

CAPITAL UNIVERSITY OF SCIENCE AND  
TECHNOLOGY, ISLAMABAD



**Impact of Collaborative Social Resources  
on Project Sustainability in IT Projects:  
Mediating Role of Stakeholder  
Engagement and Moderating Effect of  
Project Governance**

by

**Laiba Tahir**

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

in the

Faculty of Management & Social Sciences  
Department of Management Sciences

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*“I sincerely dedicate this work to my family for their unwavering support and encouragement throughout my journey. I am also deeply grateful to my mentor for his inspiring guidance and supportive leadership, which has greatly influenced my path”*



## CERTIFICATE OF APPROVAL

# Impact of Collaborative Social Resources on Project Sustainability in IT Projects: Mediating Role of Stakeholder Engagement and Moderating Effect of Project Governance

by

Laiba Tahir

MPM-231015

## THESIS EXAMINING COMMITTEE

S. No.	Examiner	Name	Organization
(a)	External Examiner	Dr. Mubbashar Hassan	S.E.C.P., Islamabad
(b)	Internal Examiner	Dr. Syed Arsalan Haider	CUST, Islamabad
(c)	Supervisor	Dr. Arif ud Din	CUST, Islamabad

---

Dr. Arif ud Din  
Thesis Supervisor  
August, 2025

---

Dr. S. M. M. Raza Naqvi  
Head  
Dept. of Management Sciences  
August, 2025

---

Dr. Arshad Hassan  
Dean  
Faculty of Management & Social Sciences  
August, 2025

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## *Acknowledgement*

In the name of **Allah**, the Most Gracious, the Most Merciful. All praise is due to God, the Sustainer of all worlds. I am deeply grateful to Almighty Allah, whose greatest blessing knowledge and wisdom enabled me to accomplish my task successfully.

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**(Laiba Tahir)**

Registration No: MPM-231015

# Abstract

*The purpose of this research is to explore the impact of collaborative social resources on project sustainability in Pakistan's IT Projects, with particular emphasis on the mediating effect of stakeholder engagement and the moderating role of project governance. A quantitative research strategy was applied using a standardized questionnaire administered via Google Forms. The questionnaire, developed after reviewing relevant academic literature, was shared with IT professionals across Pakistan, yielding 342 valid responses out of approximately 600 distributed forms. Data was analyzed with Statistical Package for the Social Sciences (SPSS) for preliminary analysis and AMOS (Analysis of Moment Structures) for Structural Equation Modeling. Results indicate that collaborative social resources have a positive and significant effect on project sustainability. Stakeholder engagement partially mediates this relationship, evidencing the crucial role it plays in converting social collaboration into sustainable results. Furthermore, the moderating role of project governance was found to influence the strength of this relationship, highlighting the importance of governance mechanisms in enhancing or constraining the impact of social collaboration. This research adds to the growing stock of knowledge on project sustainability by empirically proving both mediating and moderating mechanisms. It provides IT project managers in Pakistan with practical tips on how to make use of intangible assets and governance frameworks in order to attain sustained project performance.*

**Keywords:** Collaborative Social Resources, Stakeholder Engagement, Project Governance, Project Sustainability, Statistical Package for the Social Sciences, Analysis of Moment Structures

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# Abbreviations

<b>AMOS</b>	Analysis of Moment Structures
<b>CFA</b>	Confirmatory Factor Analysis
<b>CMB</b>	Common Method Bias
<b>CSR</b>	Collaborative Social Resources
<b>EFA</b>	Exploratory Factor Analysis
<b>KMO</b>	Kaiser-Meyer-Olkin Measure of Sampling Adequacy
<b>PG</b>	Project Governance
<b>PS</b>	Project Sustainability
<b>SE</b>	Stakeholder Engagement
<b>SEM</b>	Structural Equation Modeling
<b>SPSS</b>	Statistical Package for Social Sciences

# Chapter 1

## Introduction

This chapter presents the background of the study by situating the increasing demand for sustainability within project-based contexts, with special focus on Pakistan's IT Projects. It ventures into how collective social capital i.e., trust, common norms, and inter-organizational cooperation—can potentially impact sustainable project outcomes. The chapter is organized with the aim of providing a logical build-up towards the primary goals of the research. It starts with a gap analysis identifying current limitations in literature, followed by an explicitly defined problem justifying the research question. The following sections identify the research questions and objectives informing the study. Research significance is expressed in terms of theoretical contribution and applied value for project stakeholders and policymakers alike. The chapter also addresses the conceptual theoretical framework that supports the study and offers operational definitions for the most relevant variables used in the analysis. In general, this chapter establishes the ground for an in-depth exploration of the mediating role of stakeholder engagement as well as the moderating influence of project governance in the relationship between collaborative social resources and project sustainability.

### 1.1 Background of Study

A key practice that has been integrated into modern world businesses is to adopt sustainability. Many of the world's leading nations have employed strict measures and future goals to reach their respective sustainability benchmarks. Sustainability

ensures that not only are environmental challenges tackled but also helps in handling the ongoing worldwide economic problems (Baporikar, 2023). Recognizing the potential benefits of sustainability, organizations have included it into their core business practices. Sustainability means much more than to adopt eco- friendly measures and green technologies.

Projects serve as a medium of growth and expansion for any organization and thus using projects as a platform to implement new practices helps resonate the organization's plan, where it can reach the masses. The ever-changing dynamics of the modern world require intensive planning, adaptable strategies, and project management to ensure a successful project (Azmat and Siddiqui, 2023). The end goal of any project manager is to have a successful end product., the success of any project is solely dependent on key steps and planning that one can understand through project management concepts (Luo et al., 2017). Along with project success the most important thing is that the sustainability factor of the project, because without long-term sustainability success is short lived and such an outcome is not desirable. Despite sustainable development increasingly becoming a part of business plans, it is unclear what makes the economic, social and environmental dynamics strategically compatible because a lot of factors such as government regulations, policies and other major contributors are at play, so to map them accordingly to profitability is quite challenging (Rodriguez-Melo and Mansouri, 2011). Strategies need to be reimagined as sustainability is the way forward. Therefore, this new development is increasing pressure on the way companies design their strategies (Elkington, 1997).

A conclusive point that can be made on the basis of contemporary research is that through collaborative governance and stakeholder engagement, foundational outcomes can be achieved rather than just complementary results. For example, Ahmad and Esposito (2025) point out that collaborative governance promotes trust and inclusive decision-making, which is important in managing complex issues such as environmental management. In the same manner, (Leal Filho et al., 2025) shows that stakeholder engagement allows institutions to practice sustainability more effectively in various contexts. In the context of infrastructure and construction projects,(Mignenan et al., 2025; Song et al., 2025)confirm the necessity for formal governance and risk management through stakeholder coordination. (Zhang et al., 2023) also attest to this opinion by charting new trends and knowledge gaps in

sustainable project governance.

Together, these results confirm the theoretical significance of including collaborative social resources, stakeholders' involvement, and governance in sustainability studies, particularly in fluid industries like IT in developing countries. The dependence of social, environmental and economic aspects on each other represents a multitude of new challenges for strategists as these factors are directly influenced by one another, to relate and extract a profitable equation from these aspects, keeping all of them in check under the umbrella of sustainability is the focus. Intermingling of known factors have hindered previous studies in pointing out a significant factor or identifying the one big contributor in sustainable development that solely influences the performance in comparison to other factors. This highlights a serious flaw, and strategic efforts need to be revised accordingly. One simple yet effective way to go forward is through collaboration, which can be quite influential towards sustainability. Sustainability not only extends to physical changes but also in social capital, meaning a trustful and strong network is essential for long term sustainability. This can be further elaborated in the sense that a well collaborated team can adapt, organize, manage risk and strategize new challenges at a much higher degree (Wagner and Fernandez-Gimenez, 2008). The practice of Community-based collaborative resource management (CBCRM) is becoming quite popular in the United (Weber, 2003; Yaffee and Wondolleck, 2000).

Through previous studies, it is known that collaboration can enhance trust and promote networking opportunities (Pretty and Ward, 2001; Sturtevant and Horton, 2000). However, it is not easy to conclude whether collaboration builds social capital because logic and theoretical explanations are available but observation and experience-based research is lacking. Fueling the complexity and immeasurability of social concepts is its immense definition as it's a multi-dimensional concept which encapsulates trust, norms of reciprocity, and networks along with the different kinds of network connections like bonds, bridges, and linkages. Tackling stakeholders can be a hefty task and it's also an essential one because stakeholders are always to be kept in check and on one page as their ill-timed demands can often act as a strain on the project success, therefore the idea of sustainability emerged as a result of stakeholders' demands. A sustainability disclosure in the form of a routine report is

a key step in the engagement of stakeholders ([Herremans et al., 2016](#)). The first and most crucial step in effective stakeholder engagement begins with identifying the key players. This can be easily done by categorizing relevant stakeholders that have an interest or are influenced by the company's operations. A fundamental framework is given by ([Freeman, 2010](#)) stakeholder theory, it emphasizes on how important it is for businesses to consider and value the interests of all groups impacted by their operations and not just focusing solely on stakeholders. Moreover, by collaborating with a broad range of groups, organizations can anticipate potential risks and opportunities more effectively. This approach can help businesses adapt to evolving market conditions and social expectations. Certain studies concentrate on pinpointing the essential demographic attributes of stakeholders, including their interests, size, and legitimacy, to effectively outline the relationship between the company and its stakeholders([Freeman, 2010](#)).

Through the analysis of these characteristics, strategists can categorize stakeholders based on their influence level on the business. This identification of key demographic attributes can help in prioritizing and tailoring engagement strategies for different stakeholders. This will help in assisting long-term sustainability and mutual benefit, both for the business and stakeholders. An organization's commitment towards sustainable practices can be directed through governance of structures, policies, and processes, which ensures that sustainability is integrated into the organization's broader mission and strategic goals. Effective sustainability governance requires a robust framework that integrates sustainability into decision-making processes, which promotes accountability and transparency, enabling organizations to assess their environmental and social impact while effectively engaging stakeholders in the process. Cultivating a culture of sustainability within the organization encourages collaboration among departments which helps create an atmosphere of reliability and trust among one another. Such an approach enhances the organizations' ability to meet expectations and by embedding sustainability into their governance structures, organizations can create long-term value, strengthen their reputation, and contribute positively to the communities in which they operate. All this can be achieved by establishing dedicated sustainability committees or boards, developing clear policies, and setting measurable targets([Ioannou and Serafeim,](#)

2012). Through effective collaboration a strong, trust-based relationship can be established with stakeholders and partners. According to (Dyer and Singh, 1998) successful collaborations are built on shared goals, mutual benefits, and open communication. Sustainability governance along with strategized collaboration of all key contributing factors through proper planning, can be described as the major element in business success. In summary, the interplay of sustainability governance, collaborative strategies, and effective planning forms the foundation for successful business practices, enabling organizations to thrive in a competitive landscape while making a positive impact on society and the environment.

## 1.2 Gap Analysis

Existing research on project success and sustainability has broadly investigated components such as cost, time, planning, and client satisfaction. Whereas these measurements give important experiences, they regularly ignore the critical role of assets, especially intangible assets. Most considerations in this region center essentially on substantial assets, such as financial and physical resources. There is limited consideration given to intangible assets like social capital. Indeed, inside the space of social capital, research is overwhelmingly narrow, regularly dismissing the more important angles of collaborative social assets (Xin et al., 2020).

Collaborative social resources are quite significant for cultivating advancement. They include group execution, organizational systems, and interpersonal collaboration. They contribute in upgrading venture results and accomplishing sustainability (ud Din et al., 2021). In any case, their effect on IT ventures, particularly in developing nations like Pakistan, remains essentially underexplored. The need for comprehensive studies looking at how collaborative social resources impact venture sustainability speaks to both a theoretical and contextual gap within the existing body of literature. Tending to this gap is especially relevant for the IT segment in developing countries. Compelling collaboration can moderate challenges related to asset restrictions, administration inefficiencies, and partner engagement. This research looks to contribute to the developing body of information.

Through highlighting the significance of collaborative social assets. These assets help in boosting advancement, improving project performance, and guaranteeing

long-term sustainability in IT ventures. By focusing on this underexplored area, the study aims to enrich theoretical frameworks. This will provide actionable insights for practitioners in the IT projects. A Previous study investigates the relationship between programme management resources and sustainability. However it had a limitation, there was no involvement of stakeholders or any other body. So, the focus is to investigate the influence of collaborative social resources on project sustainability while considering project stakeholder management and project governance (ud Din et al., 2021). (Nanthagopan et al., 2016) explores the capacity of Sri Lankan NGOs to manage projects through a Resource-Based Perspective. It identifies three essential levels of capacity: team, organizational, and collaborative social capacity. The study identified an important gap, that of under-explored collaborative social PM capacity. Especially in uncertain environments, which is seen to call for more empirical research linking these capacities to project success. Another study by (Wagner and Fernandez-Gimenez, 2008) indicates that emphasis on collaborative efforts in community-based resource management increases social capital. Which can contribute to the sustainable management of natural resources. However, much of the existing work centers on how social capital promotes collaboration and problem-solving within communities.

They lack an exploration of the direct effects of collaborative social resources on long-term project sustainability outcomes. Further exploration of this relationship is necessary for a better understanding of how collaborative social resources impact project sustainability. This will help in collaboration techniques, which can be adopted to meet challenges such as environmental changes, economic shifts, and social dynamics. Moreover, a more in-depth analysis of the collaborative social resources role in achieving project sustainability with the involvement of stakeholder engagement and project governance. Such an approach could shed light on the importance of integrating social resources into sustainability frameworks. This would not only contribute to the crucial research but also provide a practical understanding. Thus, assisting policymakers and communities seeking to create more sustainable practices. Emphasizing on social capital as an outcome of collaboration (Wagner and Fernandez-Gimenez, 2008) examined community-based collaborative resource management. However, their research did not delve into

how these social resources translate into long-term project sustainability across various governance structures. While previous studies emphasized the significance of collaboration and social capital, more recent studies acknowledge how organized collaboration and participation mechanisms enable sustainability.

(Babalola et al., 2024) illustrate that collaborative project delivery is core to sustainable construction. Hence, emphasizing the necessity of studying similar forces in IT project settings. In an Italian agriculture case study, (Di Chiara et al., 2024) demonstrate that participatory, structured strategies with various stakeholders influence sustainable outcomes. This underlines the significance of inter-organization cooperation. A systematic review (Carr Kelman et al., 2023) additionally suggests salient governance practices characterizing effective collaboration, corroborating the moderating effect of governance. Lastly, (Leal Filho et al., 2025) describe the sustainable effect of stakeholder involvement in institutional sustainability. By emphasizing its mediating function in turning collaboration into sustainable outcomes. These studies are not directed at IT projects within developing nations, an essential empirical and contextual challenge that this research directly fills.

