondly, the relationship between team resilience and agile response to change

was also supported by the results. Thirdly the relationship between agile responses to change on project success is supported. Fourth, is an understanding of the effect of team resilience on project success through the agile response to change was developed that was also supported by the results. Therefore last, moderating role of project complexity has also been checked. As per my knowledge team resilience was examined against project success in the previous research only. Therefore, the impact of team resilience on PS with the mediating role of ARC and moderating role of project success. The outcomes of this research have practical consequences about the world of business and may contribute in the expansion of theory at workplace.

Previous research indicated that a team may possess these characteristics regardless of whether it is confronted with a challenge (Hartmann et al., 2020; Stoverink et al., 2020). The results of present study are partially supporting the previous theoretical research where main focus is team resilience and project success via ARC with the moderating effect of PC. Thus these results participate in the expansion of theory.

Present research responded a call for experimental study from those persons who has discussed that more experiential studies require to be carried out on the relationship between team resilience and behaviors of the team as well as attitudes.

Therefore, from a theoretical viewpoint, the current study is innovative and participating to the in-depth knowledge of the psychosocial mechanisms that will provide opportunity to the team to comprehend the importance regarding team resilient that affect team outcomes as well as project success in the setting of business. Present study also extended the thoughtful about agile response to change through the Agile Governance Theory.

5.3 Practical Implications

My study can help companies in different ways. As I have already mentioned that IT Companies need to focus on their project team members so that they can develop them effectively. Our research is focused on social aspects of project team resilience , with help of this research companies can understand development of

team members of project, their attitude towards project success and in getting them more engaged in their work which ultimately leads to successful of project teams in IT Companies.

Every project is different from other projects, meaning that every project has its own project team requirements because of which in every project different, strategies policies and procedures are used for managing project team. This study can help in development of such policies and procedures that can help in better resilience of team in a project. In this fast moving world there is a need to hire such workers that are qualified and have required skills to complete projects on time.

Organization now days are putting a lot of their focus towards successful management of project teams. Accordingly a lot of research is now focused on team resilience in projects. Similarly this research is also focused on behavioral and social aspects of project team development.

We have discussed earlier that team resilience are more involved in agile response to change which leads to increased project success. Along with that companies should focus on recruiting teams who high level of resilience. Companies should make a comfortable environment and develop a culture that promotes project team resilience this can be done by increasing the number of project resources for project team. Furthermore, companies should evaluate teams and they should give them constructive criticism in this way teams will feel motivated and will be more engaged in their work. In projects when agile methodology is used, the importance of team resilience increases success rates. Agile is a methodology that has been proven to minimize project complexity since, practically speaking, every project is complicated in its own right. By implementing the agile approach in complicated projects, the team will be better able to concentrate on the reasons that contribute to the projects' increased complexity, and by removing or reducing those aspects; the team will be able to complete the project successfully. By using agile approach in a complicated setting or complex project, the team would be given the opportunity to become more accountable and more cooperative, which would ultimately make the atmosphere more conducive to work.

Companies can communicate with teams regarding the issues and challenges they are facing in projects and should encourage them to make physical and cognitive alterations which can lead to project team resilience and agile response to change. Companies should tell teams about the characteristics of project which will help them in getting motivated for their work and can lead to project success. IT Companies can implement similar activities which will help them in getting project team more engaged which will lead to success in projects. By doing this company can increase their productivity which can ultimately lead to profit maximization.

5.4   Future Directions

The research was conducted to determine the relationship between team resilience and project success with a mediating role of agile response to change and moderating role of interpersonal trust.

- In future a study can be conducted with a different independent variable like team work or team training.

- Future research studies can be conducted with a different unit of analysis.

- Future studies should consider a larger sample size for more accurate results

- While the current study collected data in a cross-sectional method, longitudinal studies should be conducted in the future.

- Future study can be conducted to check why impact of moderation in not significant.

5.5   Limitations

Every study has some limitations because it is not possible to cover every aspect and same is the case with my research study. My research study has filled a research gap by making contribution to existing literature. Some limitations associated with this study are related to the time and resource constraint. The goal of

study was to examine the association between variables in project team members of in IT Companies but because of the time constraint we only managed to gather data of some companies operating in Pakistan. It was difficult to capture target population in recent times because of security reasons.

Some of the results of our study were not according to what we anticipated, if we look at previous literature the results were different. It is also important to add that the current study used the convenience sampling method because of limited time and resources. We used convenience sampling because it was less costly and can be done in lesser time. I calculated data with help of Google forms randomly from different IT Companies.

Furthermore, most of the project team members were busy with their project activities and because of which they were not ready to give data properly, most of the team responded to questions without reading the statements, resulting in low generalizability of the study as response rate was very low. In future studies can consider the time-lag method to collect data instead of conducting a cross sectional study. Time-lag method can give improved results by reducing common method biasness. Lastly, we analyzed our data using SPSS tool, in future research study can be conducted by using advanced tools for analysis like M Plus or Smart PLS which are used for analyzing complex models in detail.

