PROJECT GOVERNANCE AND PROJECT SUCCESS: A MODERATED MEDIATION MODEL OF PROJECT SUSTAINABILITY MANAGEMENT AND STRATEGIES

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DEDICATION

I dedicate this thesis to

"Allah Almighty"

my eternal rock and source of refuge, Who Gave me the passion to work hard and struggle to comply with my destiny and to "Hazrat Muhammad Rasoolullah Khatam-un-Nabiyyeen Sallalaho Alaihy Wa Aalehy Wa Ashabehi Wassallam" the one who enlightened my heart with the rules to follow.

This thesis is also dedicated to

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ABSTRACT

Projects have been playing an imperative part in the sustainable development of organizations and society. At the same time, projects pose challenges of governance and sustainable development to governments and societies. Now organizations aim at minimizing these challenges through project governance and project sustainability management to complete projects successfully. This study aims to examine effect of project governance, through mediating role of project sustainability management and through moderating the role of sustainability strategies along with its three dimensions (project organization strategies, project host organization strategies and mutual strategies) in the successful completion of public sector infrastructure projects. This cross-sectional study employed a simple random sampling technique for the data collection through a survey from 300 project directors and project managers of public sector infrastructure projects of Pakistan. In total 252 responses were received showing an 84% response rate. The data were examined using the structural equation modeling (SEM) technique. However, the findings of the study discovered that there is a significant positive effect of project governance on project success. In public sector projects, the stakeholder-orientated governance positively and significantly affects project success. Whereas in contrast with outcome control governance behavior control governance prevails and has a significant but partial effect on project success. The study reveals that project sustainability management mediates between project governance and project success. In addition to the development and validation of the Sustainability Strategies Questionnaire, this study identified that sustainability strategies moderate overall and dimensions-wise significantly influence project sustainability management. An increase in adoption of sustainability strategies overall and dimension-wise increases the effectiveness level of project sustainability management. The conditional effect of project governance on project sustainability management at different values of the sustainability management are significant for medium and higher values of sustainability strategies. Moreover, the results illustrate that the moderated mediation effects between project governance and project sustainability management increase as the level of SS increases, and the increase in the effectiveness of the mediating effect of PSM is visible between the relationship of project governance and project success at higher values of sustainability strategies. This study adds a project sustainability management perspective to the stakeholder theory. Finally, the study gives practical implications for practitioners of project management, project host, and project organizations towards comprehensive policy development and sustainability management for the successful completion of public sector infrastructure projects.

Keywords: Project governance; Sustainability Strategies; Project Sustainability Management; Project Success

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AMOS	Analysis of Moment Structures
AVE	Average variance extracted
BOC	Behavior vs outcome control
CFI	Comparative-fit Index
CPEC	China Pakistan Economic Corridor
DFE	Design for Environment
DV	Dependent Variable
ET	Environmental technologies
GPP	Green procurement and partnership
HEC	Higher Education Commission
IFI	Incremental Fit Indices
IOC	Impact on customer
IOT	Impact on team
IPMA	International Project Management Association
ISO	International Organization of Standardization
IV	Independent Variable
LLCI	Lower Level of Confidence Interval
MDGs	Millennium Development Goals
MSS	Mutual sustainability strategies
MSV	Maximum Squared Variance
NFI	Normed-fit Index
PCA	Principal Component Analysis
PE	Project Efficiency
PFF	Preparing for the future
PG	Project Governance
PHOS	Project host organization's Strategies
PMBOK	Project Management Body of Knowledge

PMFS	PM focusing on sustainability
PMI	Project Management Institute
POS	Project organization's Strategies
PS	Project Success
PSDP	Public Sector Development Program
PSM	Project Sustainability Management
RMSEA	Root Mean Square Error of Approximation
SDG	Sustainable Development Goals
SE	Standard Error
SR	Social responsibility
SRMR	Standardized Root Mean Squared Residual
SS	Sustainability Strategies
SSO	Stakeholder vs shareholder orientation
SSQ	Sustainability Strategies Questionnaire
TLI	Tucker-Lewis Index
ULCI	Upper Level of Confidence Interval
WCED	World Commission on Environment and Development

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Over the years, in developing countries, projects have been substantially contributing towards the growth of societies and industries (Aarseth, Rolstadas and Andersen, 2011; Magano, Silvius, e Silva and Leite, 2021). At the same time, projects pose challenges of governance and sustainable development to the governments and societies (Liu, Wang, Skitmore and Yan, 2019; Aarseth, Ahola, Aalthonen, Okland and Andersen, 2017). No doubt, every project strives for excellence but rapidly growing challenges of governance and sustainable development in the modern business environment hamper the success rate of many projects (Khan, Majid, Yasir and Arshad, 2013; Irfan and Hassan, 2019). Stakeholder theory with the distinct focus on sustainability management and strategies can address such challenges (Uribe, Ortiz-Marcos & Uruburu, 2018). However, in the domains of project management it is to be answered that how the success rate of projects could be enhanced through governance, sustainability management, and strategies.

Project success has got an important place in the research, practice, and literature. That is why over the last forty years, diversified factors of success and success criteria have been studied and developed. So project management researchers and practitioners are broadening the scope of success factors. The criteria of project success advances from the iron triangle concept. The evolution embraces numerous further success parameters such as structural characteristics of project governance, stakeholder satisfaction, and sustainability (Khalifeh, Farrell and Al-edenat, 2019; Joslin and Müller, 2016; Martens and Carvalho, 2016).

Sustainable and successful projects are being considered derivatives of project governance. This is just because project governance is now being considered as a success factor, that has grown rapidly famous in the last fifteen years (Biesenthal and Wilden, 2014). The need for effective project governance is acquiring maturity (Khan, Waris, Ismail, Sajid, Ali, Ullah, and Hussain, 2019). Through project governance, project initiatives could be executed effectively, though weak project governance could cause a delay in project completion (Garland, 2009). Project governance is not only being deliberated as one of the necessary enablers for project success, rather it is being considered as a substantial area of research in the domain of infrastructure projects (Biesenthal and Wilden, 2014; Muller, Pemsel and Shao, 2014). Project governance refers to the structural characteristics of project context that benefit project execution ultimately for project success (Muller and Lecouvre, 2014).