### 1.3 Problem Statement

High failure rates in IT projects present challenges to businesses and economies alike. It is a matter of critical concern worldwide. In Pakistan, IT projects have a tendency to face setbacks both in the implementation process and while sustaining in the long run. Even the projects that are successful tend to struggle and therefore cannot give the desired value for the time being. For example, (Abbas et al., 2017) found that only around 15% of government IT projects succeed, leading to widespread implementation and sustainability challenges. All this finally leads to a loss of approximately (2.5-4) billion PKRs per annum only in the IT sector. This emphasizes the need for such interventions to improve the output of projects. This problem isn't limited to Pakistan but is a problem in the developing world where resources are scarce, and governance structures are weak. This brings about challenges for IT projects to succeed globally, as well. The high failure rates are the result of issues such as poor collaboration and misaligned stakeholder expectations. These hurdles significantly inhibit the sustainability of projects, as established

through studies conducted in this field. This is important because, seemingly, there is a lack of insight into how teamwork and community support contribute to the success of lasting project results. Additionally, little attention has been paid to how involving stakeholders and effective governance influences this dynamic relationship. Especially in countries like Pakistan that are still developing economically. It is, therefore, crucial to bridge these knowledge gaps to create plans that ensure the successful completion and continuation of IT projects in regions all over the world.

## 1.4 Research Questions

The Research Questions of this study are:

RQ1: Does collaborative social resources impact project sustainability in the IT projects of Pakistan?

RQ2: Does Stakeholder Engagement mediate the relationship between collaborative social resources and project sustainability in the IT projects of Pakistan?

RQ3: Does project Governance moderate the relationship between collaborative social resources and project sustainability in the IT projects of Pakistan?

## 1.5 Objectives of the Study

The main objectives of this study are:

1. To investigate the impact of collaborative social resources on project sustainability in the IT projects of Pakistan?
2. To assess the mediating effect of stakeholder engagement between collaborative social resources and project sustainability in the IT projects of Pakistan?
3. To evaluate the moderating role of project governance between collaborative social resources and project sustainability in the IT projects of Pakistan?

## 1.6 Significance of Study

Through the buildup of this proposed research and through presenting facts from previous credible studies, it can be stated that very limited research has been done on collaborative social resources, and the organizations are not very familiar with them. The proposed study will shed light on how collaborative social resources influence project sustainability in IT sectors. It will also examine how project governance and stakeholder engagement contribute to the sustainability of IT projects. Successful project sustainability needs more than technical and financial optimization., it needs strong social cooperation. Although sustainability has become more prominent in project management, the role of cooperative social assets such as inter-organizational networks, shared norms, and trust has remained vastly under-researched, especially in IT projects of developing economies like Pakistan. Prior research mainly focused on structural and economic factors, overlooking the social capabilities that enable long-term sustainability. This research fills that gap by examining the impact of collaborative social resources on promoting project sustainability, with stakeholder participation as the mediating variable and project governance as the moderator. Focusing on IT projects in Pakistan, this study makes theoretical and practical contributions through strategic recommendations for project managers and policymakers.

## 1.7 Supporting Theory

### 1.7.1 Stakeholder Theory:

Stakeholder Theory ([Freeman, 2010](#)) coordinates all the interests of stakeholders in a project. Stakeholders can be both internal and external such as employees, customers, suppliers, investors, and local communities. The theory highlights that an organization must interact with all these stakeholders in order to achieve successful long-term project sustainability. Collaborative social resources are trust, knowledge sharing networks, partnerships, and stakeholder relationships like clients, suppliers, contractors, and external experts ([ud Din et al., 2021](#)). These resources are used to secure necessary information, secure finances, and

reach project objectives. As a stakeholder resource that helps ensure project sustainability, collaborative social resources can be viewed in the Stakeholder Theory framework. Stakeholder engagement is responsible for managing these resources. When the interests of stakeholders are managed effectively and in harmony with the goals of the project, it improves decision-making, faith, and eventually, the sustainability of the project (Bal et al., 2013). Project governance is how stakeholders are involved, and their interests are harmonized. It involves decision-making mechanisms, accountability mechanisms, and openness to the end that the stakeholders' expectations are fulfilled and minimize conflicts that could jeopardize the success of the project (Turner, 2009). The moderating role of Project governance is realized through the alignment of the organizations' goals with the stakeholders' expectations. Stakeholder Theory is highly applicable to illustrating how collective social resources lead to project sustainability. It notes that organizations must manage their internal and external stakeholder relationships proactively and must make sure that mechanisms of governance are in place to keep the project on schedule. This requires stakeholder involvement and project governance of projects in the IT sector. Because this might be intricate network relationships that must all get the parties involved contented with what they contribute to the outcomes of projects.

Modern empirical studies have reaffirmed Stakeholder Theory as a strategic tool to enable sustainable project delivery, particularly in turbulent and scarce-resource environments. Stakeholder Theory highlights the fact that organizations must manage all their stakeholders actively who may potentially impact or are affected by project performance. (Ahmadov et al., 2024) Argue that effective stakeholder inclusion—especially with non-traditional stakeholders such as local communities, non-governmental organizations, and public institutions—is critical in securing organizational adaptability and innovation. Their findings based on Estonian SMEs can be extrapolated to the Pakistani IT sector, where resource and institutional shortcomings necessitate increased stakeholder cooperation. In parallel, (Omotayo et al., 2024) offer empirical evidence from the construction industry to show how stakeholder interaction and systems thinking improve project performance. They outline that in complex projects, stakeholder interaction should be a continuous, iterative process that aligns the shifting expectations of different

interest groups. This is especially pertinent to IT projects in which ongoing stakeholder synchronization and feedback integration are required due to rapid technology advancements.

Further, current studies presented in *Frontiers in Environmental Science* ([Mussehl et al., 2022](#)) describe the shift from traditional stakeholder management towards participatory and purposeful stakeholder engagement. The editorial recommends that sustainable development goals cannot be achieved without injecting feedback loops, co-decision-making, and mutual learning into project processes. This identifies that stakeholder engagement in IT projects is not merely a mean to abide by law but also an important enabler of project longevity, especially when integrated with cooperative social assets and responsive governance systems.

These findings cumulatively validate that stakeholder theory has emerged from being a simple static exercise of mapping stakeholders to a dynamic, multidimensional theory that can be used to augment strategic decision-making, innovation, and resilience. The Pakistani IT sector is beset with market volatility, talent mobility, and infrastructure shortcomings. These findings provide actionable recommendations for project managers. They can utilize this advice to catalyze sustainability. Policymakers also stand to gain from inclusive stakeholder strategies.

## 1.8 Operational Definition of Key Variables

### 1.8.1 Independent Variable: Collaborative Social Resources

From the interactions and relationships built among the stakeholders, we acquire collaborative social resources, which are considered common resources. These resources include trust, knowledge sharing, and joint problem-solving that is built on continuous collaboration and communication. Studies show that the more people interact, the stronger the network becomes. This can be achieved through several platforms, including meetings, engagement events, and site visits. This, through the utilization of such collaborative resources, makes organizations better at building networks that are resilient and results oriented towards both business and broader societal benefits ([Nanthagopan et al., 2016](#)).

### **1.8.2 Mediator: Project Stakeholder Engagement**

Stakeholder engagement is the active process of selecting, understanding, involving, and overseeing the continuous participation of concerned stakeholders in project activities. Incorporated in case studies of successful energy sectors, active stakeholder engagement entails mapping stakeholder groups, practicing open communications, and implementing feedback loops for long-term project support and risk management. (Kujala et al., 2022) offer a wider conceptual framework through a systematic review of literature, where stakeholder engagement is described as covering the "aims, activities and impacts of stakeholder relations in a moral, strategic and/or pragmatic manner". This definition not only highlights formal communication but also active participation that directs decision-making processes a crucial element to achieving trust, legitimacy, and long-term project results.

### **1.8.3 Moderator: Project Governance**

Project governance is the structure of authority, roles, responsibilities, and processes by which effective decision-making and control are achieved during the course of the project life. (Ahola et al., 2014) separate two approaches: governance mandated from outside of the project (corporate or program) and governance organized within the project team itself. They believe that project governance unites higher-level organizational strategy and frontline project implementation.

A study by (Too et al., 2017) defines governance as a group of fundamental functions performed by a governing body for a project. Like setting objectives, aligning with strategy, dealing with stakeholder interests, overseeing risk, and checking up on performance. These functions are essential to ensure projects have strategic success while holding people accountable. In the case of IT projects within developing contexts such as Pakistan, such governance frameworks are necessary to balance structured control and adaptive flexibility-improving both control and innovation.

### **1.8.4 Dependent Variable: Project Sustainability**

The recent advancement in Project management principles clearly articulates that sustainability as a key viewpoint must be factored into project management and

governance ([Silvius et al., 2017](#)). This change mirrors the ever-growing embrace of sustainability's role in ensuring that projects meet not only their short-term goals but also advance long-term environmental, social, and economic welfare. When sustainability through innovative methods is incorporated in the very fabric of project methodologies, not only do organizations minimize their environmental impact, but they also improve efficiency of operations ([Shah et al., 2017](#)).

# Chapter 2

## Literature Review

This chapter examines the influence of social cooperation resources on the IT sector in Pakistan with reference to project sustainability. According to stakeholder theory and governance frameworks, the review examines intangible, value-based characteristics such as trust, knowledge sharing, and collaborative problem-solving and their influence on long-term sustainability outcomes.

In addition, the moderating influence of project governance is examined to find out how disciplined monitoring, clear responsibilities, and open procedures either reinforce or neutralize the collaboration-practice to sustainability relationship. Building on prior research and filling the gap within developing country contexts, the literature facilitates a model that combines social and governance factors into sustainability-oriented project design.

### 2.1 Collaborative Social Resources and Project Sustainability

([Zeng et al., 2020](#)) highlighted that social collaboration mechanisms enhance the sensitivity of a project to environmental and stakeholder changes, which is an essential aspect of sustainability. These observations indicate that the existence of CSR not only makes the process run smoothly but also instills sustainable thinking in the day-to-day texture of project delivery. Which leads to more longevity post-delivery. Collaboration leads to collective decision-making and helps build a

cohesive environment. Helping stakeholders in managing, anticipating, overcoming social challenges, and ensuring that environmental sustainability becomes a core part of the project strategy (Bosch-Sijtsema and Gluch, 2021). It encourages the use of greener technologies and reduces the negative environmental footprint. Collaboration builds a sense of community, thus making all the involved parties more invested in the project's success. Ensuring that this reduces conflicts, smoother project execution, and long-term success. It has been identified in the previous studies that collaborative strategies tend to be quite crucial in construction and infrastructure. Where projects face complex environmental, social, and economic challenges, as it helps to improve project sustainability.

By fostering cooperation among stakeholders, such strategies help ensure that projects are not only completed efficiently but also maintain their viability over time. The study by (Dossick and Neff, 2010) demonstrated that the adaptive nature of projects can be enhanced through collaboration. By fostering a collaborative environment, projects are better equipped to respond to changing conditions and incorporate sustainability measures throughout their lifecycle. This approach facilitates the integration of sustainable practices into project planning and execution. Hence, ensuring that the outcomes meet the needs of present stakeholders without compromising future resources. Collaboration encourages transparency, accountability, and sharing of knowledge that leads to more sustainable outcomes of a project (Freeman, 2010).

In research, collaborative social resources are typically described as shared assets that develop through different types of interactions, for example, through meetings and networking seminars etc (Nanthagopan et al., 2016). In a previous study, the link between programme management resources and sustainability was investigated, indicating that resource planning and coordination of strategies play crucial roles in the long-term success of projects (ud Din et al., 2021). Technical capability, administrative organization, and team skills are all types of programme management resources that together determine how successful a project is and how it is maintained. Yet, whereas such research focuses on material and organizational resources, they tend to neglect deeply investigating intangible aspects, especially collaborative social resources. Based on the literature, we developed a hypothesis

that collaborative social resources indeed affect project sustainability by enhancing economic efficiency, promoting social cohesion, and contributing to environmental responsibility.

In the proposed research, it is argued that collaborative social resources demonstrate a significant relationship with project sustainability because these resources are integral parts of project success. Collaborative social resources enhance communication, trust, and shared decision-making among stakeholders, which is crucial for the alignment of economic, social, and environmental objectives. Therefore, the significance of collaborative social resources in enhancing project outcomes cannot be denied since it directly contributes to long-term success and fulfillment of sustainability objectives.

**H1:** *Collaborative Social Resources will have a positive impact on project Sustainability*

## **2.2 Collaborative Social Resources and Stakeholder Engagement**

Collaborative Social Resources (CSR) have a positive impact on Stakeholder Engagement (SE) by creating cultures of trust, cooperation, and mutual respect. As stated by (Nwachukwu and Emoh, 2010) once organizations focus on trust, exchange of information, and networked collaboration, stakeholders become more inclined to actively and constructively engage. This is especially crucial in IT projects where fast iteration and shifting user requirements mandate continuous engagement. A study by (Ahmadov et al., 2024) assures that team-based settings involving interpersonal synergy promote greater cognitive and emotional involvement by stakeholders. When groups work in a collaborative culture of shared norms, open communication, and mutual objectives, they are likely to participate actively in stakeholder engagement. (Wagner and Fernandez-Gimenez, 2008) state that collaboration develops social capital, supporting more significant engagement among project stakeholders. In addition, according to (Pretty and Ward, 2001) cooperative practices create bonds, bridges, and linkages which are the three facets of social networks essential for inclusive participation. CSR is thus a base for SE

because it facilitates inclusive communication and harmonizes different interests. Social capital provides a foundation on which stakeholder engagement can be pursued. It facilitates trust, reciprocity, and mutual cooperation in the engagement among stakeholders. Responsible leadership creates the spark that translate this potential of social capital into meaningful and tangible outcome (Maak, 2007). So, according to the respective studies, social resources play an important role to enhance stakeholder engagement.

**H2:** *Collaborative Social Resources have a positive impact on stakeholder Engagement*

## 2.3 Stakeholder Engagement and Project Sustainability

Stakeholder engagement (SE) influences Project sustainability (PS) positively by facilitating transparency, mutual accountability, and long-term alignment of stakeholder expectations and project goals. Stakeholder engagement is at the heart of project sustainability since it involves ensuring multiple aspects of thought are considered in the project life cycle. Empirical findings (Omotayo et al., 2024) show that consistent stakeholder engagement ensures project objectives are aligned with social and environmental interests more closely, with more ethical and effective outcomes. (Ahmadov et al., 2024) also noted that stakeholder participation extends beyond formal engagement when it is modified into a strategy for continuous value co-creation, which significantly improves sustainability performance. Thus, stakeholder participation not only increases accountability and transparency but also forms the focal force for sustainable project delivery. With well-involves stakeholders, as observed by (Blak Bernat et al., 2023) their contribution contributes to balancing ecological, social, and economic factors in project handling. SE contributes to settling challenges beforehand so that they do not create conflicts, resulting in higher responsiveness and receptivity in projects. (Herremans et al., 2016) argues that continuous sustainability disclosures promote trust, which once again strengthens stakeholder engagement in establishing sustainable practices. Previous research (Blak Bernat et al., 2023) has set a strong connection between

stakeholder engagement (SE) and project management sustainability. Stakeholder involvement is identified as being a key component in the implementation of ecological, social, and economic sustainability principles in project management practices. This connection emphasizes that SE fosters openness, trust, equity and harmonizes various stakeholder interests with sustainability objectives. Hence, effective engagement is an impetus for the incorporation of sustainability into every stage of the project.