5.6 Conclusion

The present study is the first to acknowledge team resilience and project success through agile response to change in the IT companies. The data was collected from the individuals (project team members) working in an IT companies. 450 project team members were approached. Previous research supports the fact that team resilience has too much important for the organizations to enhance the project performance. The proposed assumptions include that team resilience positively affects the project success and our results support it and it is significance. And the proposed assumptions include that resilience positively affects the agile response to change and this hypothesis was supported. And also agile response to change is positively linked to project success and this hypothesis was supported.

When agile response is integrated as the mediating variable and this hypothesis are significant. Oppositely, the effect was very insignificant with the moderating variable that is project complexity. In this study, first second third four hypotheses are acknowledged in the Pakistani framework and four are supported, with the help of past findings and theory while fifth hypothesis is not supported.

Based on the current state of research and industry practices, there is evidence to suggest that team resilience and agile response to change are positively correlated with project success in IT companies.

Team resilience refers to a team's ability to bounce back from setbacks and challenges, and to adapt and learn from these experiences. When teams are resilient, they are better equipped to handle unexpected changes and challenges that arise during a project, which can help to prevent delays and mitigate risks.

Agile methodologies, such as Agile Scrum, are designed to promote flexibility, collaboration, and rapid iteration in software development projects. By embracing change and responding quickly to new information, teams can deliver higher-quality products that better meet the needs of stakeholders.

Together, team resilience and agile methodologies can help IT companies to navigate the fast-paced and constantly evolving landscape of software development. By building teams that are able to adapt and respond to change, companies can improve their chances of project success and stay competitive in an increasingly crowded marketplace.

Bibliography

Aga, D. A., Noorderhaven, N., & Vallejo, B. (2016). Transformational leadership and project success: The mediating role of team-building. *International Journal of Project Management*, *34*(5), 806–818.

Aitken, A., & Crawford, L. (2007). A study of project categorisation based on project management complexity. In *Irnop viii conference (8th annual international research network on organizing by projects)*.

Alexandrova, M., & Ivanova, L. (2012). Critical success factors of project management: empirical evidence from projects supported by eu programmes. *Systematic Economic Crisis: Current issues and persperctive*.

Alliger, G. M., Cerasoli, C. P., Tannenbaum, S. I., & Vessey, W. B. (2015). Team resilience: How teams flourish under pressure. *Organizational Dynamics*.

Amaral, A., Fernandes, G., & Varajão, J. (2015). Identifying useful actions to improve team resilience in information systems projects. *Procedia Computer Science*, *64*, 1182–1189.

Ambler, S. W. (2009). The agile scaling model (asm): adapting agile methods for complex environments. *Environments*, 1–35.

Andrew, & Hayes. (2021). Mediation, moderation, and conditional process analysis: Concepts, computations, and some common confusions. *The Spanish Journal of Psychology*, *24*, e49.

Arteta, B. M., & Giachetti, R. E. (2004). A measure of agility as the complexity of the enterprise system. *Robotics and computer-integrated manufacturing*, *20*(6), 495–503.

Atkinson, R. (1999). Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International journal of project management*, *17*(6), 337–342.

Baccarini, D. (1996). The concept of project complexity—a review. *International journal of project management*, *14*(4), 201–204.

Baccarini, D. (1999). The logical framework method for defining project success. *Project management journal*, *30*(4), 25–32.

Baker, B. N., Murphy, D. C., & Fisher, D. (1997). Factors affecting project success. *Project management handbook*, 902–919.

Bakhshi, J., Ireland, V., & Gorod, A. (2016). Clarifying the project complexity construct: Past, present and future. *International journal of project management*, *34*(7), 1199–1213.

Balocco, R., Cavallo, A., Ghezzi, A., & Berbegal-Mirabent, J. (2019). Lean business models change process in digital entrepreneurship. *Business Process Management Journal*.

Barton, H. (2013). 'lean'policing? new approaches to business process improvement across the uk police service. *Public Money & Management*, *33*(3), 221–224.

Bassett-Jones, N. (2005). The paradox of diversity management, creativity and innovation. *Creativity and innovation management*, *14*(2), 169–175.

Beck, K., & Beedle, M. (2001). A. van bennekum. *A., Cockburn, A., Cunningham, W., Fowler, M., Grenning J., et al.*

Beck, K., Beedle, M., Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M., . . . others (2001). *Manifesto for agile software development. 13 january 2014.*

Bergmann, T., & Karwowski, W. (2018). Agile project management and project success: A literature review. In *International conference on applied human factors and ergonomics* (pp. 405–414).

Bjorvatn, T., & Wald, A. (2018). Project complexity and team-level absorptive capacity as drivers of project management performance. *International Journal of Project Management*, *36*(6), 876–888.