Project governance gives a framework for demonstrating responsibilities and capabilities enabling strength in decision-making as well as it guarantees that project is being implemented successfully while achieving the organizational and strategic goals. One of the major concerns of project governance is about choosing the right projects. The selection of the right projects requires the prioritizing, choosing, and placing the projects with the organization's strategic targets, goals and objectives. While selecting the right project, sustainable development is a major considerations of project governance in organizations. The literature of sustainability illustrates that development and drastic progressive revolutions take advantage from a governance structure (Grin, Rotmans, and Schot, 2010). Resultantly, project governance while focusing on sustainability impacts project success (Silvius, Schipper, Brink and Planko, 2012). In nutshell, projects require project management methodologies for project success. Recent studies indicated consideration of sustainability management as a project management methodology for the projects (Silvius, 2017; Joslin, & Müller, 2015). Carvalho and Rabechini (2017) emphasized project sustainability management for the successful accomplishment of the project, and it is recognized as "a way to sustainability" (Huemann and Silvius, 2017; Marcelino, González, & Pérez, 2015).

The consideration of sustainability has become an emerging and common trend in the majority of businesses (Ullah, Khan, Kuang, Hussain, Rana, Khan, & Sajid, 2020). In fact, the focus on sustainability in the business world is due to the rising concerns for sustainable

human survival on the earth (Withisuphakorn, Batra, Parameswar, and Dhir, 2019). Similarly, in projects, sustainability management has also become essential due to multiple reasons as revealed by Silvius, Shipper, Van, and Planko, (2012). The focus on sustainability management in projects arose from their negative environmental and social impacts. These negative impacts infer those methods and procedures of managing and governing projects must be altered (Silvius et al., 2012). This move of change for sustainability can be implemented by projects supported by various strategies adopted by the organizations suggested by Silvius et al., (2012). The authors further highlighted that when organizations focus on sustainability it influences the organizations' project selection priorities. Consequently, the sustainability consideration as ethical responsibility in projects has turned it into a more credible profession. That is why the expectation regarding the increase in project success is also being associated with sustainability in the management and governance of projects.

A nexus between sustainability and project governance appears visibly in the project management research (Shiferaw, Klakegg and Haavaldsen, 2012; Patankul and Shenhar, 2012; Herazo, Lizarralde, & Paquin, 2012; Zeng, Ma, Lin, Zeng & Tam, 2015). When Project governance encounters issues in aligning the project goals with the parent organization, project sustainability management supports in addressing these challenges (APM, 2004; Klakegg, 2009). Therefore, emphasis on project sustainability in the domains project management is becoming important (Silvius, 2017).

During the last few years, sustainability appeared as a "new school of thought" in project management. It considers projects from a communal perception with the stakeholder management approach and "Triple Bottom Line" (TBL) standards (Silvius, 2017). In terms of the TBL perspective of sustainability, Martens and Carvalho (2014) emphasized that organizations should create methods to minimize negative environmental and social impacts of projects. The authors asserted that the organizations cannot pursue economic development without safeguarding the environmental and social benefits of the society. Organizations are considering sustainability seriously in operations (Thomas and Lam, 2012; Marcelino et al., 2015; Van et al., 2018;) by making alignment of sustainability with the strategic objectives of the organizations (Tharp, 2012). The consideration of sustainability in projects in terms of

TBL is emphasized by various researchers including Silvius (2017), Banihashemi, Hosseini, Golizadeh, & Sankaran, (2017), and Stanitsas, Kirytopoulos, & Leopoulos, (2020).

The application of sustainability in terms of TBL is a key tool for the organizations striving for sustainability management (Alwi, Manan, Klemeš, & Huisingh, 2014). Sustainability management requires a governance framework augmented with the stakeholder and control-oriented approach that would ultimately lead towards project success (Joslin and Muller, 2016). While studying the nexus of sustainability and project, Arseth et al., (2017) & Marten and Carvalho (2017) indicated that consideration of sustainability is recommended for projects. Therefore, distinct sustainability strategies are required for project governance and project sustainability management (Silvius, 2017).

Sustainability strategies are vital for sustainable project governance and project sustainability management. Marten and Carvalho (2016) stated that sustainability strategies got attention after the dissemination of Natural Resource-Based View. As Alwi et al (2014) advocated that organizations should try to consider sustainability strategies to tackle the challenges of sustainable development successfully. Sustainability strategies are being deployed by the project organizations and project hosts. Such kinds of strategies support consideration of sustainability as well as help in managing sustainable development and its challenges. For effective project management, several features and aspect synchronize in incorporating sustainability. Therefore, the role of sustainability strategies is essential to be identified in terms of governing and managing projects' sustainability (Aarseth et al., 2017). Subsequently, it is imperative to study project governance and its relationships with project sustainability management and sustainability strategies for the prosperous accomplishment of infrastructure projects of public sector.

1.2 Contextual Background

In projects, governance and sustainability management are taken seriously by the developed and developing economies according to the contexts and situations (Ul Musawir, Serra, Zwikael, & Ali, 2017; Arseth et al., 2017). There is a visible contextual variance in terms of research and adoption of project governance, sustainability management, and

sustainability strategies for completing the infrastructure projects successfully amongst the developing and developed countries.