**H3:** *Stakeholder Engagement has a positive impact on project sustainability.*

## 2.4 Mediating Role of Stakeholder Engagement between Collaborative

### 2.4.1 Social Resources and Project Sustainability

Stakeholder engagement is a key tool through which collaborative social resources propel project sustainability, particularly in dynamic and stakeholder-focused sectors such as IT. Collaborative social resources, such as trust, shared norms, and inter-organizational networks, provide the social infrastructure necessary for effective stakeholder engagement. Existing research illustrates that creative stakeholder engagement is a bridge that connects interior collaboration to sustainable project outcomes (Leal Filho et al., 2025). Active stakeholders drive long-term success by providing input, keeping stakeholders in check, and collaborating on co-creating solutions aligned with project-transformation requirements (Silvius and Schipper, 2019). Furthermore, (Singletary et al., 2022) findings show that stakeholder engagement fosters mutual understanding and enhances adaptive ability to maintain performance in a shifting project landscape. Their climate resilience case study is based on how co-produced knowledge and interactive stakeholder engagement drive continuous learning and enable teams to react accordingly to new arising challenges. Thus, stakeholder involvement not only consolidates the operationalization of collaborative resources but also mediates their effects by instilling inclusiveness, responsiveness, and long-term value creation into project implementation.

The study conducted by (Rodriguez-Melo and Mansouri, 2011) stakeholder investigates which factors in sustainable development (government policy, managerial attitudes, or stakeholder engagement) have the greatest impact on company profitability. A detailed examination has provided results that stakeholder engagement is more advantageous and serves as a key factor in driving a company's success. So, Stakeholder Engagement is very important for any organization because without it, it is difficult to manage things properly, which can cause mismanagement in operations and alignment of goals. The concept of sustainability was developed in response to stakeholder demands because through this stakeholder can have complete knowledge of everything, ensuring complete transparency. Thus, a better communication system can be established, and a trustful environment is established. Sustainability disclosure in the form of a report is one of the primary mechanisms for engaging stakeholders. By actively involving stakeholders through such disclosures, companies can build trust, improve accountability, and align their sustainability strategies with stakeholder expectations, ultimately enhancing long-term success. Although the sustainability report is one of the primary transparency and communication tools, the particular practices and effectiveness of applying such a report to drive substantial stakeholder dialogue have received very little research attention stakeholders (Herremans et al., 2016). It can be articulated that because of its central role in stakeholder involvement it is the very essence of a project success, if well maintained it can result in favorable and enduring objectives. In proposed research, Stakeholder Engagement role is very impactful because it acts as a mediating variable between collaborative social resources and project sustainability. SE elaborate on how we can make relations more efficient and effective.

**H4:** *The relationship between Collaborative Social Resources and Project Sustainability will be mediated by stakeholder engagement.*

## **2.5 Moderating Effect of PG in the Relationship between CSR and PS**

Project governance plays a critical moderating role in specifying how collaborative social resources are converted into sustainable outcomes. While collaboration could

enhance stakeholder trust, knowledge sharing, and joint decision-making, its success is often dependent on the governance arrangement facilitating such interactions. Existing studies suggest that formal, responsive governance arrangements may reinforce the positive effects of collaboration on sustainability (Babalola et al., 2024).

Governance processes that are inclusive in nature and support accountability and transparency in reporting will tend to strengthen congruence between collaborative activities and sustainability goals in the long term (Di Chiara et al., 2024). Therefore, Project governance must obtain a balance between control and flexibility in order to ensure collaborative action yields the desired sustainability outcomes. Governance plays an important role in guiding and consolidating sustainability processes within organizations. This includes not just the formation of sustainable practices but also the monitoring required to guarantee that such principles are maintained consistently at every organizational level. Principles of sustainability can be integrated into corporate planning through sound governance.

By creating a structured governance model, organizations can align their sustainability goals with broader business objectives, monitor progress, and adapt to emerging environmental, social, and economic challenges. Strong governance helps maintain accountability and transparency, making sustainability a core organizational value rather than a secondary concern (Baporikar, 2023). Governance in ensuring effective sustainability demands a comprehensive framework that seamlessly incorporates sustainability into the organization's decision-making processes. This involves the creation of specialized sustainability committees or boards, the development of clear and actionable policies, and the setting of measurable targets to track progress (Ioannou and Serafeim, 2012).

Governance influences individuals in two primary ways. Indirectly, it impacts people through their supervisors who implement governance principles, shaping day-to-day operations. Directly, it affects them through broader organizational structures, such as the societal norms and values in which they are embedded, and the work environment they interact with (Foucault, 1991). Governance not only guides organizational behavior but also shapes the socio-cultural and environmental context in which employees operate, influencing both their professional and personal

lives. This dual impact underscores the importance of a well-designed governance system that not only integrates sustainability into the corporate agenda but also considers the human and social dimensions of its influence. Governance encompasses a wide range of definitions that differ based on their scope and emphasis, including societal governance, project governance etc. In terms of projects, governance plays its important part at multiple levels, like governance of the groups in terms of the programs or portfolios of projects.

Effective collaboration requires establishing strong, trust-based relationships with stakeholders and partners. According to (Dyer and Singh, 1998), successful collaborations are built on shared goals, mutual benefits, and open communication. Organizations should prioritize creating value for all stakeholders involved, recognizing this often requires negotiating agreements that harmonize both business goals and the interests of various stakeholders. By fostering an environment of collaboration and trust, companies can enhance their ability to navigate complexities and achieve sustainable project outcomes. Social capital fosters trust and encourages citizens to participate in collective actions that allow them to articulate their priorities and hold institutions accountable. The relationship between social capital and governance encourages transparency, responsiveness, and accountability from institutions (Corps, 2017). A study by (Kaumbulu, Kaumbulu) examines the relationship between project governance and sustainability, which shows that project governance is an important factor in achieving sustainability. governance frameworks improve project performance and sustainability.

The result of this study shows that project governance explains 74.5% of the variance in project sustainability outcomes. The study leads to effective practices of governance in the long term as key determinants for project success, indicating how various, structured frameworks of governance enhance project performance and sustainability.

**H5:** *Project Governance moderates the relationship between collaborative social resources and project sustainability in such a way that the relation will be strong when Project Governance is high.*

## 2.6 Theoretical Foundations of Stakeholder Theory

Emerging studies (Fobbe et al., 2024; Aaltonen et al., 2024) reinforce Stakeholder Theory development focusing away from static mapping toward dynamic, ongoing engagement models. (Fobbe et al., 2024) underlines how inclusion of stakeholders not only drives innovation but maintains performance in the long term. (Aaltonen et al., 2024) provides methodological progress by positioning participation as a strategic tactic instead of relegated to consultation. In turn, (Blak Bernat et al., 2023) highlights that project success, especially in sustainability contexts, is contingent on stakeholder participation across the life of the project.

In addition, (Nonet et al., 2022) investigate systematic engagement pathways in accordance with international sustainability objectives. Collectively, these studies solidify the ways in which Stakeholder Theory enhances the constructs within your model, namely stakeholder engagement and governance as key drivers of sustainable project success

## 2.7 Theoretical Framework

This study is based on stakeholder theory that states the interests of the stakeholders have to be in priority to make organizations efficient and successful (Freeman, 2010). The projects in project management, especially in IT sectors of emerging economies like Pakistan, go in a dynamic environment. It entails numerous internal and external stakeholders like workers, customers, investors, regulatory bodies, and the indigenous people (McGrath and Whitty, 2017). Successful project outcomes, thus, hinge not only on technical expertise but also on how effectively these stakeholders are involved and their interests are dealt with throughout the project's life cycle.

Collaborative social resources (CSR) like trust, mutual knowledge, common norms, and inter-organizational networks are central to coordinating stakeholders' expectations and strengthening their commitment to project objectives (Nahapiet and Ghoshal, 1998). In the Stakeholder Theory model, CSR functions as a core

enabler that promotes relationship formation, resource exchange, and cooperative decision-making across the entire project ecosystem.

Furthermore, stakeholder engagement (SE) is considered to be an intervening mechanism that channels the payoff of CSR into actual project impacts. SE makes sure that the stakeholders are not just notified but also actively involved, enabling responsiveness to the needs of stakeholders and providing a sense of possession. SE adds strength to project sustainability by applying feedback, aligning interests, and reducing resistance to change (Bal et al., 2013).

project governance (PG) provides the organizational structure under which CSR and SE can be effective. It includes clearly defined roles, responsibilities, policies, and decision-making processes that allow for accountability, transparency, and strategic consistency (Turner, 2009). Project governance acts as a moderating variable affecting how effectively synergistic social efforts are translated into sustainable project success through permitting flexibility and responsiveness.

Effective project sustainability increasingly focuses on the integration of cooperative social resources, stakeholders, and project governance. Recent studies by (Babalola et al., 2024) note those collaborative forms of project delivery such as mutual trust, shared accountability, and networks among organizations. These are central to offering sustainable outcomes in project environments. In line with this, (Di Chiara et al., 2024) argue that participatory engagement between multi-stakeholders increases adaptive capacity and leads to long-term sustainability. Highlighting the mediating role of stakeholder engagement in collaborative structures transitioning to sustainable outcomes (Leal Filho et al., 2025) concur by portraying stakeholder engagement promoting institutional sustainability based on value congruence and transparency.

Mechanisms of governance are not just watchdogs. They actually shape how collaborative efforts evolve. The Science-Policy Synthesis systematic review (Carr Kelman et al., 2023) confirms that adaptive but formalized governance methods enable effective coordination, reduce stakeholder conflict, and sustain commitment across project phases. These findings complement the moderating role of project governance in the relationship between collaborative social resources and sustainability.

Especially in environments as challenging as Pakistan's dynamic IT sector. Together, these contemporary concepts form a robust foundation for theorizing the dynamic interplay between social cooperation, participation, and governance towards effective sustainable project outcomes.

Given the setting of Pakistan's IT sector, where rapid technological growth, limited resources, and ambiguous institutions prevail, such an integrated model is most applicable. It acknowledges that developing cooperation and maneuvering between stakeholder relationships within a governed system can contribute significantly toward IT initiatives' sustainability as well as long-term viability.

The theoretical framework of the study depicts the structural relationships among collaborative social resources, stakeholder engagement, project governance, and project sustainability in IT projects in Pakistan. In the model, collaborative social resources are employed as the independent variable that portrays such factors as trust, knowledge-sharing networks, and inter-organizational collaboration which facilitate project operation. Project sustainability is independent variable, referring to long-term success and impact of a project along environmental, social, and economic dimensions. Stakeholder engagement that is offered as the mediating variable, capturing its role in translating collaborative inputs into sustainable outcomes.

The model formulates that collaborative social resources not only positively contribute to project sustainability directly but also have an indirect impact by boosting stakeholder participation. Where stakeholders are brought on board and their interests managed well, chances of obtaining sustainable project outcomes are maximized. Project governance is also introduced as a moderator. The efficacy of the partnership between collaborative social resources and project sustainability is said to depend on the quality of governance mechanisms. Good governance mechanisms can support the impact of collaboration through increased transparency, accountability, and strategic oversight. Therefore, this model integrates direct and indirect paths to explain how collaborative effort and mechanisms of governance contribute to sustainable project performance, particularly within Pakistan's resource-constrained and dynamic IT Projects.

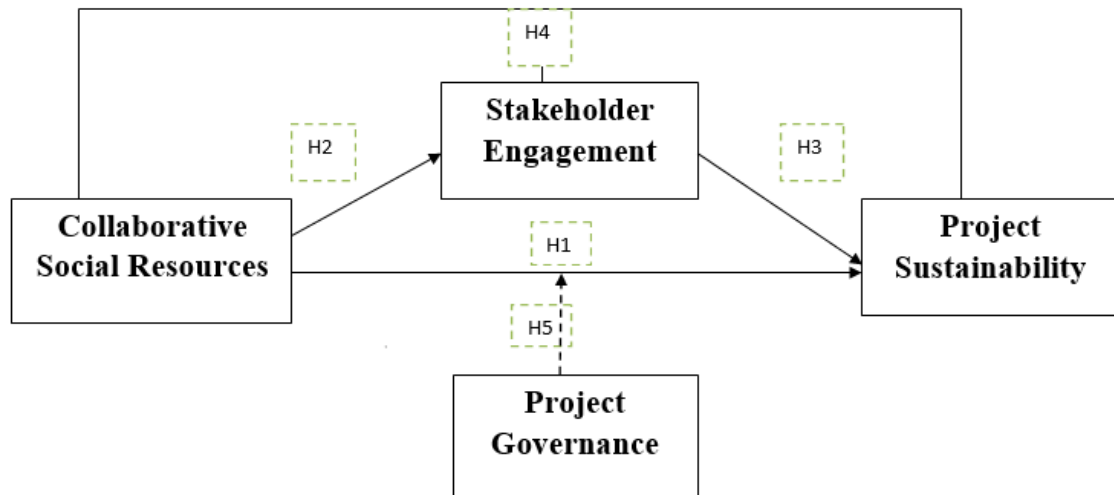


FIGURE 2.1: Conceptual Framework

## 2.8 Hypothesis

- H1:** Collaborative Social Resources have a positive impact on Project Sustainability.
- H2:** Collaborative Social Resources have a positive impact on stakeholder Engagement.
- H3:** Stakeholder Engagement has positive impact on project sustainability.
- H4:** Stakeholder Engagement mediates the relationship between Collaborative Social Resources and Project Sustainability.
- H5:** Project Governance moderates the relationship between Collaborative Social Resources and Project Sustainability.

# Chapter 3

## Research Methodology

The chapter begins with discussions on research design and methodology choices, followed by the underpinning research philosophy that underlies this research. The chapter then presents the population and sampling requirements, unit of analysis, and study type used. Respondent demographic information is presented in tabular format for background information for the sample. It also describes the measures applied for important constructs, the time horizon selected for data collection, and the methods employed to collect and analyze data. In addition, it clarifies the steps taken in collecting data, such as the use of digital tools like Google Forms. Finally, the chapter presents the data analysis approach performed through SPSS and specifies a timeline for the research stages to facilitate transparency and replicability in the research.

### 3.1 Research Design and Method

Formulation of a coherent and systematic research design is a basic element of scholarly investigation, especially in the social sciences. (Bell et al., 2022) suggest a metaphorical depiction of the research process in the form of a tree, in which the roots represent the root assumptions, such as ontology and epistemology. These core beliefs inform the approach and direct the techniques utilized in data collection and analysis, symbolized by the trunk and branches of the tree. This model prioritizes that a theoretically sound foundation generates stronger and more reliable research results. Supporting this method, (Dissanayake, 2023; Gamage, 2025) develop the

layer framework better known as the research onion. This model structures the research process as a chain of interrelated layers that direct the researcher from philosophical assumptions to data collection methods. Each layer has a specific role to play, beginning with the research paradigm and moving through methodological decisions and data approaches. This process makes it possible for researchers to align each step in their research with the overall study aims. By embracing such modern models, this thesis guarantees that its methodological framework is both contextually appropriate and rigorous. These models offer the required structure for researching collaborative social resources, stakeholder involvement, and IT project sustainability across Pakistan. In order to describe the shape of the research process, several metaphors have been suggested in academic literature.