Boehm, B., & Turner, R. (2003). Using risk to balance agile and plan-driven methods. *Computer*, *36*(6), 57–66.

Bosch, Jongkind, Y., Mooi, H., Bakker, H., & Verbraeck, A. (2011). Grasping project complexity in large engineering projects: The toe (technical, organizational and environmental) framework. *International journal of project*

Management, *29*(6), 728–739.

Bosch-Rekveldt, M. G. C. (2011). Managing project complexity: A study into adapting early project phases to improve project performance in large engineering projects.

Brown, A., & Adams, J. (2000). Measuring the effect of project management on construction outputs: a new approach. *International Journal of project management*, *18*(5), 327–335.

Bryde, D. (2008). Perceptions of the impact of project sponsorship practices on project success. *International journal of project management*, *26*(8), 800–809.

Butler, C. W., Vijayasarathy, L. R., & Roberts, N. (2020). Managing software development projects for success: Aligning plan-and agility-based approaches to project complexity and project dynamism. *Project Management Journal*, *51*(3), 262–277.

Buvik, M. P., & Rolfsen, M. (2015). Prior ties and trust development in project teams–a case study from the construction industry. *International journal of project management*, *33*(7), 1484–1494.

Cameron, K., & Dutton, J. (2003). *Positive organizational scholarship: Foundations of a new discipline*. Berrett-Koehler Publishers.

Carmeli, A., Friedman, Y., & Tishler, A. (2013). Cultivating a resilient top management team: The importance of relational connections and strategic decision comprehensiveness. *Safety science*, *51*(1), 148–159.

Chapman, M. T., Lines, R. L., Crane, M., Ducker, K. J., Ntoumanis, N., Peeling, P., . . . others (2020). Team resilience: A scoping review of conceptual and empirical work. *Work & Stress*, *34*(1), 57–81.

Chiocchio, F., Forgues, D., Paradis, D., & Iordanova, I. (2011). Teamwork in integrated design projects: Understanding the effects of trust, conflict, and collaboration on performance. *Project management journal*, *42*(6), 78–91.

Chow, T., & Cao, D.-B. (2008). A survey study of critical success factors in agile software projects. *Journal of systems and software*, *81*(6), 961–971.

Ćirić, D., & Gračanin, D. (2017). Agile project management beyond software industry. In *proceedings of the xv international scientific conference on industrial systems* (pp. 332–337).

Ciric, D., Lalic, B., Gracanin, D., Tasic, N., Delic, M., & Medic, N. (2019). Agile vs. traditional approach in project management: Strategies, challenges and reasons to introduce agile. *Procedia Manufacturing*, *39*, 1407–1414.

Cohen, Bailey, & E, D. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of management*, *23*(3), 239–290.

Cohen, P., West, S. G., & Aiken, L. S. (2014). *Applied multiple regression/correlation analysis for the behavioral sciences*. Psychology press.

Collins, A., & Baccarini, D. (2004). Project success—a survey. *Journal of construction research*, *5*(02), 211–231.

Conforto, E. C., Amaral, D. C., da Silva, S. L., Di Felippo, A., & Kamikawachi, D. S. L. (2016). The agility construct on project management theory. *International Journal of Project Management*, *34*(4), 660–674.

Coutu, D. L. (2002). How resilience works. *Harvard business review*, *80*(5), 46–56.

Daniel, P. A., & Daniel, C. (2018). Complexity, uncertainty and mental models: From a paradigm of regulation to a paradigm of emergence in project management. *International journal of project management*, *36*(1), 184–197.

Dao, B., Kermanshachi, S., Shane, J., Anderson, S., & Hare, E. (2016). Identifying and measuring project complexity. *Procedia Engineering*, *145*, 476–482.

Dao, B., Kermanshachi, S., Shane, J., Anderson, S., & Hare, E. (2017). Exploring and assessing project complexity. *Journal of Construction Engineering and Management*, *143*(5), 04016126.

Denning, S. (2013). Why agile can be a game changer for managing continuous innovation in many industries. *Strategy & Leadership*.

Denning, S. (2015). Agile: it's time to put it to use to manage business complexity. *Strategy & Leadership*.

De Toni, A. F., & Pessot, E. (2021). Investigating organisational learning to master project complexity: An embedded case study. *Journal of Business Research*, *129*, 541–554.

Diallo, A., & Thuillier, D. (2004). The success dimensions of international development projects: the perceptions of african project coordinators. *International journal of project management*, *22*(1), 19–31.

Diallo, A., & Thuillier, D. (2005). The success of international development projects, trust and communication: an african perspective. *International journal of project management*, *23*(3), 237–252.

Dove, R. (2002). *Response ability: the language, structure, and culture of the agile enterprise.* John Wiley & Sons.

Dubey, M. A., Jain, M. A., & Mantri, M. A. (2015). Comparative study: waterfall v/s agile model.