In the 21st century, sustainability management is a major challenge for academia, society, and organizations (Schipper and Silvius, 2018). As a result, the perceptions on considering sustainability in projects are emerging. The adoption rate of sustainability in projects is higher in the states of Europe and America in comparison with the other countries around the globe (Carboni, 2016). Despite the fact, research on project sustainability management has been pursued gradually but it is limited and scattered (Aarseth et al., 2017). The studies, conducted in the developing and South Asian countries, underscored multiple success and delay factors for project sustainability management. The researched factors included lack of commitment for project sustainability and delivery from the perspective of project stakeholders (Li, Wu and Liu, 2018; Ihuah, Kakulu, & Eaton, 2014; Liu et al., 2016). The critical factors also include lack of support for sustainable projects (Tabish and Jah, 2011; Liu et al., 2016; Yong and Mustaffa, 2013); Illusive goals and de-prioritization of stakeholders (Du Plessis, 2007; Yong and Mustaffa, 2013; Gudieene et al., 2013); and support deficiency from a client for sustainability (Chan, Scott and Chan, 2004; Tabish and Jha, 2011). The emphasis of these studies shows that the project sustainability management research trend is in the emerging phase in developing countries (Carboni, 2016) and it shows the researchers' rising inclination towards seeking the factors contributing to sustainability management.

In Pakistan, like other developing economies, the consideration of sustainability is at an early stage and facing hurdles due to governance issues. Even few private sector organizations have somehow defined sustainability policies, the sustainability consciousness is deemed to be very low (Pakistan Institute of Corporate Governance, 2013). Pakistan has amplified emphasis on the development of infrastructure sectors due to provisions of Development Goals known as MDGs. The objective was to expand the infrastructure sector merely through strategy intermediation (State Bank of Pakistan, 2005). Furthermore, the government of Pakistan aligned the pillars of "Vision 2025" with the UN-SDGs for attaining goal number nine of the SDGs "Industry, Innovation and Infrastructure" and goal number eleven "Sustainable Cities and Communities" by allocating a considerable volume of budget amounting of Rs. 2000 billion (GOP, 2018). Even though, in comparison with the other

development sectors, the success rate of government sector infrastructure projects in Pakistan remained very low, mainly due to a lack of governance (ADB, 2018). No doubt, Pakistan made timely efforts and initiatives of sustainability management and allocated remarkable budgets but remained worthless due to weak project governance (Kakakhel, 2011; Faisal, 2017).

Project sustainability management can improve performance and could lead to the success of infrastructure projects in Pakistan as being assumed in CPEC projects (Hashim, Chao and Wang, 2021; Zaman et al., 2020). In the perspective of Pakistan as a developing state, considering project governance as an antecedent of sustainability management and successful projects becomes imperative. There is a need of identifying sustainability strategies, those to be employed, for the completion of government funded projects successfully (Ali and Ahmed, 2019). There is an urgent need of managing the sustainability of projects especially in emerging countries in comparison with the developed economies (Klakegg, Williams, & Shiferaw, 2016; Khan et al., 2019). Pakistan is a member of the "UN-2030 Agenda for Sustainable Development". All projects are made visible part of Public Sector Development Programs by the government, those have recognizable envisioned noticeable outcomes pertinent to attaining sustainable development goals by 2030 (PSDP, 2018).

The contextual background shows that project governance, project sustainability management, and sustainability strategies for the success of infrastructure projects are the less explored areas in the context of project management domain generally, in developing countries particularly, and especially in Pakistani circumstances. Given the contextual needs of Pakistan, it becomes substantial to investigate and support the mentioned goals and targets of UN-SDGs, as the Government of Pakistan, GOP (2018) envisions that the infrastructure sector projects would be the center points for putting Pakistan on a sustainable trajectory.

1.3 Research Gap

Project governance has not been given much priority in mainstream published research. Only a few conceptual or qualitative studies that further doubt the generalizability

of the results. Project governance is recognized as a key factor for successful project completion, but still, literature on project governance is fragmented and the basic elements for the constitution of governances lack evidence (Unl Musawir, Abd-Karim and Mohd-Danuri, 2020). Project governance can be used for strategy implementation and to provide a complete foundation for achieving project success but ample quantitative evidence on its relationship with successful project completion is scarce (Joslin and Muller, 2016; Khan et al., 2019; Musawir et al., 2020). However, this has become essential to realize and comprehend a specific structure of project governance for the successful delivery of the projects (Khan et al., 2019).

The recently published but inadequate literature of project governance features inconsistency about its stature in project management. The relationship of project governance has been tested as an antecedent of benefits management and project success and proposed that project governance could influence project outcomes (Musawir, Serra, Zwikael, & Ali, 2017; Joslin and Muller, 2016; Bekker and Steyn, 2008). According to Joslin and Muller (2016), several questions are left unanswered by the limited research available on the project governance and project success linkage. These inquiries include; to what magnitude project governance and project success are interconnected; to what extent project governance is complementary for project success; and what could be the probable moderator effects for the significance of their relationship. The understanding of what constitutes and contributes to successful completion of projects remains something essential for the experts to be familiar with. Contrasting results found by Muler and Martinso (2015) underlined the moderating role of project governance. Whereas Joslin and Muller (2015) found partial moderating role of project governance not as a full moderator. This role shows that it has an unspecified impact on the PM methodology and project success (Joslin and Muller, 2015). However, such variations in roles of project governance towards the successful delivery of projects need to be addressed through research.

Similarly, the scarcity of research on considering project sustainability management decelerates its assumption in developing countries (Silvius et al., 2012; Aarseth et al., 2017; Carvalho and Rabechini, 2017). Although the Project Management Body of Knowledge provides a comprehensive guideline for PM several attributes about project sustainability management remained unaddressed (Stanitsas, Kirytopoulos, and Leopoulos, 2020). The

holistic view of projects sustainability management needs to be addressed in PMBOK and this requirement has been rising gradually in recent years particularly in infrastructure projects (Saad, Ijaz, Asghar and Yamin, 2020; Stanitsas et al, 2020). The importance of sustainability management of projects in the infrastructure sector is due to major investments in its huge projects (Flybjerg, 2014). The progressive growth of the infrastructure market at world level is predicted to remain growing 7% yearly until 2025 (PwC, 2014). Despite this fact, academic literature is not particularly focusing research on large infrastructure developments (Maddaloni and Derakhshan, 2019).