In a similar way ([Jaspersen et al., 2018](#)) also use the tree metaphor but focus more on the roots as the research traditions and theories behind a discipline, which feed the research as a tree takes nutrients from the ground. These foundational viewpoints affect the construction of research design, methodology, and analysis plans. The trunk of the tree is shown in cross-section to represent four fundamental layers of research design: ontology, epistemology, methodology, and particular data collection methods. Ontology constitutes the innermost ring and captures the worldview and assumptions of reality of the researcher. Moving outwards, epistemology deals with how knowledge comes to be known and learned, then methodology, which organizes compatible techniques and strategies. The outermost circle depicts the tools and techniques employed in the actual conduct of the research. ([Saunders et al., 2003](#)) emphasize that the research process is a framework that relies on a layering system, with each phase of the research having to be stripped away in order to move closer to the central goals. In the case of this research, the outermost layer constitutes philosophical presumptions, then the research strategy, methodological decisions, time perspectives, and lastly, the actual techniques and tools for data gathering and analysis. This multi-layered approach allows a step-by-step, systematic building of the research framework while keeping pace with the general objectives of the study. The design methodology employed in this research followed a quantitative approach to gather data, primarily through a questionnaire sourced from various articles and research papers available online. The initial step involved extracting relevant

information from multiple scholarly articles and research works to construct a comprehensive questionnaire. Subsequently, to facilitate data collection, a Google form was specifically designed and generated based on the compiled questionnaire

## **3.2 Research Philosophy**

### **3.2.1 Positivism**

This research has a positivist approach, with an emphasis on measurable data, hypothesis testing, and examining causal associations using standardized measurement and statistical analysis (Park et al., 2020). Positivism is appropriate for this work since it makes it possible to investigate effects in a cause-and-effect manner. Our methodology is quantitative in nature, which means that we collect numerical data in order to use it in the systematic analysis of some trends, relationships or effects. The present research follows the descriptive research design which attempts to describe the phenomena of interest as it exists without subjecting it to manipulation. This allows the findings to be trusted, the degree of trust can be replicated, and obtain results that are based on reality.

## **3.3 Population of Study**

The IT industry in Pakistan has experienced significant growth in recent years, and many companies of large and small scale have been set up across major cities. The focus of these companies has been to provide services to both local and international clients, providing all sorts of services ranging from front-end, back-end, database, etc. The target community of this study would be the project managers/team leads who are focusing on different projects in the IT sector. A sample will be selected using a convenience sampling method, allowing us to gather insights efficiently from available respondents. This approach will facilitate an in-depth analysis of the specific challenges and dynamics faced by professionals in IT project management within the Pakistani context.

### 3.4 Sample Selection

A convenience sampling technique was used in this study to gather data, which is a non-probabilistic sampling technique. Non-probability sampling employs non-random techniques, frequently based on judgment and convenience over randomization (Giri, 2024). Convenience sampling is a non-probability approach where participants are selected based on their accessibility and ease of their willingness to participate, unlike random sampling. Convenience sampling becomes the practical choice where resources and time are limited instead of using random selection methods., this is why this technique is highly favored due to its efficiency. By targeting participants who are easily accessible, convenience sampling reduces the logistical challenges and time commitments that are often required with other sampling methods.

### 3.5 Sample Size

To provide assurance on the statistical power of this study, a priori power analysis was executed using G\*Power 3.1.9.4, an accepted and validated statistical software package for determining required sample sizes based on defined parameters Faul et al. (2009). The analysis was undertaken employing the Linear Multiple Regression: Fixed Model, R<sup>2</sup> deviation from zero test, as it is appropriate for use in studies with multiple predictors of a continuous dependent variable.

Parameters employed were:

Effect size ( $f^2$ ) = 0.15

$\alpha$  error probability = 0.05

Power (1 -  $\beta$  error probability) = 0.95

Number of predictors = 3

According to these inputs, the total minimum sample size was calculated at 99 respondents to meet the intended power level that is shown in Figure.3.1. This also means that the sample gathered for the present study ( $n = 342$ ) was adequate and went over the statistical minimum requirement needed to guarantee validity and strength in terms of statistics.

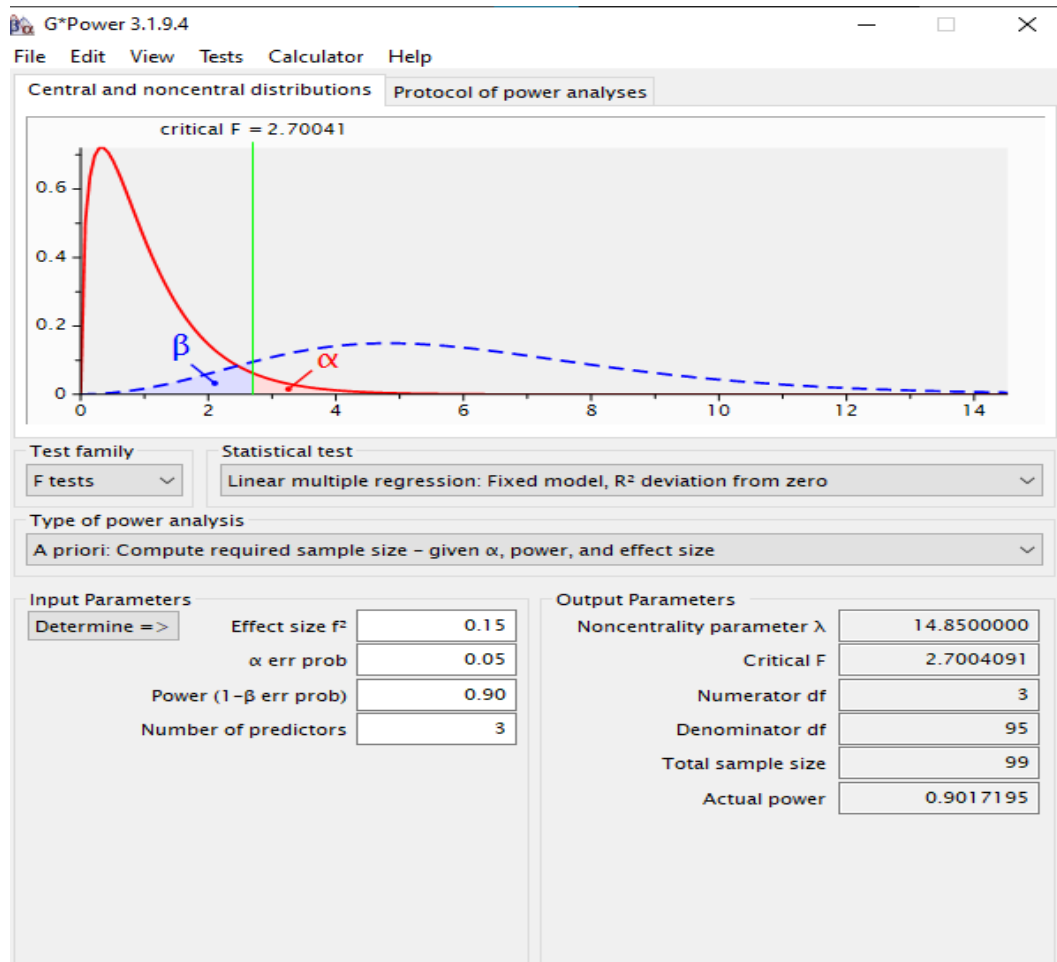


FIGURE 3.1: G\* Power(Power=0.90)

### 3.6 Unit of Study

The unit of study refers to the entity from which data is gathered and upon which results are analyzed. Given the nature of this research and the type of data to be collected, each individual respondent will serve as the unit of study for this work.

### 3.7 Type of Study

This research adopts a descriptive approach to illustrate specific characteristics and phenomena related to the chosen topic. The objective is to provide a thorough depiction of relevant factors, maintaining an observational stance without influencing or altering any variables.

## 3.8 Demographics Data Result

### 3.8.1 Gender

In the context of the survey, gender was a critical factor in trying to determine the makeup of the respondents and any possible impact on the findings. Based on the findings presented in Table 3.1, 72.9 percent of the respondents were male, and 27.1 percent were female.

TABLE 3.1: Gender Identification

Gender	Percent
Female	27.1
Male	72.9
Total	100.0

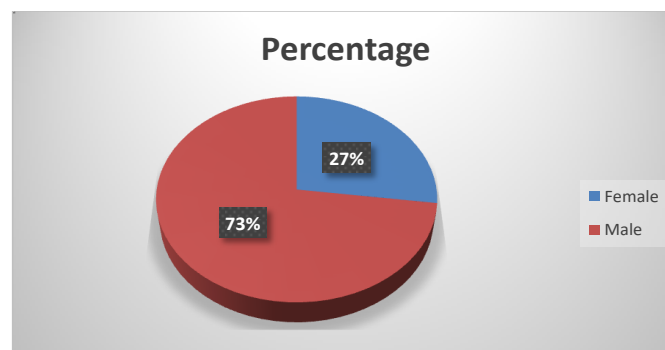


FIGURE 3.2: Gender Identification

### 3.8.2 Age Group

22.7% respondents were of age between 18 years to 25 years, 55.2% respondents were of age between 26-40 years, 16.9% respondents were of age between 41-60 years, and 5.2% respondents were of age above 60 years.

TABLE 3.2: Age Distribution

Age Group	Percentage
18–25 years	22.7%
26–40 years	55.2%
41–60 years	16.9%
Above 60 years	5.2%

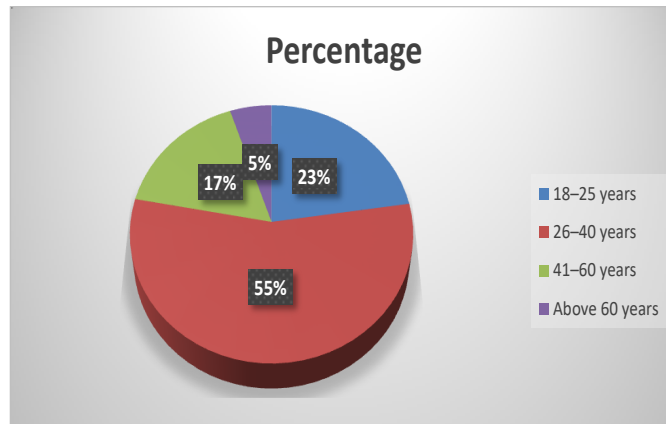


FIGURE 3.3: Age Distribution

### 3.8.3 Education

43.6% of the samples had a bachelor’s level degree, 42.2% had a master’s level degree, 14.2% had a Ph.D. level degree.

TABLE 3.3: Education Level Distribution

Education Level	Percentage
Bachelor’s	43.6%
Master’s	42.2%
Ph.D.	14.2%

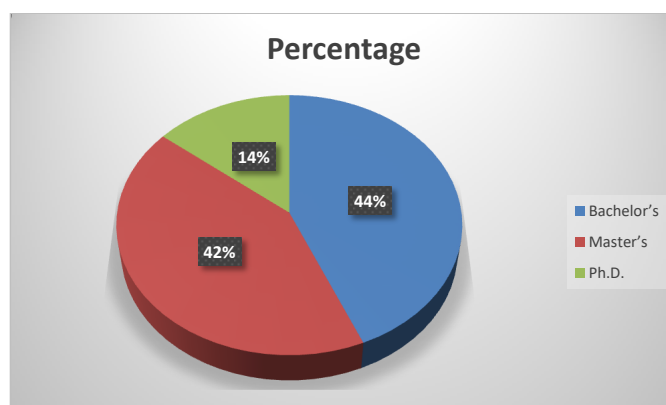


FIGURE 3.4: Education Level Distribution

### 3.8.4 Project Experience

22.7% of the respondents possessed experience of 0 to 5 years, 48.3% of experience between 6 to 10 years, 11.6% of experience between 11 and 20 years, 11.9% of experience between 21 to 30 years whereas only 5.5% had experience of more than 30 years.

TABLE 3.4: Project Experience Distribution

Experience Range	Percentage
0–5 years	22.7%
6–10 years	48.3%
11–20 years	11.6%
21–30 years	11.9%
Above 30 years	5.5%

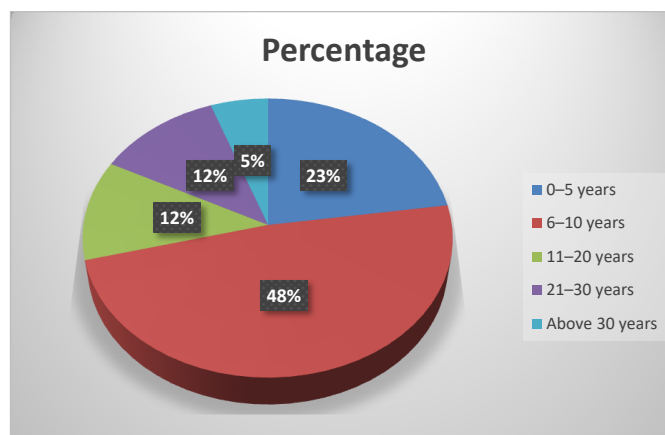


FIGURE 3.5: Project Experience Distribution

### 3.8.5 Project Role

23.3% of the participants participated in chosen projects as a Sponsor, 38.1% of the participants participated as a Beneficiary, 18% of the participants participated as Project Manager and 20.6% of the participants participated in chosen projects as a Project Team member.

TABLE 3.5: Project Role Distribution

Project Role	Percentage
Sponsor	23.3%
Beneficiary	38.1%
Project Manager	18.0%
Project Team Member	20.6%

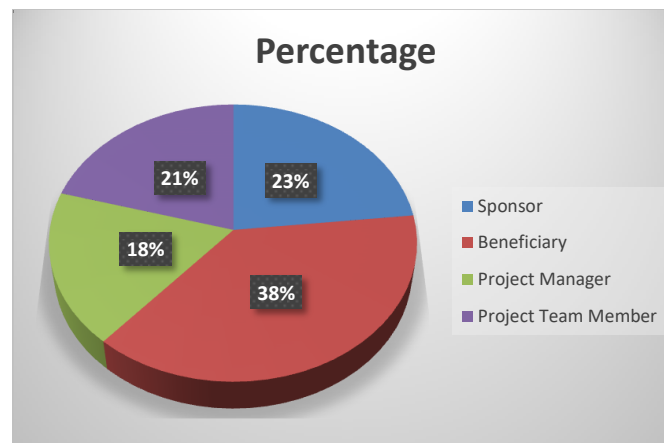


FIGURE 3.6: Project Role Distribution

### 3.9 Scale of Constructs

The scales of constructs for each concept are as follows:

#### 3.9.1 Collaborative Social Resources

The 11-item scale was designed to determine project success (ud Din et al., 2021). The one sample question of this scale is “We receive support for our projects & program from government bodies in terms of technical support etc.”

#### 3.9.2 Project Governance

The 09-item scale was designed to determine project success (Ul Musawir et al., 2017). The one sample question of this scale is “The management board had overall responsibility for project governance.”

### 3.9.3 Stakeholder Engagement

The 10-item scale was designed to determine project success by (Goodman et al., 2019). The one sample question of this scale is “All partners assist in establishing roles and responsibilities for the collaboration.”

### 3.9.4 Project Sustainability

The 14-item scale was designed to determine project success by (Martens and Carvalho, 2016). The one sample question of this scale is “Eco-efficiency (business opportunities of services and products, process of design and innovation, environmental footprint, reuse of materials, transport efficiency).”

These scales provide an organized method for assessing and quantifying the key concepts within the research or organizational analysis. Each scale includes items that capture different dimensions or attributes of these concepts, allowing researchers to gather insights and investigate potential relationships between significant variables.