Dumrak, J., Mostafa, S., & Hadjinicolaou, N. (2020). Using analytic hierarchy process to evaluate implementation barriers of agile project management in australian project environments. In *The 10th international conference on engineering, project, and production management* (pp. 277–286).

Dvir, D., Raz, T., & Shenhar, A. J. (2003). An empirical analysis of the relationship between project planning and project success. *International journal of project management*, *21*(2), 89–95.

Ebad, S. A. (2016). Influencing factors for it software project failures in developing countries-a critical literature survey. *J. Softw.*, *11*(11), 1145–1153.

Egeland, B., Carlson, E., & Sroufe, L. A. (1993). Resilience as process. *Development and psychopathology*, *5*(4), 517–528.

Floricel, S., Michela, J. L., & Piperca, S. (2016). Complexity, uncertainty-reduction strategies, and project performance. *International Journal of Project Management*, *34*(7), 1360–1383.

Flyvbjerg, B., & Budzier, A. (2013). Why your it project might be riskier than you think. *arXiv preprint arXiv:1304.0265*.

Ganor, M., & Ben-Lavy, Y. (2003). Community resilience: Lessons derived from gilo under fire. *Journal of Jewish Communal Service*, *79*(2/3), 105–108.

Gemino, A., Horner Reich, B., & Serrador, P. M. (2021). Agile, traditional, and hybrid approaches to project success: is hybrid a poor second choice? *Project Management Journal*, *52*(2), 161–175.

Geraldi, J., Maylor, H., & Williams, T. (2011). Now, let's make it really complex (complicated): A systematic review of the complexities of projects. *International journal of operations & production management*.

Ghezzi, A., & Cavallo, A. (2020). Agile business model innovation in digital entrepreneurship: Lean startup approaches. *Journal of business research*,

110, 519–537.

Gidado, K. (1996). Project complexity: The focal point of construction production planning. *Construction Management & Economics*, *14*(3), 213–225.

Gittell, J. H., Cameron, K., Lim, S., & Rivas, V. (2008). 12. airline industry responses to september 11th. *International terrorism and threats to security: Managerial and organizational challenges*, *42*(3), 267.

Goldman, S. L., Nagel, R. N., & Preiss, K. (1995). Agile competitors and virtual organizations. *Manufacturing review*, *8*(1), 59–67.

Gully, S. M., Incalcaterra, K. A., Joshi, A., & Beaubien, J. M. (2002). A meta-analysis of team-efficacy, potency, and performance: interdependence and level of analysis as moderators of observed relationships. *Journal of applied psychology*, *87*(5), 819.

Haider, S. A., & Kayani, U. N. (2020). The impact of customer knowledge management capability on project performance-mediating role of strategic agility. *Journal of Knowledge Management*.

Hanisch, B., & Wald, A. (2014). Effects of complexity on the success of temporary organizations: Relationship quality and transparency as substitutes for formal coordination mechanisms. *Scandinavian Journal of Management*, *30*(2), 197–213.

Hargadon, A. B., & Bechky, B. A. (2006). When collections of creatives become creative collectives: A field study of problem solving at work. *Organization science*, *17*(4), 484–500.

Hartmann, S., Weiss, M., & Hoegl, M. (2020). Team resilience in organizations: A conceptual and theoretical discussion of a team-level concept. In *Research handbook on organizational resilience.* Edward Elgar Publishing.

Hass, K. (2009). *Managing complex projects. a new model. management concepts.* Leesburg Pike PA.

Hertogh, M., & Westerveld, E. (2010). Playing with complexity. management and organisation of large infrastructure projects.

Hogg, M. A., & Turner, J. C. (1985). Interpersonal attraction, social identification and psychological group formation. *European journal of social psychology*, *15*(1), 51–66.

Ika, L. A. (2009). Project success as a topic in project management journals. *Project management journal*, *40*(4), 6–19.

Ika, L. A. (2015). Opening the black box of project management: Does world bank project supervision influence project impact? *International Journal of Project Management*, *33*(5), 1111–1123.

Jakhar, A. K., & Rajnish, K. (2014). A new cognitive approach to measure the complexity of software's. *International Journal of Software Engineering and Its Applications*, *8*(7), 185–198.

Janssen, M., & Shu, W. S. (2008). Transformational government: basics and key issues. In *Proceedings of the 2nd international conference on theory and practice of electronic governance* (pp. 117–122).

Joslin, R., & Müller, R. (2015). Relationships between a project management methodology and project success in different project governance contexts. *International journal of project management*, *33*(6), 1377–1392.

Jugdev, K., & Müller, R. (2005). A retrospective look at our evolving understanding of project success. *Project management journal*, *36*(4), 19–31.

Kaim, R., Härting, R.-C., & Reichstein, C. (2019). Benefits of agile project management in an environment of increasing complexity—a transaction cost analysis. In *Intelligent decision technologies 2019* (pp. 195–204). Springer.