Project sustainability management is an emerging field and new school of thought that holds obligations for the researchers to expand this research horizon by filling the research gap (Silvius 2017; Huemann and Silvius; 2017). The authors further pointed out the necessity for project sustainability management while considering contextual circumstances of project governance and sustainability strategies. Silvius (2017) highlighted that sustainability management is imperative for the better prospects of the profession of project management and to be researched in generalization. The concept of sustainability has diverse relevance to organizational and social contexts; therefore, future research should address different contexts as suggested by Silvius (2017). Project sustainability management is also related to the sustainable development goals; targeted to be achieved before 2030 (Carboni, 2016). Silvius & Schipper (2014) recognized the importance of sustainability for projects and the effect of project sustainability management on the overall project life cycle. Moreover, the authors criticized the deficiency of previous research that are lacking generalization of knowledge. Silvius and Schipper (2014) suggested quantitative studies for investigating the impact of sustainability on projects. Aarseth et al., (2017) did a SLR and identified a framework of three kinds of distinct strategies to support the sustainability goals of projects. The authors highlighted that if these strategies are considered it would help in improving the sustainable management of the projects leading to the project success. The authors suggested some future research directions such as investigating the identified strategies for concluding a better understanding of the applicability of strategies in contexts such as infrastructure projects. The research gaps identified to provide a robust foundation for investigating the part of project governance, sustainability strategies, and project sustainability management in the successful completion of public sector infrastructure projects.

1.4 Problem Statement

The importance of completing projects successfully has always remained a challenge for governments, organizations, practitioners, and academia as well. However, a visible decline in project success rates is highlighted by the Standish Report (2020), which shows 69% of unsuccessful projects. Moreover, the declining success rate of public sector infrastructure projects is also gaining prompt attention (Lawani and Moore, 2016). In the global infrastructure industry, overall 66% of projects remained unsuccessful as reported in LogiKal (2020) survey. Over the last five decades, even though organizations are putting tremendous effort into project success, still most of the organizations are failed to complete their projects successfully (Vlahov, Omazic and Tipuric, 2015; Irfan, Hassan & Hassan, 2019). The same is the condition in Pakistan the performance of public sector projects is facing a falling trend for many years (Ahmed and Mohammad, 2014). These projects are unable to end successfully. Such projects are continuously facing failure due to poor governance that has been causing delays and cost overruns. In some cases, these projects expanded to many times more than the original project budget (PAC, 2017). Major factors contributing to project failure include weak governance and lack in the implementation of sustainability strategies; hence resulting in failure of organizations in completing projects successfully (World Bank, 2018; ADB, 2018). Particularly the infrastructure projects are severely influenced by the matters related to governance, sustainability management, and strategies, which are being recognized as one of the leading factors of project failure (Noor, Khalfan, & Maqsood, 2012; Khan et al., 2019).

The federal government has allocated a huge budget amounting to Rs. 2,043 billion for public sector projects (GOP, 2018). Due to the enormous funding and resource allocation, these projects are being considered a sign of economic growth in Pakistan. On the other hand, these projects are being delayed due to poor governance and lack of sustainability management and strategies while leaving negative social, economic, and environmental effects (Alvi, Musawir, and Nauman, 2019; Ullah et al., 2020). Eventually, similar to other developing nations; Pakistan is fighting the issues of project sustainability management and strategies (Ullah et al, 2020). In this situation, researchers are blowing the whistle for suitable corrective actions to decrease the ecological and social hazards prompted by the

infrastructure projects in Pakistan (Alvi et al., 2019, Ullah et al., 2020). Hence the problem statement guiding this research work is as follows;

"Despite contributing substantially to the growth of industries and societies, projects pose numerous challenges to the sustainable development of the community and the state. These rapidly growing challenges relevant to sustainability and governance in the business environment are raising the failure rate of many public sector infrastructure projects which are supposed to be the main drivers for development but are continuously causing delays, cost overruns, and negative impacts on the society as well. Given the contextual needs of Pakistan, it becomes substantial to envisage the infrastructure sector projects that would be the center points for putting Pakistan on a sustainable trajectory and may create value for all stakeholders. The problem of project failure due to weak governance and issues of sustainability management could be resolved by deploying a particular governance structure, supported by the specific sustainability strategies, to manage the project sustainability and complete these public sector infrastructure projects in Pakistan successfully".

1.5 Research Questions

The research questions are:

1. What effect does project governance have on project success?
2. Does project sustainability management mediate the relationship between project governance and project success?
3. Do sustainability strategies moderate the direct and indirect effect of project governance on project sustainability management?
4. Whether sustainability strategies will moderate the indirect relationship between project governance and project success through project sustainability management, such that this indirect relationship will be stronger when there is a higher level of sustainability strategies?

1.6 Research objectives

The overall objective of the study is to investigate the effect of project governance on project success with the mediating role of project sustainability management and with the moderating role of sustainability strategies.

The specific objectives of the study are:

1. To investigate the role of project governance being predictor of project success.
2. To investigate the mediating effect of project sustainability management between the relationship of project governance and project success.
3. To investigate the moderating effect of sustainability strategies on the relationship between project governance and project sustainability management.
4. To investigate that moderated mediation effect of sustainability strategies on the indirect relationship between project governance and project success through project sustainability management, such that this indirect relationship will be stronger when there is a higher adoption level of sustainability strategies.