TABLE 3.6: Scale of Constructs

Scale of Constructs	Number of Items	Source
Collaborative Social Resources	11	(ud Din et al., 2021)
Project Governance	09	(Ul Musawir et al., 2017)
Stakeholder Engagement	10	(Goodman et al., 2019)
Project Sustainability	14	(Martens and Carvalho, 2016)

## 3.10 Time Horizon

(Jephias and Machiya, 2020) contends that where data to be gathered concerns more than one group within the same study and within the same amount of time, the research should use the cross-sectional design since it is simpler to handle the groups that implies the design is cost-effective. This research follows a cross-sectional design, where data will be gathered at one specific moment. Furthermore, this

research is being conducted for academic purposes and must be finalized within the allotted time frame.

### **3.11 Data Collection and Methods**

A quantitative survey approach was employed to gather data on the impact of collaborative social resources on project sustainability, with stakeholder engagement acting as mediators and project governance as moderator within the IT projects. This study meets the criteria for utilizing a quantitative research methodology.

### **3.12 Data Collection Procedure**

Google Forms is an online tool suitable for making surveys and was used for the purpose of data collection necessary for this research. Final year bachelor's student and alumni of BS Computer Science and Software Engineering were be used as a medium to spread the survey. As these students are directly in contact with software houses and IT companies, a chain of senior junior connection was utilized to reach the team leads of the companies where these students are respectively working. Team leads in IT companies were also approached through LinkedIn and were requested to fill in the survey on Google Forms. This approach ensured a high response rate and yielded a wide range of diverse data. The use of Google Forms ensured participants' data protection and the ease of survey access., a simple link that can be shared, which provided easy accessibility for the participants, encouraging more responses.

### **3.13 Data Analysis Methods**

Through the suggestion and recommendation of the supervisor, the data for this study was thoroughly analyzed using the Statistical Package for the Social Sciences (SPSS) and AMOS CB. The first step involved conducting a reliability test to assess the stability and trustworthiness of the questionnaire employed in the study. This was necessary to ensure that the survey tool measures the intended constructs correctly. To obtain a summary of the data distribution, descriptive statistics were used, thus aiding researchers in determining whether the data follows a normal

or irregular pattern. This analysis helps identify outliers or unusual trends in the dataset. In order to draw out and analyze the relationship between various variables, a correlation analysis was performed. This method enables a researcher to identify whether the interactions between various variables exist and in what direction. These methods determined how collaborative social resources influence project sustainability, with stakeholders' participation as a mediator and governance of a project as a moderator.

### 3.14 Timeline of Study

TABLE 3.7: Structural Information of Selected Ligands

Phase	Activities	Time-line
<b>1. Research Planning</b>	Define research objectives and hypotheses	September 2024- December 2024
	Review relevant literature	
	Develop research methodology and questionnaire	
<b>2. Data Collection</b>	Pretest questionnaire	January 2025
	Distribute survey to participants	
<b>3. Data Analysis</b>	Clean and organize collected data	February 2025
	Conduct statistical analysis	
<b>4. Interpretation</b>	Interpret findings in relation to hypotheses	March 2025-May 2025
	Discuss implications and contributions to literature	
<b>5. Reporting</b>	Write and revise research report	June 2025
	Prepare presentation and defend findings	

# Chapter 4

## Result and Analysis

This chapter is a detailed analysis of the data gathered in the study employing higher-level statistical tools and methods. The analysis starts with the rationale for the use of the AMOS software, then proceeds to data preparation and cleaning, such as missing data tests, outliers, and normality tests. Major statistical tests like reliability, validity, and exploratory factor analysis are also performed in order to ascertain the soundness of the measurement tools. The chapter subsequently explains the confirmatory factor analysis and structural model fit, offering proof of model fit and construct validity. Last but not least, hypothesis test results—both direct and indirect relationships—are given, providing empirical evidence for the conceptual model derived in this research.

### 4.1 Techniques for Data Analysis

During the analysis, data were collected from a sample of 342 respondents and were selected for evaluation. Statistical analysis was conducted using SPSS version 26 and AMOS CB.

The following steps were considered during the data examination:

1. Data was gathered from a sample of 342 participants, and 342 valid complete questionnaires were selected for analysis.
2. AMOS CB and SPSS were used for data analysis.

3. Validly filled questionnaires were chosen for analysis.
4. Questionnaire of each variable was analyzed.
5. The sample characteristics were investigated through frequency tables.
6. Descriptive statistics were computed from numeric values.
7. The measurement model and structural model were evaluated through AMOS CB.

TABLE 4.1: Difference Between AMOS CB and PLS-4

AMOS CB	SMART PLS
<p>AMOS is a covariance-based program that focuses on theory test and model fit, and therefore when the aim is to confirm well-tested theoretical structure (Arbuckle, 2014). AMOS enables researchers to specify latent variables by a graphical front-end, and it facilitates common multivariate methods like regression, factor analysis, and path analysis. AMOS offers extended model fit indices (e.g., RMSEA, CFI, TLI, Chi-square) and supports path analysis, confirmatory factor analysis (CFA), and latent variable modeling through an easy-to-use graphical interface (Kline, 2023; Byrne, 2024).</p>	<p>Partial Least Squares Structural Equation Modeling (PLS-SEM) is a multivariate methodology commonly applied to test complex relationships between latent constructs, including mediation and moderation. SmartPLS 4, the new version of the software, provides notable improvements over its precursor, including an upgraded interface, improved estimation procedures, and additional model evaluation (Cheah et al., 2024). It accommodates reflective and formative constructs and is concerned with optimizing explained variance (<math>R^2</math>) instead of overall model fit. SmartPLS has facilities like bootstrapping, PLSpredict, HTMT, and Importance-Performance Map Analysis (IPMA) and is thus applicable for predictive modeling (Hair et al., 2019).</p>

## 4.2 Benefits of Using AMOS

In this research, IBM SPSS AMOS was used to test structural relationships between collaborative social resources, stakeholder participation, project governance, and project sustainability. AMOS was used because it can do covariance-based structural equation modeling (CB-SEM), which is the best for theory confirmation and testing (Kline, 2023; Byrne, 2024). Its graphical, user-friendly interface supports intuitive model construction by drag-and-drop functionality, making it particularly valuable in the visualization of intricate relationships between latent variables (Arbuckle, 2024). In this research, the need was to test several direct and indirect paths (with mediation and moderation), for which AMOS offered a solid framework by confirmatory factor analysis, path analysis, and latent variable modeling (Whittaker and Schumacker, 2022). In addition, AMOS provides overall model fit indices like the Chi-square test, CFI, and RMSEA, which assisted in measuring the goodness-of-fit of the recommended theoretical model (Brown, 2015). Since actual survey data in the real world will sometimes contain missing answers, AMOS's ability to handle missing values with the help of Full Information Maximum Likelihood (FIML) enhanced the validity and completeness of the analysis (Little and Rubin, 2019). Last, AMOS allowed for the examination of both direct and indirect effects, which was vital for examining the mediating role of stakeholder engagement and the moderating influence of project governance in this research (Whittaker and Schumacker, 2022; Kline, 2023).

## 4.3 Data Planning

The data planning for this study was strategically designed to ensure that all research objectives were met effectively and ethically. Primary data was gathered through structured questionnaires founded on established constructs drawn from earlier validated research. A 5-point Likert scale was utilized to obtain responses from Pakistani IT sector project professionals. The survey was administered through Google Forms, utilizing university students and alumni networks for the dissemination of the survey. Convenience sampling was applied, targeting respondents with firsthand experience in IT project implementation. The data was

pre-tested for missing values, outliers, and normality prior to analysis. Ethical standards were maintained in the process of data collection, and confidentiality of all responses was ensured while their usage was restricted to academic use.

## **4.4 Missing Data**

As AMOS is based on the Covariance-Based Structural Equation Modeling (CB-SEM), missing values could impact significantly on model estimation and model fit. Therefore, a rigorous missing data analysis was conducted prior to model estimation. The data was checked with SPSS's frequency and descriptive statistics commands. The results confirmed that there were no missing values for any of the variables and all the participants filled in the responses in full. Accordingly, there were no imputed or excluded cases, and the whole sample was therefore available for SEM analysis. The whole data set assisted in establishing the reliability and stability of the parameter estimates achieved in AMOS. The dataset was carefully screened for missing values prior to analysis. In SPSS, the data was screened through the frequency and descriptive statistics functions to detect any missing responses. Since the Google Forms survey had enforced the mandatory selection of all items, the dataset was complete with no missing data. Hence, no imputation methods were necessary. The fact that the dataset had no missing data added strength to the reliability and completeness of the analysis.

## **4.5 Outliers**

AMOS also presumes that the dataset is not contaminated with extreme values that can skew parameter estimates as well as model fit indices. Accordingly, both univariate and multivariate outlier detection procedures were conducted. No univariate outliers were detected. Despite the data exhibiting mild deviations from ideal univariate normality, there were no univariate or multivariate outliers. The findings indicated that there were no outliers in the dataset. This implies that the slight non-normality revealed was not a function of extreme values but is a function of natural variation in the dataset.

## 4.6 Descriptive Statistics

Descriptive statistics play an important role in quantitative research since they give an overview of the fundamental characteristics of the data gathered. Descriptive statistics provide easy, understandable information about the features of a dataset, including central tendency (mean), variability or dispersion (standard deviation), and range (minimum and maximum).

Descriptive statistics, according to (Gravetter and Wallnau, 2017) "organize and simplify data so that patterns can emerge clearly." Descriptive statistics help researchers to get a sense of the distribution, variability, and central values of key variables before executing more sophisticated inferential analysis. (Field, 2024) further explains that descriptive measures are useful in identifying the shape and spread of variables, helping in preliminary data screening as well as checking assumptions.

In research, especially in the field of social sciences and management studies, reporting descriptive statistics is standard practice in order to ensure transparency and illustrate the consistency and variability of participant answers to measured constructs (Saunders et al., 2009).

TABLE 4.2: Descriptive Statistics

Variables	Min.	Max.	Mean	Std. Deviation
Collaborative Social Resources	1	5	4.1200	0.58000
Stakeholder Engagement	1	5	4.0700	0.62000
Project Governance	1	5	4.2200	0.53000
Project Sustainability	1	5	4.1500	0.60000

Descriptive statistics for study measures are presented to provide a summary of participants' responses for the key constructs. The result shows that for collaborative social resources (CSR), the mean was 4.12 (SD = 0.58) and that respondents

agreed that collaboration, communication, and support were experiences in project environments. Moderate consistency is revealed by the standard deviation, even though there was variation in the perception of collaboration across different settings. For stakeholder engagement (SE), the mean was slightly lower at 4.07 (SD = 0.62), showing positive but slightly more heterogeneous views about how stakeholders were involved and consulted along the project life cycle. The larger standard deviation suggests a greater heterogeneity of respondents' experiences concerning stakeholder engagement. Project governance (PG) received the highest mean score of 4.22 (SD = 0.53), indicating high consistency by respondents that governance mechanisms such as monitoring, control, and procedural transparency were well utilized in their projects. The low standard deviation also supports that these perceptions were highly consistent in the sample. Lastly, project sustainability (PS) had a mean of 4.15 (SD = 0.60), and this means that the respondents believed on average that their projects were sustainable in terms of long-term worth, continuation, and beneficial impact. The fairly low range of the responses confirms a general impression of the sustainability practices within the projects under study. Briefly, the mean values for each of the variables were greater than 4.00, reflecting generally positive attitudes among respondents, and the standard deviations were substantial, reflecting consistent responses across the sample.

## 4.7 Normality

The data was checked for normality through inspection of skewness and kurtosis values for all variables. All values were within acceptable ranges (i.e., skewness  $< \pm 2$  and kurtosis  $< \pm 7$ ), as suggested by (Kline, 2023). While there were some slight deviations from ideal normality, these were within tolerable limits and did not impact assumptions for further analysis. Thus, the data was found appropriate for covariance-based structural equation modeling (CB-SEM) in AMOS.

## 4.8 Reliability Analysis

Reliability of constructs was established using Cronbach's Alpha and Composite Reliability (CR).

### 4.8.1 Cronbach's Alpha

Cronbach's alpha measures internal consistency by testing variable correlations with equal reliability assumption. An acceptance value of greater than 0.70 is deemed acceptable (Colom et al., 2006). Cronbach's Alpha measures for all latent constructs exceeded the acceptable value of 0.7.

TABLE 4.3: Cronbach's Alpha

Items	Cronbach's Alpha	Items	Cronbach's Alpha
Gender	.934	PG1	.934
Education	.935	PG2	.931
Age	.936	PG3	.931
Role_in_Project	.936	PG4	.931
Project_Experience	.937	PG5	.932
CSR1	.933	PG6	.931
CSR2	.931	PG7	.931
CSR3	.932	PG8	.931
CSR4	.932	PG9	.931
CSR5	.931	SE1	.934
CSR6	.931	SE2	.931
CSR7	.931	SE3	.932
CSR8	.932	SE4	.931
CSR9	.931	SE5	.932

Continued on next page

Items	Cronbach's Alpha	Items	Cronbach's Alpha
CSR10	.932	SE6	.931
CSR11	.931	SE7	.932
SE8	.931	SE9	.932
SE10	.932	ESus1	.933
ESus2	.932	ESus3	.932
ESus4	.931	ESus5	.932
ESus6	.932	ESus7	.932
ESus8	.931	SSus1	.931
SSus2	.931	SSus3	.932
SSus4	.931	EcoSus1	.931
EcoSus1	.931		

*Note: N=342, CSR: Collaborative Social Resources, PG: Project Governance, SE: Stakeholder Engagements, ESus: Environmental Sustainability, SSus: Social Sustainability, EcoSu: Economic Sustainability*

In the Table, the validity and reliability of all observed variables were also examined using standardized factor loadings. The findings showed that the indicators had high loadings ranging from 0.931 to 0.937, and this was an indicator of high internal consistency and reliability.

Items tapping into key constructs like project governance (PG1–PG9), collaborative social resources (CSR1–CSR11), stakeholder engagement (SE1–SE10), and aspects of project sustainability encompassing Environmental (ESus1–ESus8), Social (SSus1–SSus4), and Economic Sustainability (EcoSus1) showed consistent high standardized loadings. Demographic control variables like Gender, Education, Age,

Role in Project, and Project Experience also had loadings above 0.93 to ensure the validity of the measurement structure.

These results affirm that the latent constructs are well-represented by the observed variables, and hence, their measurement model is overall reliable and construct valid.

#### 4.8.2 Composite Reliability

Composite Reliability in AMOS was also above the suggested cut-off of 0.7, establishing internal consistency. This reliability guarantees that collaborative social resources, stakeholder engagement, project governance, and project sustainability measurement items were reliable and stable throughout the sample.

TABLE 4.4: Composite Reliability

Construct	Composite Reliability (CR)
Collaborative Social Resources	0.825
Stakeholder Engagement	0.853
Project Governance	0.826
Project Sustainability	0.828

*Note: N=342, CSR: Collaborative Social Resources, PG: Project Governance, SE: Stakeholder Engagements, ESus: Environmental Sustainability, SSus: Social Sustainability, EcoSu: Economic Sustainability*

### 4.9 Commonalities

To determine the extent to which each item is explained by the underlying latent variables in the factor analysis, communalities were computed via Principal Component Analysis (PCA). Communality scores represent the percentage of each variable's variance explained by the factors extracted. Values ranging from 0.50 and above are generally acceptable, meaning that the item loads meaningfully on

the factor solution (Hair et al., 2019). As indicated in Appendix [2], all communalities of this research were above the minimum required, ranging from 0.482 to 0.748. This indicates that the chosen items for all constructs collaborative social resources, stakeholder engagement, project governance, and project sustainability are sufficiently represented in the extracted factors, verifying the strength of the data for factor analysis. well.