Kaming, P. F., Olomolaiye, P. O., Holt, G. D., & Harris, F. C. (1997). Factors influencing construction time and cost overruns on high-rise projects in indonesia. *Construction Management & Economics*, *15*(1), 83–94.

Kayser, D., Schmitz, C., & Ramsauer, C. (2017). *Erfolgsfaktor agilität: Chancen für unternehmen in einem volativen marktumfeld*. Wiley-VCH.

Kermanshachi, S., Dao, B., Shane, J., & Anderson, S. (2016). An empirical study into identifying project complexity management strategies. *Procedia engineering*, *145*, 603–610.

Kerzner, H. (2017). *Project management: a systems approach to planning, scheduling, and controlling*. John Wiley & Sons.

Kissi, J., Dainty, A., & Tuuli, M. (2013). Examining the role of transformational leadership of portfolio managers in project performance. *International Journal of project management*, *31*(4), 485–497.

Klein, C., DiazGranados, D., Salas, E., Le, H., Burke, C. S., Lyons, R., & Goodwin, G. F. (2009). Does team building work? *Small group research*, *40*(2), 181–222.

Kloppenborg, T. J., Manolis, C., & Tesch, D. (2009). Successful project sponsor behaviors during project initiation: an empirical investigation. *Journal of Managerial Issues*, 140–159.

Kossek, E. E., & Perrigino, M. B. (2016). Resilience: A review using a grounded integrated occupational approach. *Academy of Management Annals*, *10*(1), 00–00.

Kruchten, P. (2013). Contextualizing agile software development. *Journal of software: Evolution and Process*, *25*(4), 351–361.

Kutsch, E., & Hall, M. (2016). *Project resilience: The art of noticing, interpreting, preparing, containing and recovering.* Routledge.

Lappi, T., & Aaltonen, K. (2017). Project governance in public sector agile software projects. *International Journal of Managing Projects in Business*.

Lauer, R. H., Lauer, J. C., & Kerr, S. T. (1990). The long-term marriage: Perceptions of stability and satisfaction. *The International Journal of Aging and Human Development*, *31*(3), 189–195.

Lee, G., & Xia, W. (2010). Toward agile: an integrated analysis of quantitative and qualitative field data on software development agility. *MIS quarterly*, *34*(1), 87–114.

Lengnick-Hall, B. (2011). Lengnick-hall (2011 lengnick-hall, ca, beck, te, & lengnick-hall, ml (2011). developing a capacity for organizational resilience through strategic human resource management. *Human Resource Management Review*, 243–255.

Lessard, D., Sakhrani, V., & Miller, R. (2014). House of project complexity—understanding complexity in large infrastructure projects. *Engineering project organization journal*, *4*(4), 170–192.

Lindvall, M., Basili, V., Boehm, B., Costa, P., Dangle, K., Shull, F., & Zelkowitz, M. (2002). *Empirical findings in agile methods. inconference on extreme programming and agile methods (pp. 197-207).* Springer Berlin Heidelberg.

Loiro, C., Castro, H., Ávila, P., Cruz-Cunha, M. M., Putnik, G. D., & Ferreira, L. (2019). Agile project management: A communicational workflow proposal.

Procedia Computer Science, *164*, 485–490.

Luna, A. J. d. O., Kruchten, P., & de Moura, H. P. (2015). Agile governance theory: conceptual development. *arXiv preprint arXiv:1505.06701*.

Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of management review*, *26*(3), 356–376.

Mathieu, J., Maynard, M. T., Rapp, T., & Gilson, L. (2008). Team effectiveness 1997-2007: A review of recent advancements and a glimpse into the future. *Journal of management*, *34*(3), 410–476.

Mendez, A. H. (2018). *Improving project performance through implementation of agile methodologies in the renewable energy construction industry* (Unpublished doctoral dissertation). The George Washington University.

Meneghel, I., Salanova, M., & Martínez, I. M. (2016). Feeling good makes us stronger: How team resilience mediates the effect of positive emotions on team performance. *Journal of Happiness Studies*, *17*(1), 239–255.

Meyer, M. H., & Marion, T. J. (2010). Innovating for effectiveness: Lessons from design firms. *Research-Technology Management*, *53*(5), 21–28.

Mir, F. A., & Pinnington, A. H. (2014). Exploring the value of project management: linking project management performance and project success. *International journal of project management*, *32*(2), 202–217.

Mishra, D., & Mishra, A. (2011). Complex software project development: agile methods adoption. *Journal of Software Maintenance and Evolution: Research and Practice*, *23*(8), 549–564.

Morgan, Fletcher, D., & Sarkar, M. (2013). Defining and characterizing team resilience in elite sport. *Psychology of sport and exercise*, *14*(4), 549–559.

Müller, R., & Turner, R. (2007). The influence of project managers on project success criteria and project success by type of project. *European management journal*, *25*(4), 298–309.

Munns, A. K., & Bjeirmi, B. F. (1996). The role of project management in achieving project success. *International journal of project management*, *14*(2), 81–87.