1.7 Scope of the study

On the basis of research questions and objectives of the study, the scope of the study is: 1) to investigate the effect of project governance through the role of project sustainability management and strategies on the successful completion of public sector infrastructure projects; 2) to develop and validate sustainability strategies as a multi-dimensional construct; 3) to devise and validate an instrument for measurement of multidimensional sustainability strategies; 4) to investigate the effect of multidimensional sustainability strategies on the relationship of project governance and project sustainability management; 5) to examine the mediating role of project sustainability management between project governance and success; 6) to develop a generalized framework for strengthening and advancement of theories. The PMs and PDs of public sector infrastructure projects of PDSP (2017-18) are the targeted population of the current study. Instruments for the measurement of project governance, project sustainability management and project success are adapted from

previous research, whereas instrument from measurement of multidimensional sustainability strategies is developed as a part of study. This study encompasses a cross sectional collection of data on completed projects from project managers and project directors from the infrastructure sector to test research hypotheses for responding the research questions.

1.8 Significance of the Study

The significant impact of this study research includes a comprehensive framework for examining role of project sustainability management as an outcome of project governance and its effect on project success. This framework considers role of sustainability strategies in augmenting governance and sustainability management in projects of infrastructure sector. The contribution of the study is highlighted in the ensuing paragraphs.

This study is supposed to augment the current body of knowledge regarding improving project success rates through governance and sustainability management. The comprehensive framework developed in this study is a notable addition to the scarce literature of this field relating to developing economies like Pakistan. However, in the recent times the focus projects is shifted from merely manufacturing products to adding value, therefore, this study develops the capacity of organizations to complete projects successfully while adding value to them. The governance approaches highlighted in the developed framework offer value addition in projects by emphasizing behavior control orientated and stakeholders orientated governance approaches. The project sustainability management augmented through distinct strategies offers a great deal of road map for project practitioners, policymakers, government officials, and non-government organizations to improve the governance issues of public sector projects and celebrate their successful completion.

The novelty of the current study has a noteworthy effect on the new emerging project governance and sustainability management philosophies in the domain of PM. The perspective of stakeholder theory supported the developed framework by focusing the interests of stakeholders in governing, managing, and completing government sector infrastructure projects successfully. However, the governance approaches, project sustainability management, and strategies studied in this study contribute at the micro and

macro level. State at macro-level and micro-level project organizations would save resources by decreasing the negative environmental and social impacts of infrastructure projects.

In addition to validation of sustainability strategies construct, this study developed and validated the Sustainability Strategies Questionnaire (SSQ), for the measurement of sustainability strategies. The creation and validation of sustainability strategies construct and its measuring tool as well as considering sustainability strategies as a moderator in the framework is a remarkable addition in the field of project sustainability management. The outcomes of this study could be generalized to advance a field for researchers, academics, project practitioners, and policymakers. The findings of study may add value to the development of national-level policy to improve project governance in the context of project sustainability management for successful projects in infrastructure sector. The outcomes address the issues and challenges encountered by the infrastructure sector of Pakistan during the development and implementation of strategies for efficient execution of projects for sustainable development, as articulated by various studies (ADB, 2020; Abbas and Yaqoob, 2009; Ministry of Planning, 2019; Rehman, Farhana, Imtiaj, Wachira, Rahman, and Saha, 2010; Qureshi, McCornick, Sarwar, & Sharma, 2010; Sial, Usman, Zulfiqar, Satti, and Khursheed, 2013). The current study is new in Pakistan that statistically examined the moderated as well as mediating role of sustainability strategies on relationship between PG and PSM and project success.

The rising need for highlighting the effects of project sustainability management has been addressed as suggested by Silvis et al (2012). Resultantly, the idea of project sustainability management is clarified to further implement it in projects effectively. The current study is beneficial in enlightening the processes of decision-making and governance while taking the concept of sustainability “as a new school of thought” in the domains of PM. This framework would enable the project practitioners to embrace the globally growing need to consider sustainability management in projects practically. This research may support project organizations to implement distinct sustainability strategies framework for sustainability management to achieve success in infrastructure public sector projects. The framework of sustainability management would provide important insight into focusing stakeholders’ needs, leading towards sustainable development while managing the social and environmental challenges posed by the infrastructure industry.

The outcomes of the study, in terms of SDGs, would significantly enlighten the institutional coordination mechanism set up by the government to advance progress on these SDGs. The findings of the study could be indiscriminate in order to benefit the practitioners in introducing the mechanism of waste reduction and environmental technologies, fulfilling social responsibility at large. However, it would enable policymakers for policy formulation about including and cooperating with stakeholders, government, and non-government organizations through introducing sustainable management for successful delivery of the infrastructure project in Pakistan. However, it is the first-ever study conducted in the Pakistani context offers a comprehensive solution to the issues relevant to the governance, sustainability, and successful completion of public sector infrastructure projects.

1.8.1 Significance at institutional level

The current study has multiple aspects of significance especially for the parent institution i.e., Bahria University. It is anticipated that the study shall add value by opening avenues of basic and applied research, contributing to national and international causes, and support in capacity building through training programs. The following paragraphs define salient contributions showing the significance of the study for Bahria University in terms of teaching, research, and practices:

While devising means of implementation for Sustainable Development Goals, the state has planning to engage universities' researchers and human resources on research for, and the implementation of the SDGs (Ministry of Planning, 2019). However, the completion of this study at Bahria University enables it to stand proudly in the row of pioneering contributors towards the Government of Pakistan's implementation of the "2030 Agenda for Sustainable Development Goals".

The framework developed in this study opens opportunities for applied research in the fields of echo-friendly infrastructure development for university students, researchers, and faculty members. The applied research could further enable Bahria University to win funded research projects from industry and United Nations' developmental projects. At Bahria University, the academic programs of project management are very popular and

successful. This research will add a new field of study for the researchers of project management and would offer emerging themes for the forthcoming researchers of PM at the undergraduate and postgraduate levels.