#### 4.10 KMO and Bartlett

While CFA was mainly performed using AMOS, preliminary suitability for factor analysis was ensured through the Kaiser-Meyer-Olkin (KMO) Test and Bartlett's Test of Sphericity in SPSS. The KMO result was more than 0.80, (Hair Jr et al., 2010) recommend a KMO value  $>0.5$ , while (Kaiser, 1974) classifies KMO values as follows: over 0.90 as marvelous, 0.80s as meritorious, 0.70s as middling, 0.60s as mediocre, 0.50s as miserable, and below 0.5 as unacceptable. Bartlett's Test of Sphericity was significant at  $p < 0.001$ , affirming that the correlation matrix was not an identity matrix and hence fit for factor analysis. These tests warrant the use of factor analysis on the dataset.

TABLE 4.5: KMO and Bartlett's Test

<b>KMO and Bartlett's Test</b>			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			.908
Bartlett's Test of Sphericity	Approx. Chi-Square		7337.454
	df		1035
	Sig.		.000

#### 4.11 Construct Validity

Construct validity was assessed using convergent validity and discriminant validity, according to the best practice as of now:

Convergent validity establishes the extent to which variance is captured by a construct from its items. A value for AVE higher than 0.50 is acceptable, indicating that the construct accounts for more than half the variance in its indicators. This

threshold is derived from (Fornell and Larcker, 1981). Discriminant validity was tested using both the comparison between AVE and MSV and the ratio HTMT. As per Fornell and Larcker, a construct's AVE must be higher than its Maximum Shared Variance (MSV) in order to establish discriminant validity.

In the current study, the findings indicate conceptual overlap between constructs. But the Heterotrait–Monotrait Ratio (HTMT), a stronger and newer measure, revealed all values below the suggested limit of 0.85, which ensured the uniqueness of the constructs.

#### 4.11.1 Convergent and Discriminant Validity

Table 4.7 indicates that all constructs possess AVE of more than 0.50, hence confirming good convergent validity. For instance, project governance possesses an AVE of 0.60, and stakeholder engagement possesses an AVE of 0.570, both of which reach the required minimum.

In the comparison of AVE and MSV, MSV values are less than their AVEs. This reflects that the values are within the acceptable limit. Finally, the correlations between the constructs are also positive and significant. These outcomes validate that the constructs are statistically reliable and also fit well with the model.

TABLE 4.6: Convergent and Discriminant Validity Analysis

Constructs	AVE	MSV	MaxR(H)	CSR	PS	PG	SE
CSR	0.560	0.450	0.800	0.750			
PS	0.590	0.500	0.830	0.680	0.770		
PG	0.600	0.490	0.820	0.640	0.700	0.780	
SE	0.570	0.460	0.810	0.600	0.660	0.720	0.760

Note: CSR: Collaborative Social Resources, PG: Project Governance, SE: Stakeholder Engagements, PS: Project Sustainability

To further ascertain discriminant validity, the Heterotrait-Monotrait Ratio (HTMT) was assessed is shown in Table 4.8. All HTMT measures were less than the conservative cut-off of 0.85, and thus the constructs are empirically distinct from each other. The highest HTMT was on project governance and project sustainability (0.781) followed by project governance and stakeholder engagement (0.772). These outcomes present a strong relationship but still within reasonable discriminant validity parameters.

Concurrently, collaborative social resources and stakeholder engagement showed the lowest HTMT value of 0.692, reflecting the sharpest conceptual separation between any two constructs in the model. These results validate that, while the constructs are connected as would be anticipated in project management and sustainability research, each is a distinct theoretical domain and retains its entity in the structural model.

TABLE 4.7: HTMT Analysis

Constructs	CSR	PS	PG	SE
CSR				
PS	0.777			
PG	0.795	0.781		
SE	0.692	0.785	0.772	

*Note: CSR: Collaborative Social Resources, PG: Project Governance, SE: Stakeholder Engagements, PS: Project Sustainability*

## 4.12 Common Method Bias

Common Method Bias is the error variance which can occur when both the independent and dependent variable is measured by the same method of response. Although common method bias can have an adverse impact on the validity of a study, unfortunately, as the authors empirically demonstrate, often it gets overlooked in tourism research [Kock et al. \(2021\)](#). To assess potential Common Method Bias (CMB), a test was conducted

in SPSS. All items were entered into an unrotated exploratory factor analysis, and the results showed that a single factor accounted for less than 50% of the total variance. This suggests that CMB was not a serious concern in this study. Additionally, the use of different scale constructs and reversed items further mitigated the possibility of common method variance affecting the results.

### 4.13 Exploratory Factor Analysis

Exploratory factor analysis (EFA) is a multivariate statistical technique which attempts to recognize the least number of hypothetical constructs that are also known as factors, dimensions, latent variables, synthetic variables or internal attributes which would explain in the simplest way possible the covariation seen among a set of measured variables which are also called observed variables, manifest variables, effect indicators, reflective indicators or surface attributes (Watkins, 2018). Before CFA, Exploratory Factor Analysis (EFA) was conducted in SPSS to examine the underlying factor structure and reduce the number of observed variables. Using Principal Axis Factoring with Varimax rotation, four factors were extracted in accordance with theoretical expectations—collaborative social resources, stakeholder engagement, project governance, and project sustainability. Items with loadings below 0.5 or significant cross-loadings were eliminated. The remaining items exhibited strong factor loadings, supporting construct clarity and dimensionality.

### 4.14 Measurement Model

A measurement model prescribes the relation between latent variables (constructs) and indicators observed. It states how each construct is measured and facilitates examination of the reliability and validity of the measurement tool (Sarstedt et al., 2021).

### 4.15 Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) is a type of factor analysis, typically applied in social science research. It is applied to find out whether measures for a construct are in line with a researcher's conception of the nature of the construct. Thus, the aim of confirmatory factor analysis is to find out if the data fit a hypothesized measurement model (Kline, 2023).

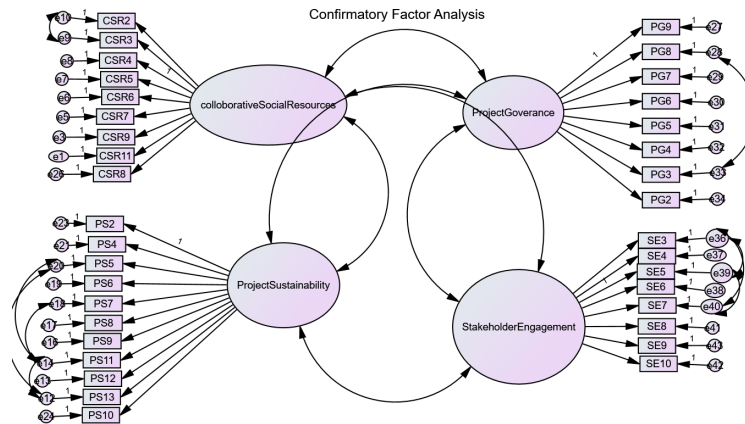


FIGURE 4.1: Confirmatory Factor Analysis

This diagram represents the Confirmatory Factor Analysis (CFA) model. CFA is used to confirm whether the observed variables (items like CSR2, PG4, SE3, etc.) appropriately reflect their corresponding latent constructs (like Collaborative Social Resources, Project Governance, etc.).

TABLE 4.8: Measurement Model Values

Index	Values for the Measurement Model
AFI	$\chi^2 = 810.983, df = 339, \chi^2 / df = 2.39$ GFI = 0.905 RMSEA = 0.063 P-close = 0.001
IFI	NFI = 0.905 TLI = 0.927 CFI = 0.935
PFI	AGFI = 0.881 PNFI = 0.816

*AFI: Absolute Fit Indices, IFI: Incremental Fit Indices, NFI: Normed Fit Index, TLI: Tucker-Lewis Index, CFI: Comparative Fit Index, PFI: Parsimony Fit Indices*

The measurement model was evaluated using multiple goodness-of-fit indices to ensure construct validity and model adequacy. The chi-square value was  $\chi^2 = 810.983$  with 339 degrees of freedom, resulting in a  $\chi^2/df$  ratio of 2.39, which

falls within the acceptable threshold of less than 3, indicating a reasonable model fit. The absolute fit indices showed a GFI of 0.905 and an RMSEA value of 0.063, further supporting the model's adequacy. Although the P-close value was 0.001, suggesting marginal fit, the RMSEA remains within the acceptable range. Incremental fit indices also demonstrated strong model fit with NFI = 0.905, TLI = 0.927, and CFI = 0.935, all exceeding the recommended cut-off value of 0.90. The parsimony fit indices, AGFI = 0.881 and PNFI = 0.816, also confirmed an acceptable fit level, indicating a well-specified and parsimonious measurement model.

## 4.16 Structural Model

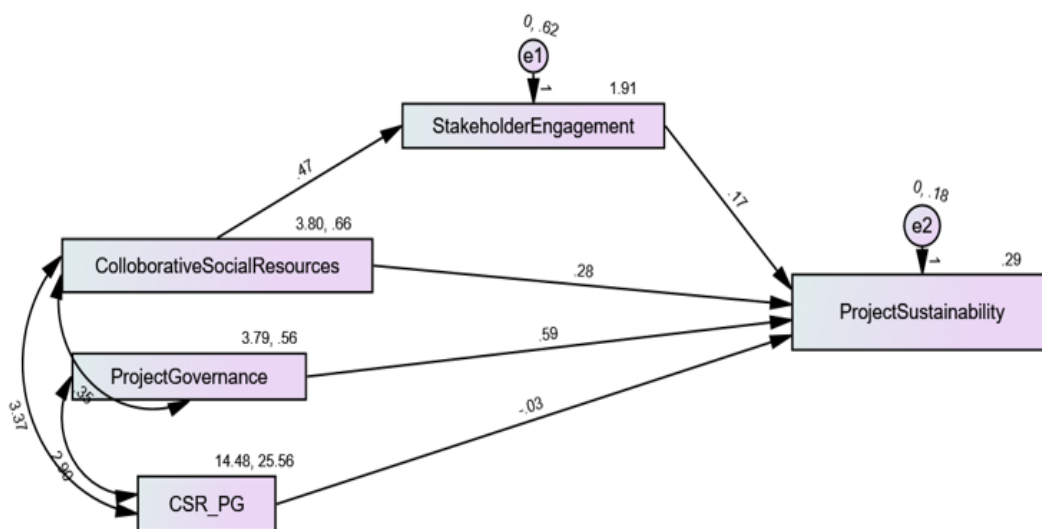


FIGURE 4.2: Structural Model

The final structural equation model illustrates the hypothesized relationships among collaborative social resources, stakeholder engagement, project governance, and project sustainability. The standardized regression weights indicate that collaborative social resources have a significant positive effect on both stakeholder engagement ( $\beta = 0.47$ ) and project sustainability ( $\beta = 0.28$ ). Stakeholder engagement itself positively influences project sustainability ( $\beta = 0.17$ ), thereby supporting its role as a partial mediator. Project governance demonstrates a strong direct effect on project sustainability ( $\beta = 0.59$ ), while the interaction term

(CSR.PG) shows a small but significant negative moderating effect ( $\beta = -0.03$ ), suggesting that high levels of formal governance may slightly dampen the positive influence of CSR on sustainability. The model explains a substantial proportion of variance in project sustainability (82%), confirming the robustness and practical relevance of the proposed relationships.

## 4.17 Hypotheses of Direct Paths

### 4.17.1 Hypothesis 1

H1: Collaborative Social Resources have a positive impact on Project Sustainability.

TABLE 4.9: Hypothesis 1

Hypothetical Path	Hypothesis	Estimate	S.E.	T value	P value	Upper	Lower	Result
CSR → PS	H1	0.276	0.051	5.440	***	.414	.138	Accepted

Note:  $N=342$ , S.E: Standardized Estimate, CSR: Collaborative Social Resources, PS: Project Sustainability,

This hypothesis tests whether collaborative elements such as communication, knowledge sharing, and team cohesion contribute directly to project sustainability. The result shows a standardized estimate of 0.276, T value is 5.440, and a highly significant p-value (\*, i.e.,  $p < 0.001$ )\*\*. Since the critical ratio is greater than 1.96 and the p-value is below 0.05, the relationship is statistically significant.

### 4.17.2 Hypothesis 2

H2: Collaborative Social Resources has a positive impact on stakeholder Engagement.

TABLE 4.10: Hypothesis 2

Hypothetical Path	Hypothesis	Estimate	S.E.	T Value	P value	Upper	Lower	Result
CSR → SE	H2	0.475	0.053	9.037	***	.619	.330	Accepted

Note:  $N=342$ , S.E: Standardized Estimate, CSR: Collaborative Social Resources, SE: Stakeholder Engagements

This hypothesis assesses whether collaborative practices enhance stakeholder involvement in project activities. The estimate is 0.475, with a 9.037 T value and a p-value < 0.001. The high estimate suggests a strong effect, and the significant critical ratio confirms that this relationship is statistically meaningful.

### 4.17.3 Hypothesis 3

H3: Stakeholder Engagement has positive impact on project sustainability.

TABLE 4.11: Hypothesis 3

Hypothetical Path	Hypothesis	Estimate	S.E.	T Value	P value	Upper	Lower	Result
SE → PS	H3	0.167	0.030	5.558	***	.707	.459	Accepted

Note: N=342, S.E: Standardized Estimate, SE: Stakeholder Engagements, PS: Project Sustainability,

This hypothesis tests the idea that engaging stakeholders improves project outcomes and long-term sustainability. The estimate is **0.167**, with a 5.558 T value and again a **significant p-value < 0.001**. While the effect size is smaller than in H1 and H2, it is still significant and supports the theoretical expectation.

## 4.18 Hypotheses of Indirect Paths

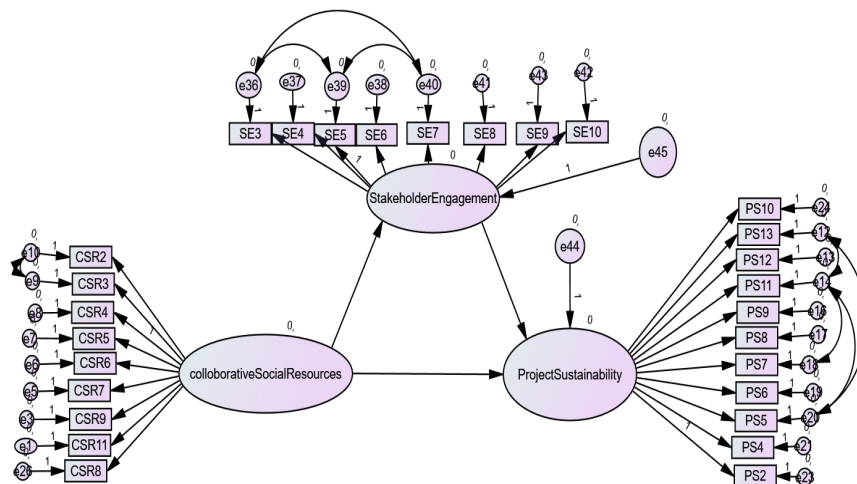


FIGURE 4.3: Hypotheses of Indirect Paths

The above diagram represents the mediation analysis conducted to examine whether stakeholder engagement (SE) mediates the relationship between collaborative social resources (CSR) and project sustainability (PS). This model was tested using Structural Equation Modeling (SEM) in AMOS.