Ngacho, C., & Das, D. (2014). A performance evaluation framework of development projects: An empirical study of constituency development fund (cdf)

construction projects in kenya. *International Journal of Project Management*, *32*(3), 492–507.

Nguyen, T. S., & Mohamed, S. (2020). Interactive effects of agile response-to-change and project complexity on project performance. In *The 10th international conference on engineering, project, and production management* (pp. 311–320).

Papadakis, E., & Tsironis, L. (2018). Hybrid methods and practices associated with agile methods, method tailoring and delivery of projects in a non-software context. *Procedia computer science*, *138*, 739–746.

Papadopoulos, G. (2015). Moving from traditional to agile software development methodologies also on large, distributed projects. *Procedia-Social and Behavioral Sciences*, *175*, 455–463.

Park, H., Kim, K., Kim, Y.-W., & Kim, H. (2017). Stakeholder management in long-term complex megaconstruction projects: The saemangeum project. *Journal of Management in Engineering*, *33*(4), 05017002.

Pinto, & Pinto, J. K. (1990). Project team communication and cross-functional cooperation in new program development. *Journal of Product Innovation Management: an international publication of the product development & management association*, *7*(3), 200–212.

Pinto, & Slevin, D. P. (1988). Project success: definitions and measurement techniques.

PMI, P. (2013). Pmi's pulse of the profession in-depth report: navigating complexity. *Newtown Square, PA*.

Popaitoon, S., & Siengthai, S. (2014). The moderating effect of human resource management practices on the relationship between knowledge absorptive capacity and project performance in project-oriented companies. *International Journal of Project Management*, *32*(6), 908–920.

Porter, M. E., & Advantage, C. (1985). Creating and sustaining superior performance. *Competitive advantage*, *167*, 167–206.

Prabhakar, G. P. (2008). What is project success: a literature review. *International Journal of Business and Management*, *3*(9), 3–10.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models.

Behavior research methods, *40*(3), 879–891.

Qazi, A., Quigley, J., Dickson, A., & Kirytopoulos, K. (2016). Project complexity and risk management (procrim): Towards modelling project complexity driven risk paths in construction projects. *International journal of project management*, *34*(7), 1183–1198.

Qumer, A., & Henderson-Sellers, B. (2008). A framework to support the evaluation, adoption and improvement of agile methods in practice. *Journal of systems and software*, *81*(11), 1899–1919.

Rasnacis, A., & Berzisa, S. (2017). Method for adaptation and implementation of agile project management methodology. *Procedia Computer Science*, *104*, 43–50.

Ravichandran, T. (2018). Exploring the relationships between it competence, innovation capacity and organizational agility. *The Journal of Strategic Information Systems*, *27*(1), 22–42.

Roberts, K. H., & Weick, K. E. (1993). Collective mind in organizations: Heedful interrelating on flight decks. *Administrative Science Quarterly*, *38*(3), 357–381.

Ruoslahti, H. (2020). Complexity in project co-creation of knowledge for innovation. *Journal of Innovation & Knowledge*, *5*(4), 228–235.

Sambamurthy, V., Bharadwaj, A., & Grover, V. (2003). *Shaping agility through digital options: reconceptualizing the role of information technology in contemporary firms. mis q. 27 (2), 237–263 (2003).*

Scholz, J.-A., Sieckmann, F., & Kohl, H. (2020). Implementation with agile project management approaches: Case study of an industrie 4.0 learning factory in china. *Procedia Manufacturing*, *45*, 234–239.

Schultz, R. L., Slevin, D. P., & Pinto, J. K. (1987). Strategy and tactics in a process model of project implementation. *Interfaces*, *17*(3), 34–46.

Serrador, P., & Pinto, J. K. (2015). Does agile work?—a quantitative analysis of agile project success. *International journal of project management*, *33*(5), 1040–1051.

Serrador, P., & Turner, R. (2015). The relationship between project success and project efficiency. *Project management journal*, *46*(1), 30–39.

Sheffield, J., & Lemétayer, J. (2013). Factors associated with the software development agility of successful projects. *International Journal of Project Management*, *31*(3), 459–472.

Shenhar, A. J., Dvir, D., Levy, O., & Maltz, A. C. (2001). Project success: a multidimensional strategic concept. *Long range planning*, *34*(6), 699–725.

Shrout, P., & Bolger, N. (2002). Psychological methods, 7. *Mediation in experimental and nonexperimental studies: new procedures and recommendations*, *7*, 422–445.

Sinclair, V. G., & Wallston, K. A. (2004). The development and psychometric evaluation of the brief resilient coping scale. *Assessment*, *11*(1), 94–101.

Sohi, A. J., Hertogh, M., Bosch-Rekveldt, M., & Blom, R. (2016). Does lean & agile project management help coping with project complexity? *Procedia-social and behavioral sciences*, *226*, 252–259.