The outcomes of the study could be correlated with the ongoing Bahria University construction projects to complete these projects successfully while contributing to sustainable infrastructure development. The distinct sustainability strategies could be adopted as a project host organization to cope with the challenges of sustainable development. Based on the comprehensive framework of the study, Bahria University can commercially offer a strategic sustainable development training program to the organizations striving for value-added completion of their infrastructure development projects. The newly developed sustainability strategies instrument could be offered as a checklist and assessment tool for the organizations looking for project sustainability management. Sustainability strategies instrument could be offered as a checklist and assessment tool for the organizations looking for project sustainability management.

1.9 Organization of Thesis

The *first chapter* of this thesis gives an introduction of the current study including background, research gap, problem statement followed by research questions of the study and research objectives, the significance of the study generally and specifically in terms of Bahria University. The conceptual definitions of the terms and variables followed by the operational definitions are also given in this chapter.

A detailed review of literature based on latest, relevant and past studies starts *Chapter two.* It starts with the literature review of project governance, project success, sustainability strategies, and its dimensions. The support from literature about relationships and linkages between study variables develops a comprehensive theoretical framework. A research model with the elaboration of underpinning stakeholder theory along with research hypotheses is presented in this chapter.

Chapter three explains research methodology including research philosophy, a flowchart of research strategy, a comprehensive research design comprising research

approach and research strategy. It elaborates population and sampling with details of sample size and sampling technique. This chapter also reports the process of scale development, instrument testing process, pre-testing, and pilot testing of the questionnaire. It also states the ethical consideration of this research study.

Chapter four starts with reporting of descriptive statistics, and statistics of analysis of demographic variables, data cleansing, exploratory factors analysis for dimension reduction, reliability analysis, confirmatory factor analysis followed by the hypotheses testing in terms of direct, indirect relationships, and conditional effects.

Chapter five covers a brief description of findings and their relevance for further theoretical and practical implications. Built on the limitations of study a few directions for future way forward and research and a way forward were also offered to the researchers. Finally, at end of the chapter five, a brief conclusion of the study completes the document.

CHAPTER 2

LITERATURE REVIEW

The chapter opens with a brief introduction of the study in terms of previous literature and research studies. The aim of the chapter is reviewing the theoretical and practical features of project governance, sustainability management, project success and sustainability strategies. In addition, old and latest studies on contemplation of sustainability in project management for successful delivery of projects were examined. First section reviewed literature relevant to the project success, project governance, project sustainability management and sustainability strategies. In next section, review of literature underscored research gaps which led toward examining different direct and indirect relationships. In the following section, a theoretical context of this study is presented since emergence of the stakeholder theory. The chapter ends with the developed conceptual framework showing hypothesized direct and indirect relationship of independent variable project governance, mediating variable project sustainability management, dependent variable project success, and sustainability strategies as moderating variable.

2.1 Introduction

Sustainability in projects has been discussed in very few studies, and the connection between both fields is still complex. Fewer studies focused on both topics and inadequate research is seen on searching for new strategies for contemplating sustainability management in projects (Martens and Carvalho, 2017 and Chawla, Chanda, Angra, and Chawla, 2018). Thus, the concept of considering sustainability in projects is confined by the deficiency of empirical validation (Car-valho and Rabe'chini, 2017; Arseth et al., 2017). There are few empirical studies, which support the assertion of researchers (Carvalho and Rabechini, 2017 and Khalifeh et al, 2019; Silvis and Shipper, 2016) about subject of project governance and

project sustainability management for project success have been inadequately researched leaving a scarcity of pragmatic evaluation. This section presents an analysis of literature about various research studies about project success, project governance, project sustainability management, and sustainability strategies followed by theoretical reflection, research model, and research hypothesis.

2.2 Project Governance

Governance is "act of governing or directing the policies, management, and activities of an organization at the highest level, with the authority, credibility, and responsibility to do so" (Kanyne and Sausi, 2015). Governance is defined by Hjelmbrekke, Klakegg, & Lohne (2017) as "it is basically about leadership selection, incentives, control systems, and monitoring". The theoretical research standpoint has also arisen that governance is a significant apprehension of supporters for mega-investment and, then, it impacts the project results (Sharma, 2012).

Project governance has gained rising attention from practitioners and researchers globally over the last two decades. It has turned out to be an imperative research domain of projects. PMI (2016) referred to project management as a mechanism of organizing and conducting work activities, whereas project governance is referred to as explaining the organizational settings where project decisions are taken. Project governance ensures the decisions are aligned through the objectives of the project and stakeholders respectively. The agenda of project governance discusses set of principles, guidelines, functions, measures, procedures, and duties to describe the project formation, administration, and control. Müler (2009, p. 4) defines project governance; "the value system, responsibilities, processes, and policies that allow projects to achieve organizational objectives and foster implementation that is in the best interest of all stakeholders, internal and external, and the corporation itself". Garlands (2009, p. 10) describes it merely as "the framework within which project decisions are made". Project governance emphasizes the control of individual projects. Muller et al., (2015) differentiated that project governance addresses the management and control of individual projects, and the governance of projects considers programs, group of projects,

programs, or port-folios. However, lack of project governance at individual level of the single project directly contributed to the project failures. Most organizations earn from their successful completion of projects. That is why such organizations need effective project governance for their successful completion.

Project governance is described by PMI as “an oversight function that is aligned with the organization's governance model and that encompasses the project lifecycle [and provides] a consistent method of controlling the project and ensuring its success by defining and documenting and communicating reliable, repeatable project practices” (PMI, 2013). There is a difference in governance of project and project governance. Müler et al., (2014) differentiated both, Project governance means governing the individual project, whereas “governance of projects” is a broader perspective that is for the group of projects, e.g., portfolio of projects or program.