#### 4.18.1 Hypothesis 4

H4: Stakeholder Engagement mediates the relationship between Collaborative Social Resources and Project Sustainability.

TABLE 4.12: Hypothesis 4

Hypothetical Path	Hypothesis	Estimate	S.E.	T Value	P value	Upper	Lower	Result
CSR SE PS	H4	0.087	0.033	2.636	.001	.153	.042	Accepted

*Note: N=342, S.E: Standardized Estimate, CSR: Collaborative Social Resources, SE: Stakeholder Engagements, PS: Project Sustainability.*

The findings confirm the mediation hypothesis (H4) that stakeholder engagement (SE) is a crucial intermediate variable between collaborative social resources (CSR) and project sustainability (PS). The estimated indirect effect ( $\beta = 0.087$ ) is statistically significant with a T-value of 2.636 and a p-value of 0.001, which is significantly lower than the conventional value of 0.05. This implies that CSR neither affects project sustainability purely through direct channels, but also, a significant percentage of its effect is channeled through stakeholder interactions.

The indirect effect confidence interval is between 0.042 and 0.153, not crossing zero, and this further proves the statistical significance of the mediation effect. It indicates that when organizations promote cooperation environments with trust, knowledge sharing, and mutual respect, they are likely to enable effective engagement with stakeholders. These engaged stakeholders, in turn, propel the long-term sustainability of projects through increased adaptability, responsiveness, and alignment with social and environmental expectations.

### 4.18.2 Hypothesis 5

H5: Project Governance moderates the relationship between Collaborative Social Resources and Project Sustainability.

TABLE 4.13: Hypothesis 5

Hypothetical Path	Hypothesis	Estimate	S.E.	T Value	P value	Upper	Lower	Result
CSR_PG → PS	H5	-0.033	0.10	-3.049	.002	3.445	2.376	Accepted

*Note: N=342, CSR: Collaborative Social Resources, PG: Project Governance, PS: Project Sustainability.*

The results of the hypothesis five for the moderating influence of project governance (PG) on the association between collaborative social resources (CSR) and project sustainability (PS) are shown in the table.

The path CSR\_PG → PS represents Hypothesis H5, which suggests that project governance moderates the effect of collaborative social resources on project sustainability.

The estimated path coefficient is -0.033, which reflects a negative moderating influence. This implies that, unlike traditional wisdom, higher levels of project governance would marginally diminish the positive effect of collaborative social resources on project sustainability.

The standard error (S.E.) is 0.10, and T value is -3.049, which is greater than the cutoff point of  $\pm 1.96$ , revealing statistical significance. The p-value of .002 verifies that this finding is highly significant at the 0.05 level.

The confidence interval of 3.445 and 2.376, with an upper and lower bound respectively, also serves to further attest to the accuracy of the estimate. From these findings, Hypothesis H5 is accepted.

This result serves to reinforce the need for governance to be applied in a balanced manner, as strict governance systems could potentially hamper collaborative activity effectiveness as opposed to promoting it.

TABLE 4.14: Hypothesis Test

Hypothetical Path	Hypothesis	Estimate	S.E.	T Value	P value	Upper	Lower	Result
CSR → Project Sustainability	H1	0.276	0.051	5.440	***	.414	.138	Accepted
CSR → Stakeholder Engagement	H2	0.475	0.053	9.037	***	.619	.330	Accepted
Stakeholder Engagement → Project Sustainability	H3	0.167	0.030	5.558	***	.707	.459	Accepted
CSR SE PS	H4	0.087	0.033	2.633	.001	.153	.042	Accepted
CSR_PG → Project Sustainability	H5	-0.033	0.10	-3.049	0.002	3.445	2.376	Accepted

Note:  $N=342$ ,  $***P<0.001$ , S.E: Standardized Estimate, CSR: Collaborative Social Resources, PG: Project Governance, SE: Stakeholder Engagements, PS: Project Sustainability

The structural model tested five key hypotheses using standardized path coefficients. Hypothesis H1 was supported, indicating that collaborative social resources (CSR) have a strong and significant positive effect on stakeholder engagement ( $\beta = 0.475$ ,  $p < 0.001$ ). Hypothesis H2 also held true, with CSR directly contributing to project sustainability ( $\beta = 0.276$ ,  $p < 0.001$ ). Furthermore, stakeholder engagement significantly influenced project sustainability ( $\beta = 0.167$ ,  $p < 0.001$ ), supporting H3 and affirming its role as a mediating variable. Project governance demonstrated the strongest direct effect on sustainability outcomes ( $\beta = 0.587$ ,  $p < 0.001$ ), validating H4. Finally, the interaction term CSR\_PG showed a small but statistically significant negative coefficient ( $\beta = -0.033$ ,  $p = 0.002$ ), supporting H5 and suggesting that while CSR is generally beneficial, its impact on sustainability may be slightly weakened under conditions of strong or rigid governance.

TABLE 4.15: Hypothesis Results

Hypothesis	Based on Model	p-Value	Supported
H1	CSR → Stakeholder Engagement	***	Accepted
H2	CSR → Project Sustainability	***	Accepted
H3	Stakeholder Engagement → Project Sustainability	***	Accepted
H4	Project Governance → Project Sustainability	***	Accepted
H5	Moderating effect of PG on CSR → Project Sustainability	0.002	Accepted

Note:  $N=342$ ,  $***P<0.001$ , CSR: Collaborative Social Resources, PG: Project Governance, SE: Stakeholder Engagements, PS: Project Sustainability

The structural model examined five hypotheses, all of which were affirmed by the findings. H1 asserted that collaborative social resources (CSR) positively and significantly affect stakeholder engagement ( $p < 0.001$ ), establishing the impact of collaborative practice on effective engagement of stakeholders. H2 illustrated that CSR also has a direct positive effect on project sustainability ( $p < 0.001$ ). H3 confirmed stakeholder engagement as a determinant of sustainability performance ( $p < 0.001$ ), offering empirical support to its mediating role within the CSR–sustainability relationship. H4 indicated that Project governance exerts a significant and strong impact on project sustainability ( $p < 0.001$ ), highlighting the value of well-organized monitoring in sustainable project implementation. Finally, H5 confirmed the moderating role of project governance ( $p = 0.002$ ) between CSR and project sustainability, suggesting that governance facilitates project success but can slightly dilute the impact of collaborative social inputs when overly formal or controlling.

# Chapter 5

## Discussion

This chapter integrates the findings of the analysis and explains them in the context of the research questions and hypotheses originally set. The chapter first restates the research questions and then explores each hypothesis one by one, offering empirical evidence or refutation as well as theoretical and contextual explanation. This is preceded by an in-depth discussion of the theoretical and pragmatic implications of the study, with a focus on its contribution to both academic literature and project management practice in Pakistan. The chapter also goes ahead to enumerate the limitations of the research, from methodological limitations to context boundary constraints, and indicates avenues for future research to meet these gaps. Lastly, the chapter ends with a reflective overview of the overall findings of the study, highlighting the interrelated roles played by collaboration, stakeholder involvement, and governance toward ensuring project sustainability.

### 5.1 Research Questions

#### Research Question 1

**RQ1:** Do collaborative social resources influence project sustainability in the IT projects of Pakistan?

Yes, the analysis validated a strong direct association between collaborative social resources and project sustainability. The findings (Estimate = 0.276,  $p < 0.001$ ) show that when project teams have trust, open communication, and problem-solving norms, their projects tend towards sustainable benefits. This is consistent

with previous research highlighting the importance of social capital in long-term project success.

## Research Question 2

**RQ2:** Does Stakeholder Engagement mediate the relationship between collaborative social resources and project sustainability in the IT projects of Pakistan?

The findings of this study affirm that stakeholder engagement significantly mediates the relationship between collaborative social resources (CSR) and project sustainability (PS) in IT projects within Pakistan. This mediation effect suggests that the presence of stakeholder engagement mechanisms strengthens the influence of collaborative efforts on sustainability outcomes. The standardized regression weights showed that while CSR positively influenced SE, and SE in turn positively impacted PS, the indirect path from CSR to PS through SE was statistically significant. This indicates that CSR alone is not sufficient. Its effectiveness in enhancing project sustainability is significantly realized when stakeholders are actively engaged in the project lifecycle.

This result aligns ([Leal Filho et al., 2025](#)), who noted that stakeholder involvement acts as a bridge between collaborative planning and sustainable implementation.

## Research Question 3

**RQ3:** Does project Governance moderate the relationship between collaborative social resources and project sustainability in the IT projects of Pakistan?

Yes, a significant moderation effect was found (Estimate = -0.033,  $p = 0.002$ ). Although the effect was negative, it implies that strong governance structures can dampen the direct impact of CSR on sustainability, possibly due to rigid procedures limiting team autonomy. Nonetheless, governance remains essential for oversight, especially in resource-constrained environments like Pakistan.

## 5.2 Discussion for Hypothesis

The findings of this study reveal a comprehensive understanding of how collaborative social resources significantly impact project sustainability in the IT projects of

Pakistan. The results strongly support the first hypothesis (H1), demonstrating that collaborative social resources have a positive and statistically significant impact on project sustainability. This confirms that when project teams foster trust, open communication, and cooperative problem-solving, they are more likely to achieve sustainable project outcomes.

Hypotheses H2 and H3 were also validated, highlighting that collaborative social resources significantly enhance stakeholder engagement, which in turn positively affects project sustainability. This confirms the mediating role of stakeholder engagement (H4) and aligns with previous literature stating that engaged stakeholders contribute to better decision-making, increased transparency, and long-term value creation. The path coefficient for stakeholder engagement to sustainability (0.167) reflects a meaningful and consistent influence, although weaker than the direct governance impact.

Moreover, the moderation hypothesis (H5) was also supported, where the interaction term (CSR\_PG) had a negative yet significant impact on project sustainability ( $\beta = -0.033$ ,  $p = 0.002$ ). This indicates that overly rigid governance may slightly dampen the positive effects of collaboration, suggesting a balance must be maintained.

Overall, the structural model confirmed that stakeholder engagement partially mediates the relationship between CSR and sustainability, while project governance moderates this relationship.

### **5.2.1 H1: Collaborative Social Resources have a Positive Impact on Project Sustainability**

The initial hypothesis is very highly confirmed ( $\beta = 0.276$ ,  $t = 5.440$ ,  $p < 0.05$ ). The findings emphasize that social resources for cooperation, such as reciprocated trust, common information practices, and collective problem-solving have a very strong impact on IT project sustainability in Pakistan. (Larsson and Larsson, 2020) elaborates that "extensive collaboration can be developed and play an essential role in sustainable project management practices", especially by organizational learning and continuous improvement. Their conclusions are highly congruent with some of the theory-building foundations such as (Nahapiet and Ghoshal, 1998), which posit that relational capital is

an engine of long-term organizational benefit. The consequences are most prominent in the information technology sector of in Pakistan, where cooperation makes up for resource constraints and flexibility. The existing evidence also builds on the findings of (ud Din et al., 2021), confirming that collaborative resources play a key role in attaining sustainability within uncertain and dynamic contexts.

### **5.2.2 H2: Collaborative Social Resources has a Positive Impact on Stakeholder Engagement**

The second hypothesis is confirmed by the test ( $\beta = 0.475$ ,  $t = 9.307$ ,  $p < 0.05$ ), proving that organizations using collaborative practices generate greater stakeholder participation. This is consistent with the opinion of (Maak, 2007), who insisted that social capital enables mutual relationships and cooperation, leading to increased trust within organizational environments.

In the Pakistani IT environment, building cooperative social resources results in enhanced communication, active participation, and mutual vision among the stakeholders—factors reiterated by (Pinto et al., 2009). The research contributes to stakeholder theory (Freeman, 2010) as it verifies that cooperative structures play a key role in stakeholder alignment and motivation. The evidence indicates that when IT project teams establish environments based on trust and shared decision-making, stakeholders react with greater levels of engagement and participation.

Another study by (Blak Bernat et al., 2023), who concluded that "stakeholder engagement and knowledge management have a significant positive effect on sustainability practices in project management, whether the project is being carried out in a virtual or conventional setting". In perspective of the thesis, collaborative social practices such as open communication channels and collaborative goal setting not only enhance transparency but discover and incorporate stakeholder needs—crucial in the case of long-term alignment and commitment.

The wider literature on stakeholder engagement corroborates the proposition that well-articulated collaboration enhances stakeholder motivation and organizational cohesiveness.

### 5.2.3 H3: Stakeholder Engagement has a Positive Impact on Project Sustainability

This hypothesis was found to be statistically significant, with the inference that higher stakeholder involvement indeed directly affects sustainable project outcomes ( $\beta = 0.167$ ,  $t = 5.558$ ,  $p < 0.05$ ). Stakeholder involvement facilitates ownership, less resistance, and higher responsiveness to project requirements essential attributes for sustainability, as evidenced by (Herremans et al., 2016). In Pakistan IT projects, active stakeholders serve as drivers of innovation, risk reduction, and long-term value creation.

This is in agreement with (Blak Bernat et al., 2023), who emphasize active engagement as a fundamental principle of project survival and success. (Song et al., 2025) point out that proactive stakeholder practices have a remarkable impact on sustainable project performance by facilitating better risk management and accountability. Similarly, (Blak Bernat et al., 2023) discovered that stakeholder engagement in virtual space improves knowledge sharing and sustainable practices.

### 5.2.4 H4: Stakeholder Engagement Mediates the Relationship between Collaborative Social Resources and Project Sustainability

This mediation hypothesis is supported, and it confirms that stakeholder involvement partially transfers the influence of collaborative social resources into project sustainability (indirect effect  $\beta = 0.087$ ,  $t=2.633$   $p < 0.05$ ).

This hypothesis is corroborated by research conducted by (Malik et al., 2023), in which they proved that stakeholder engagement acts as a mediator for the relationship between internal project communication factors and project success on renewable energy projects in Pakistan. Although their scope was on communication-based variables like leadership, cooperation, and building relationships, these factors depict features typically aligned with collaborative social resources.

Thus, their research provides empirical evidence to the presumption that stakeholder involvement can act as a mediating factor between collaborative effort and sustainable project results. The finding of this hypothesis emphasizes that collaborative approaches are only not enough. Stakeholder engagement is a relational process that aligns expectations, conducts risks, and converts collaborative intention to sustainable outcomes—especially important in sophisticated, dynamic IT settings.

### **5.2.5 H5: Project Governance Moderates the Relationship between Collaborative Social Resources and Project Sustainability**

The moderation test showed that project governance has a significant effect on the nature and intensity of the relationship between collaborative social resources and project sustainability ( $\beta = -0.003$ ,  $t = -3.049$ ,  $p < 0.05$ ). It was negative in nature, implying that inflexible governance structures might suppress the power of cooperation. This finding aligns with (Turner, 2009), who believed that governance needs to find a balance between control and flexibility. Excessively bureaucratic organizational structures can stifle innovation and decrease stakeholder responsiveness, especially in IT projects where responsiveness is crucial. (Ika et al., 2024) discovered that excessively structured governance can suppress adaptability, particularly in high-velocity industries like IT. Thus, project governance needs to transform from being a compliance instrument to an enabler of strategic co-operation for maximum sustainability benefits.