Staudinger, U. M., Marsiske, M., & Baltes, P. B. (1995). Resilience and reserve capacity in later adulthood: Potentials and limits of development across the life span. *Developmental psychopathology*, *2*, 801–847.

Stettina, C. J., & Hörz, J. (2015). Agile portfolio management: An empirical perspective on the practice in use. *International Journal of Project Management*, *33*(1), 140–152.

Stoica, M., Mircea, M., & Ghilic-Micu, B. (2013). Software development: agile vs. traditional. *Informatica Economica*, *17*(4).

Stoverink, A. C., Kirkman, B. L., Mistry, S., & Rosen, B. (2020). Bouncing back together: Toward a theoretical model of work team resilience. *Academy of Management Review*, *45*(2), 395–422.

Suprapto, M., Bakker, H. L., & Mooi, H. G. (2015). Relational factors in owner–contractor collaboration: The mediating role of teamworking. *International journal of project management*, *33*(6), 1347–1363.

Sutcliffe, K. M. (2003). Organizing for resilience. *Positive organizational scholarship: Foundations of a new discipline*.

Tam, Oliveira, T., & Varajão, J. (2020). The factors influencing the success of ongoing agile software development projects. *International Journal of Project Management*, *38*(3), 165–176.

Tam, Shen, L., & Kong, J. S. (2011). Impacts of multi-layer chain subcontracting on project management performance. *International Journal of Project Management*, *29*(1), 108–116.

Tatikonda, M. V., & Rosenthal, S. R. (2000). Technology novelty, project complexity, and product development project execution success: a deeper look at task uncertainty in product innovation. *IEEE Transactions on engineering management*, *47*(1), 74–87.

Totterdell, P. (2000). Catching moods and hitting runs: mood linkage and subjective performance in professional sport teams. *Journal of applied Psychology*, *85*(6), 848.

Truong, D., & Jitbaipoon, T. (2016). How can agile methodologies be used to enhance the success of information technology projects? *International Journal of Information Technology Project Management (IJITPM)*, *7*(2), 1–16.

Turner, R., & Zolin, R. (2012). Forecasting success on large projects: developing reliable scales to predict multiple perspectives by multiple stakeholders over multiple time frames. *Project management journal*, *43*(5), 87–99.

Van Teijlingen, E., & Hundley, V. (2001). The importance of pilot studies. *Social research update*(35), 1–4.

Varajão, J., & Cruz-Cunha, M. M. (2013). Using ahp and the ipma competence baseline in the project managers selection process. *International Journal of Production Research*, *51*(11), 3342–3354.

Veil, C., & Turner, J. R. (2002). Group efficiency improvement: how to liberate energy in project groups. *International Journal of Project Management*, *20*(2), 137–142.

Vidal, L.-A., & Marle, F. (2008). Understanding project complexity: implications on project management. *Kybernetes*.

Vogus, T. J., & Sutcliffe, K. M. (2007). Organizational resilience: towards a theory and research agenda. In *2007 ieee international conference on systems, man and cybernetics* (pp. 3418–3422).

Vogus, T. J., & Sutcliffe, K. M. (2012). Organizational mindfulness and mindful organizing: A reconciliation and path forward. *Academy of Management Learning & Education*, *11*(4), 722–735.

Walker, D. H., Davis, P. R., & Stevenson, A. (2017). Coping with uncertainty and ambiguity through team collaboration in infrastructure projects. *International Journal of Project Management*, *35*(2), 180–190.

Wang, X., Conboy, K., & Cawley, O. (2012). "leagile" software development: An experience report analysis of the application of lean approaches in agile software development. *Journal of Systems and Software*, *85*(6), 1287–1299.

Weaver, P. (2010). The effective management of time on mega projects. *Challenges of global mega projects innovations and creativities for project excellence*.

West, B. J., Patera, J. L., & Carsten, M. K. (2009). Team level positivity: Investigating positive psychological capacities and team level outcomes. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, *30*(2), 249–267.

Williams. (1999). The need for new paradigms for complex projects. *International journal of project management*, *17*(5), 269–273.

Williams, Gruber, D. A., Sutcliffe, K. M., Shepherd, D. A., & Zhao, E. Y. (2017). Organizational response to adversity: Fusing crisis management and resilience research streams. *Academy of Management Annals*, *11*(2), 733–769.

Wood, H., & Ashton, P. (2010). The factors of project complexity. In *18th cib world building congress* (pp. 69–80).

Yang, Y., Lee, P. K., & Cheng, T. (2015). Operational improvement competence and service recovery performance: The moderating effects of role stress and job resources. *International Journal of Production Economics*, *164*, 134–145.

Young, L., Ganguly, A., & Farr, J. (2012). Project management processes in agile project environment. In *Annual international conference of the american society for engineering management* (Vol. 33, pp. 9–19).

Youssef, C. M., & Luthans, F. (2007). Positive organizational behavior in the workplace: The impact of hope, optimism, and resilience. *Journal of management*, *33*(5), 774–800.