In the field of project governance, there are several definitions presented by various authors (Pitsis, Sankaran, Gudergan, & Clegg, 2014; Bekker & Steyn, 2009; Too & Weaver, 2014; Zwikael & Smyrk, 2012, 2015) but a generally accepted definition of project governance still lacks. Keeping in view the fact that project governance research shows wide differences in definitions, contexts, and perspectives (Weill & Ross, 2004; Bekker & Steyn, 2009), the literature review surrounds the definition and concept given by Muller (2009). As Müller and Lecoeuvre, (2014) took project governance as a resource management methodology for acquiring resources. Project governance monitors the project feasibility throughout its life cycle. So, the governance concept coexists within the concept of corporate governance. As explained by Steyn and Bekker (2009), project governance provides a framework that supports decisions for the accomplishment of managerial targets. Project governance comprises a system of responsibilities, policies, and processes. This system supports projects in achieving the objectives of the organization for implementation. The outcomes of the system benefit the stakeholders’ interests and the organization itself. Garland (2009) also considers project governance as a decision-making framework. Hence, project governance connects the management of projects with sponsors, owners, and stakeholders (Turner, 2009). It supports the governance structure for setting out the organization’s objective, resource allocation for the achievement of those objectives. Project governance is viewed by Nistor and Beleiu (2014) as system of responsibilities for attaining

project goals while considering the interest of the organization and its stakeholders. Project Management Institute describes project governance as “The framework, functions, and processes that guide project management activities to create a unique product, service, or result to meet organizational strategic and operational goals” (PMI, 2016, p. 4). Association of Project Management described project governance as “The governance of project management concerns those areas of corporate governance that are specifically related to project activities” (APM, 2011, p. 7).

Project governance, within the context of corporate governance that facilitates ventures, coexists (Muller, 2009). Project governance is often confused with project management (Too & Weaver, 2014; PMI, 2016). It is obvious that overall project lifecycle covers project activities on a daily basis (Biesenthal & Wilden, 2014) whereas the higher level of project governance works by enforcing a monitoring system structured to coordinate decision-making of the project aligned with the goals of the financing agency (Biesenthal and Wilden, 2014).

All the definitions of project governance revolve around the framework of functions or processes to be applied by the organizations. Whereas, project governance in the project organizations differs entirely based on their orientation. Project organizations could be behavior-oriented or outcome-oriented based on their priorities (Muller, 2009). Project organizations emphasize adherence to the processes to get project outcomes. These project organizations are practicing behavior-oriented project governance. In contrast, project organizations that are focusing on the deliverables of the project are practicing outcome-oriented project governance. Hence, project governance in the project organization could be behavior vs. outcome control-oriented. Secondly, in project organizations, the structures of project governance are also based on the preference given to the shareholders or stakeholders. Müller (2009) termed this orientation of shareholder versus stakeholder in a very easy way. Both governance structures might have pros and cons. Multiple groups of theorists support each structure based on their theories. Those project organizations which prefer financials and safeguard the interests of shareholders are practicing shareholders-oriented project governance structures. On the other hand, stakeholders-oriented project governance structures believe in balancing the conflicting interests and claims of stakeholders (employees, suppliers, society, etc.). Joslin and Muller (2016) identified these two

dimensions of project governance i.e., behavior versus. outcome control and share-holder versus stakeholder-oriented.

The first dimension “behavior versus outcome control” has been discussed noticeably in the literature. Like, literature on project governance (Klakegg, Williams, & Magnussen, 2009) and PM maturity models (PMI, 2013) support the importance of process for successful project implementation. The importance of processes for successful project implementation advocates the need for behavior-oriented project governance structure in the project organizations. The second dimension “Stakeholder vs shareholder orientation” of project governance has also been deliberated in literature with the support of distinctive theories. Muller (2009) thoroughly discussed this project governance structure based on postulates of stakeholder theory (Freeman, 2002) and agency theory explained by Jensen and Smith (2000). When project organizations support shareholders’ wealth maximization instead of the needs of other stakeholders, the shareholder-oriented governance structure applies there. In cases where raison d’etre as a project organization is stakeholder-oriented when it considers the needs and requirements of various stakeholders for obtaining the project targets.

The theoretical aspect of project governance can be clarified by global social developments. It is essential to know the use of relevant management theories in corporate governance before getting into the more comprehensive details on project governance since many of the theories apply and are used in project governance. Several research indicated that different project governance frameworks are suitable for different project contexts. The studies that Biesenthal and Wilden (2014) looked at, had studies in project governance that had looked at different theoretical methods, and these research studies found that the most commonly used theories were either economic theories or behavioral theories. This section will address theories and models of project governance applicable in the setting of the current research.

Across the globe, project governance is among the most important attributes of any successful outcome across the globe. Uncourtly, project governance has a huge effect on the efficiency of project delivery, and impacts on the progress of every project. Emphasizing the importance of project governance, Lechler and Devir (2010) acknowledged that the progress of every project around the globe is highly reliant on the efficiency of project governance.

Although the vast majority of the previous studies on the subject show no visible linkage in project governance and project success, directly (Joslin and Müller, 2016), the aforementioned studies expose the significance of project governance for project success (Wang and Chen, 2006; Muler and Martinso, 2015). According to Hjelmbrekke et al (2017), the project governance improved by the use of a strategic approach is advantageous when it comes to ensuring that project results are consistent with a business plan. In a research report, Muller, Zhai, and Wang (2017) have made recommendations for effective project completion that are compatible with one another. Governance investigation is negligent, project governance processes are unclear, and project management procedures are insufficient to monitor management activities are the key causes of government projects' inadequate performance and failure (Khan, Waris, Ismail, Sajid, Ullah, & Usman, 2019). When Bekker and Steyn (2008) conducted a qualitative analysis on highly invested projects in South Africa, they found correlation in project governance and increasing performance of projects. However, project governance was shown to be a primary contributor to overall project performance. There is a tremendous opportunity to research project governance having variations in the degree to which project governance impacts project performance. In studies conducted by Muller and Martinsuo (2015) and Joslin and Muler (2015), project governance demonstrated a conditional effect. Joslin and Muller (2015) additionally found that project governance played a partial role, and Bekker and Steyn (2008) demonstrated that project governance is a criterion for the success of a project. Hence, there are several examples of differing project governance activities resulting in the success of projects. These findings call for further review.