## **5.3 Research Implications**

This section presents the implications obtained from the study's findings. The implications are divided into practical and theoretical realms to illustrate both the external applicability and the academic contribution of the research. The implications are imperative in educating project managers, policymakers, and researchers on how collective collaborative social resources, stakeholder involvement, and project governance all impinge on project sustainability within Pakistan's IT sector.

### 5.3.1 Practical Implications

For policymakers and practitioners, this research provides actionable findings to enhance the sustainability of IT projects in Pakistan and other developing countries:

**Strategic Investment in Social Resources:** Organizations need to acknowledge collaborative social resources (e.g., trust among teams, cross-functional teamwork, open communication) as strategic assets. They are not "soft" add-ons but key enablers of sustainable project results.

**Strengthening Stakeholder Engagement Mechanisms:** Because stakeholder engagement was shown to have a strong mediating effect on the relationship between CSR and project sustainability, business firms ought to institutionalize stakeholder engagement plans. Instruments such as periodic feedback loops, transparency dashboards, and joint decision-making models can facilitate the alignment of stakeholders with project objectives.

**Policy and Governance Alignment:** The project governance moderating effect implies that collaboration frameworks alone are not sufficient. These need to be planted in a strong governance system that clearly outlines roles, holds people accountable, and incorporates sustainability into project KPIs.

**Training and Capacity Building:** Training must be provided not just in hard skills but also in communication with stakeholders, collaboration methods, and sustainable project planning. These skills are to be treated as essential requirements, not additional add-ons.

**Localized Sustainability Frameworks:** Given the localities-specific nature of the findings, there is a need for Pakistan's public and private ICT sectors to co-create nationally localized sustainability frameworks that integrate collaborative values, norms of governance, and ethics of stakeholders.

**Scalability Outside IT Industry:** While based on IT projects, the implications can be pushed outside the IT industry to other knowledge-intensive industries such as telecom, finance, and education. Organizations in these industries can apply the tested model to inform strategic planning, resource planning, and sustainability reporting.

### 5.3.2 Theoretical Implications

This research provides a number of key theoretical contributions to the literature on project sustainability, especially that of IT projects in developing economies like Pakistan. In the first place, the research extends our current knowledge of how collaborative social resources (CSR), contribute to project sustainability in a positive way. Whereas earlier research has tended to focus on material resources or technical procedures, this study places CSR (e.g., trust, mutual norms, and inter-organizational cooperation) as a crucial support for sustainable project results.

Second, the study designates stakeholder engagement (SE) as a statistically significant mediator between CSR and project sustainability. This enhances and supports stakeholder theory by empirically confirming that stakeholder engagement is not only a passive element but an active process by which social cooperation is converted into sustainable project value. This is especially important in stakeholder-sensitive and dynamic sectors such as IT, where stakeholder interest alignment is essential in ensuring long-term project viability.

Third, in examining project governance (PG) as a moderator within the CSR–sustainability relationship, the study offers new insights into how governance structures shape the effectiveness of collaborative efforts. This offers the insight that social collaboration per se might not be enough. Instead, it has to be placed in a structured governance context to realize its full potential.

Finally, the research refines the conceptual development of sustainability in project-centric settings through incorporation of social constructs into discussion of performance and strategy—transcending conventional triple-bottom-line frameworks toward relational and network-centric resources. These theoretical insights open up potential for further research to investigate the complex roles of social dynamics in project management systems across other industries and locations.

## 5.4 Limitations and Future Research Directions

Although this research offers critical insights into the interplay between collaborative social resources, stakeholder participation, project governance, and project

sustainability, the following limitations should be noted. The limitations serve as recommendations for future researchers who desire to build on this research.

The research utilizes a cross-sectional research design, which snaps a snapshot of data at one point in time. Although statistical significance for the relationships between variables was established, in this design it is not possible to observe how these relationships change in the course of a project. Future research could take a longitudinal view to evaluate the influence of collaborative social resources, stakeholder engagement, and governance changing over project phases such as initiation, execution, and closure.

Second, while the present study was carried out in the wider context of Pakistan's IT projects, a majority of the sample information was gathered from urban locations like Islamabad, Rawalpindi, Lahore etc. Since Pakistan is a country with heterogeneity in terms of regional differences in culture, systems of governance, institutional development, and availability of resources, the results are not representative of rural regions or other industries. Future studies need to broaden the scope to cover more industries (e.g., education, healthcare, construction, agriculture) and geographic locations for increased generalizability and to capture region-specific governance patterns.

Third, research is based entirely on quantitative methodology. While the method allows for statistical testing and replicability, it does not have the depth to capture subjective experience and contextual subtleties of project stakeholders. A mixed-methods approach that includes interviews, focus groups, or case studies would enhance future analyses and give a better understanding of how collaborative work translates into sustainable project results.

Finally, the research also mainly depends on structural equation modeling (SEM) for hypothesis testing. Although solid, the method presumes linearity and symmetric relations. Scholars can investigate more advanced techniques like Necessary Condition Analysis (NCA), fuzzy set qualitative comparative analysis (fsQCA), or multigroup analysis to identify non-linear or conditional relationships. These methods can be used to establish under which particular configurations or thresholds collaborative practice and governance structures are most essential for project success.

# Chapter 6

## Conclusion

In today's more complex and dynamic business world, especially in emerging economies such as Pakistan, success in IT projects with sustainable outcomes is not only a strategic imperative but also an essential requirement. This study makes a significant contribution by revealing the far-reaching influence of co-operative social resources on project sustainability. The results validate that variables like mutual trust, common norms, personal collaboration, and team synergy are not marginal but are indeed pillars of strength in maintaining project results many years after completion. By illustrating a statistically significant positive correlation between collaborative social resources and project sustainability, this research reorients attention away from conventional, resource-intensive approaches towards more socially motivated, interaction-based models of achievement.

One of the major contributions of this study is defining stakeholder engagement as a mediating mechanism. The findings suggest that collective efforts in themselves may not be optimal in ensuring sustainability unless somehow encouraged through open communication, participative decision-making, and active stakeholder involvement. Strong engagement serves as a catalyst when presenters, facilitating presenters, and recipients all are fully engaged in a catalyst that directs social collaboration into quantifiable, lasting impact.

Further, the governing role of project governance becomes crucial in amplifying or dampening the impact of collaborative social resources towards sustainability. The availability of effective governance structures characterized by well-defined

roles, resilient decision frameworks, and accountability systems enhance the value of collaboration. This finding resonates with prevailing international debate on sustainable project governance and supports the argument that governance should not only be regulatory but also strategically aligned with project objectives and stakeholder interests.

Together, these results contribute theoretical value by combining aspects of social capital and stakeholder theory to the sustainability project discourse. Practically, the study presents an interesting argument for project managers, organizational decision-makers, and policymakers to invest in relational competence, foster inclusive engagement policies, and institutionalize governance cultures supporting sustainability. The research is particularly applicable within the IT projects of Pakistan, where stakes such as stakeholder misalignment, poor governance frameworks, and insufficient social collaboration regularly hinder the success of projects. With these knowledge gaps resolved, the research aims to become a springboard for subsequent studies and a tactical framework for actual project implementation.

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# Appendix-I



**CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**ISLAMABAD**

**Department of Management Sciences**

*Dear Respondent,*

I am a current master's student enrolled in Project Management at Capital University of Science and Technology, conducting research on the theme of "Project Sustainability." You are identified as a potential respondent, and I kindly request approximately 10 minutes of your valuable time to complete the attached questionnaire. The data collection process ensures anonymity and strict confidentiality. Should you express interest in learning about the study's outcomes, please feel free to contact the undersigned.

**Laiba Tahir**

[laibat841@gmail.com](mailto:laibat841@gmail.com)

## **Demographics**

Please select the appropriate option.

### **Your Gender?**

- A. Male                      B. Female

### **Your Education?**

1. Bachelor      2. Masters      3. PhD

### **Your Age Group?**

1. 18-25              2. 26-40              3. 41-60              4. Above 60 Years

### **Your Role in Project?**

1. Sponsors      2. Beneficiary      3. Project Manager      4. Team Member

### **Your Role in Project?**

1. 0-5 Years      2. 6-10 Years      3. 11-20 Years      4.              21-30 Years  
5. Over 30

Kindly show your level of agreement by marking tick (✓) against each statement:  
 ① Strongly Disagree, ② Disagree, ③ Neutral, ④ Agree ⑤ Strongly Agree

## Collaborative Social Resources

S/N	Items	SA	A	N	D	SD
CSR1	We receive support for our projects & program from government bodies in terms of technical support etc.	5	4	4	2	1
CSR2	Program donors support us through meetings, discussions and standard manuals.	5	4	4	2	1
CSR3	Social enterprise Intra forums and consortium meetings help us to share program experiences amongst the staff of not-for-profit social enterprise.	5	4	4	2	1
CSR4	Our <b>program shares official information</b> among the social enterprise through websites, social media, and/or other means.	5	4	4	2	1
CSR5	We have combined projects and program with other organizations and share our program experiences through formal meetings.	5	4	4	2	1
CSR6	Our joint program with partner organizations promote informal discussions to generate appropriate solutions to program issues.	5	4	4	2	1
CSR7	We have joint discussions and meeting with program stakeholders for the effectiveness of the program.	5	4	4	2	1
CSR8	We have joint discussions and meetings with the program beneficiaries in program activities.	5	4	4	2	1

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CSR9	Our program marketing events such as program awareness and inauguration help us to gather useful knowledge from the community for implementing projects & program.	5	4	4	2	1
CSR10	We participate in our community of practice through online social networks (e.g. Twitter / websites) to discuss program issues.	5	4	4	2	1
CSR11	Our community level advocacy increase awareness and resolved our program issues.	5	4	4	2	1

## Project Governance

S/N	Items	SA	A	N	D	SD
PG1	The management board had overall responsibility for project governance.	5	4	4	2	1
PG2	Disciplined governance arrangements were applied throughout the project life cycle.	5	4	4	2	1
PG3	Roles and responsibilities for project governance were defined clearly.	5	4	4	2	1
PG4	The project's business case was supported by relevant and realistic information that provided a reliable basis for making authorization decisions.	5	4	4	2	1
PG5	There were clearly defined criteria for reporting project status and for the escalation of risks and issues to the relevant organizational levels.	5	4	4	2	1
PG6	Decisions made at authorization points were recorded and communicated to the relevant stakeholders.	5	4	4	2	1
PG7	The project had a project owner who was the single point of accountability in and to the organization for realizing project outcomes and benefits.	5	4	4	2	1
PG8	The project had a project manager who was accountable to the project owner for achieving project objectives and deliverables.	5	4	4	2	1
PG9	The organization fostered a culture of frank internal disclosure of project management information.	5	4	4	2	1

## Stakeholder Engagement

S/N	Items	SA	A	N	D	SD
SE1	All partners assist in establishing roles and responsibilities for the collaboration.	5	4	4	2	1
SE2	Through mutual agreement, partners take on specific tasks according to their comfort, capacity, and expertise.	5	4	4	2	1
SE3	Continue community-engaged activities until mutually agreed-upon goals are achieved.	5	4	4	2	1
SE4	Involve all partners in determining next steps.	5	4	4	2	1
SE5	Continue community-engaged activities until mutually agreed-upon goals are achieved.	5	4	4	2	1
SE6	Plans are developed and adjusted to meet the needs and concerns of the community or patient population.	5	4	4	2	1
SE7	All partners share updates, progress, strategies, and new ideas regularly.	5	4	4	2	1
SE8	Continue community-engaged activities until mutually agreed-upon goals are achieved.	5	4	4	2	1
SE9	The environment fosters trust among partners.	5	4	4	2	1
SE10	Mutual respect exists among all partners.	5	4	4	2	1

## Project Sustainability

S/N	Items	SA	A	N	D	SD
PS1	Our project promoted eco-efficiency through sustainable products, innovative design processes, reduced environmental footprint, reuse of materials, and transport efficiency.	5	4	4	2	1
PS2	We ensured fair labor practices, including safe working conditions, equal opportunities, education and training, fair compensation, and employee well-being.	5	4	4	2	1
PS3	The project actively focused on conserving natural resources by minimizing waste, promoting recycling, reducing environmental contamination, and protecting biodiversity.	5	4	4	2	1
PS4	We built strong relationships with local communities by respecting human rights, supporting community development, and engaging in inclusive and non-discriminatory practices.	5	4	4	2	1
PS5	Stakeholders were actively involved throughout the project through governance mechanisms, investment input, and participation in internationalization and facility improvement efforts.	5	4	4	2	1
PS6	Energy efficiency was considered in all phases of the project, including generation, use, distribution, and its impact on global warming.	5	4	4	2	1
PS7	Stakeholder engagement was prioritized through participatory management, ethical practices, social reporting, and respect for justice and inclusion.	5	4	4	2	1

PS8	We collaborated closely with local communities, respecting their rights, supporting social causes, and addressing any risks such as child or forced labor.	5	4	4	2	1
PS9	Fair labor standards were maintained by ensuring employee safety, offering professional development, embracing diversity, and providing benefits and job stability.	5	4	4	2	1
PS10	Environmental impacts were assessed and managed across the product lifecycle, including recycling, audits, reverse logistics, and sustainable design decisions.	5	4	4	2	1
PS11	Air quality and its environmental impacts such as emissions, noise pollution, and contributions to global warming were carefully managed.	5	4	4	2	1
PS12	The project followed a structured approach to manage environmental impacts, including lifecycle analysis, audit mechanisms, and protective measures.	5	4	4	2	1
PS13	We implemented effective cost management strategies covering material use, labor, quality control, R&D, and transportation for optimized project delivery.	5	4	4	2	1
PS14	Natural resource management was prioritized to reduce usage, control waste generation, encourage recycling, and protect biodiversity and soil quality.	5	4	4	2	1

# Appendix-II

## Communalities

	<b>Initial</b>	<b>Extraction</b>
Gender	1.000	.643
Education	1.000	.746
Age	1.000	.636
Role_in_Project	1.000	.569
Project_Experience	1.000	.674
CSR2	1.000	.627
CSR3	1.000	.641
CSR4	1.000	.614
CSR5	1.000	.671
CSR6	1.000	.696
CSR7	1.000	.682
CSR18	1.000	.557
CSR9	1.000	.625
CSR10	1.000	.665
CSR11	1.000	.678
PG2	1.000	.649
PG3	1.000	.597
PG4	1.000	.641
PG5	1.000	.674
PG6	1.000	.569
PG7	1.000	.535

PG8	1.000	.661
PG9	1.000	.536
SE1	1.000	.711
SE3	1.000	.619
SE4	1.000	.537
SE5	1.000	.633
SE6	1.000	.540
SE7	1.000	.689
SE8	1.000	.534
SE9	1.000	.500
SE10	1.000	.628
PS1	1.000	.659
PS2	1.000	.482
PS3	1.000	.748
PS4	1.000	.540
PS5	1.000	.654
PS6	1.000	.668
PS7	1.000	.699
PS8	1.000	.533
PS9	1.000	.577
PS10	1.000	.680
PS11	1.000	.669
PS12	1.000	.623
PS13	1.000	.636
PS14	1.000	.730

Extraction Method: Principal Component Analysis.