Yusuf, Y. Y., Sarhadi, M., & Gunasekaran, A. (1999). Agile manufacturing:: The drivers, concepts and attributes. *International Journal of production economics*, *62*(1-2), 33–43.

Zolin, R., Turner, R., & Remington, K. (2009). A model of project complexity: distinguishing dimensions of complexity from severity. In *International research network of project management conference (irnop)* (pp. 1–30).

Appendix-A

Questionnaire

Dear Respondent

My name is Maira Afzaal, as a MS research student at Capital University of Sciences and Technology, Islamabad; I am collecting data for my research paper titled as **"Impact of Team Resilience on Project Success with Mediating Role of Agile Response to Change and Moderating Role of Project Complexity"**. It will take your 10-15 minutes to answer the questions and to providing the valuable information. I assure you that data will be kept confidential and will only be used for academic purposes.

Sincerely,

Maira Afzaal,

MS Research Scholar,

Faculty of Management and Social Sciences,

Capital University Science and Technology, Islamabad.

Section 1: Demographics

Gender	1- Male 2- Female
Age(years)	1 (18-25), 2 (26-33), 3 (34-41), 4 (42-49), 5 (50-above)
Qualification	1 (Matric), 2 (Inter), 3 (Bachelor), 4 (Master), 5 (MS/M.Phil.), 6 (PhD), 7(Post PhD)
Experience(years)	1 (0–5), 2 (6–10), 3 (11-16), 4 (17-22), 5 (23-28)

Section 2: Team Resilience

Please tick the relevant choices: 1= strongly disagree, 2= Disagree, 3 = Neutral, 4= Agree, 5= Strongly Agree.

Sr. No	Statement					
1	We look for creative ways to alter difficult situations.	1	2	3	4	5
2	Regardless of what happens to us, we can control our reaction to it.	1	2	3	4	5
3	We can grow in positive ways by dealing with difficult situations.	1	2	3	4	5
4	We actively look for ways to overcome the challenges we encounter.	1	2	3	4	5

Section 3: Project Success

Please tick the relevant choices: 1= strongly disagree, 2= Disagree, 3 = Neutral, 4= Agree, 5= Strongly Agree.

Sr. No	Statement					
1	The project was completed on time.	1	2	3	4	5
2	The project was completed according to the budget allocated.	1	2	3	4	5
3	The outcomes of the project are used by its intended end users.	1	2	3	4	5
4	The outcomes of the project are likely to be sustained.	1	2	3	4	5
5	The outcomes of the project have directly benefited the intended end users, either through increasing efficiency or effectiveness.	1	2	3	4	5

6	Given the problem for which it was developed, the project seems to do the best job of solving that problem.	1	2	3	4	5
7	I was satisfied with the process by which the project was implemented.	1	2	4	4	5
8	Project team members were satisfied with the process by which the project was implemented.	1	2	3	4	5
9	The project had no or minimal start-up problems because it was readily accepted by its end users.	1	2	3	4	5
10	The project has directly led to improved performance for the end users/target beneficiaries.	1	2	3	4	5
11	The project has made a visible positive impact on the target beneficiaries.	1	2	3	4	5
12	Project specifications were met by the time of handover to the target beneficiaries.	1	2	3	4	5
13	The target beneficiaries were satisfied with the outcomes of the project.	1	2	3	4	5
14	Our principal donors were satisfied with the outcomes of the project implementation.	1	2	3	4	5

Section 4: Project Complexity

Please tick the relevant choices: 1= strongly disagree, 2= Disagree, 3 = Neutral, 4= Agree, 5= Strongly Agree.

Sr. No	Statement					
1	The number of different organizations involved in the project	1	2	3	4	5
2	The number of distinct disciplines, methods, or approaches involved in project execution	1	2	3	4	5

3	Level of stakeholder agreement about the project outcomes	1	2	3	4	5
4	Level of importance of legal, social, or environmental implications on project execution	1	2	3	4	5
5	Overall financial impact (positive or negative) on the projects and stakeholders.	1	2	3	4	5
6	Level of importance of the project to my organization	1	2	3	4	5

Section 5: Agile Response to Change

Please tick the relevant choices: 1= strongly disagree, 2= Disagree, 3 = Neutral, 4= Agree, 5= Strongly Agree.

Sr. No	Statement					
1	The project management team had the abilities to respond to political changes that affected the project	1	2	3	4	5
2	The project management team had the abilities to respond to economic changes that affected the project	1	2	3	4	5
3	The project management team had the abilities to respond to policy changes that affected the project	1	2	3	4	5
4	The Project management team had the abilities to respond to social value changes (e.g. awareness of environmental issues, safety standard and climate change) that affected the project)	1	2	3	4	5
5	The Project management team had the abilities to respond to technology changes that affected the project	1	2	3	4	5

6	The Project management team had the abilities to respond to technology changes that affected the project	1	2	3	4	5