Project governance is the independent variable of the study, and its direct relationship with the dependent variable through mediating and moderating variables is examined. Project governance has two dimensions. The first-dimension share-holder vs stake-holder oriented governance addresses the corporate-wide governance orientation. The second-dimension behavior control verses outcome control oriented governance structure mentions the control behavior maintained by the project host over its project organization. The validation of the concepts and dimensions of project governance was made by Müler and Lecouvre (2014) and allows a quantitative assessment of a project organization's governance style. The project governance model of Müller and Lecoeuvre (2014) is used to comprehend project

governance structures of the organization and its dimensions for completion of projects successfully.

2.3 Project Success

Project success relies on the successful completion of the project. Jugdev and Müller (2005) refer to project success as a term that depends on achieving the desired outcomes. Project success is referred to as a set of standards or principles for the successful accomplishment of project outcomes within a set order (Chan, 2001). Unlike prior research that ordered cost, time, and scope as project success criteria, Shenhar and Dvir place the iron triangle at second by putting satisfaction of the customer as the number one parameter for project success at entire level (Shenhar, Levy, and Dvir, 1997).

The definition of the term project success was not explicitly mentioned in the PMBOK (PMI, 2008). Project success is only reflected as criteria or objectives of the project, those must be mentioned in the project charter (Nixon, Harrington, & Parker, 2012). It is measured through cost, schedule, scope, and stakeholder's satisfaction measures (Nassar and AbouRizk, 2014). Project success refers to the attainment of some set goals as defined by Lim and Mohammad (1999). The project success criteria may comprise micro and macro stakeholder perspectives. The micro stakeholder perspective embraces stakeholders involved during the execution of the project. The macro perspective includes stakeholders at large, including employees, suppliers, and society. The deliberation of project success criteria includes some conditions suggested by Jugdev and Muller (2005). These four conditions emphasize whether agreement of stakeholders ensured about the success criteria before project execution and before completion of the project. Secondly, did the project manager handle unexpected situations flexibly? Thirdly, project owners were involved in project activities and the fourth condition is, whether a cooperative relationship was maintained between project manager and sponsor.

Project success and its measures have progressed from basic triple constraint i.e. (iron triangle), which further evolved and embraced numerous further success criteria including knowledge management, stakeholder management, quality and sustainability (Atkinson,

1999; Judgev and Müler, 2005; Shanhar and Divir, 2007; Müller and Jugdev, 2012; Carvalho and Rabechini, 2017). A comprehensive framework of project success was developed by Morris and Hough (1987) who are considered pioneers of project success criteria. The framework was based on preconditions that the notion of success differs across the product and project lifecycle by involving numerous stake-holders both in terms of subjective and objective (Jugdev and Müller, 2005). Moreover, a range of research models for assessing success of projects and that were established by the previous researchers such as Hoegl and Gemünden (2001); Pintoo and Prescot (1988); Turner and Müller (2006), Shenhar et al. (2002); overall studies are deliberated with diverse fundamental conventions.

The iron triangle includes cost, time, and scope, it was mostly used in the past (Ika, 2009). One additional criterion on customer satisfaction was included by many researchers (Belassi and Tukal, 1996; Morris and Hogh, 1987; Kerzner, 1987; Turner, 1999). In contrast, Shenhar, Dvir & Levy (1997) placed customer satisfaction at the top of three components of the iron triangle. A multidimensional scale comprising project success valuation standards were established by Shenhar and Dvir (2007), acknowledged by project management institute PMI as these five dimensions are consistent with the best practices in project management (PMI, 2008).

Project success has been tested with various antecedents. In line with research objectives, the current study focused only those research studies which incorporated project governance and sustainability-related constructs while examining the project success. Joslin and Muller (2016) tested the frameworks of a theoretical model while delving to navigate the way of a better revision on research methods, components, and influences on project delivery successfully. Using this research, the study examined different project settings, including dissimilar orientation of project governance structures, influence the linkage between project methodology and project success. The main authors in the domain of PM like, Joslin and Muller (2016) applied a deductive approach to confirm a theoretically relevant conceptual framework. After the nineteen interviews were completed, the data was collected from eleven industrial sectors in four countries. Although various aspects of project methodology such as how methodology elements are used and their overall effectiveness have an influence on project success, project governance significantly affects how methodology elements are

employed and how effectively they are used, which consequently has an impact on project success.

Project success was studied in the theoretical perceptions, as Joslin and Muler (2016) examined the linkage of project governance and project success and found significant relationship. Project governance was validated by Joslin and Muller (2016) in the cited study. The findings of the study revealed that project success associates with a higher stake-holder orientation within the organization, while the kinds of control contrivances examined did not link with project success. In addition, study discovered critical role that behavior oriented approaches play in helping the projects succeed. Similarly, project success has also been examined while taking antecedents like project governance and benefits management (Ul Musawir et al., 2017). The findings show that project success could be enhanced by improving governance of projects as well as by refining the efficiency of the benefits. As a result, tested framework sets the basis for a theoretical assumption that describes how project success could be achieved through project governance. Wang and Chen (2006) examined project success through various governance mechanisms and their capability to lessen project risks. The results showed a substantial affirmative association in the link of governance structure and project outcomes.

Although there are several conventional project success factors, such as cost, time, and quality, these are three (Duncan, 1987; Blaney, 1989; Globerson and Zwikal, 2002; Redmil, 1997; Thomset, 2002), However, completion time, expenditure cost, and project quality are not adequate metrics for success of projects, as has been mentioned above (Nixon et al., 2012). In a very recent research, Carvalo and Rabechni (2017) added social dimensions in project success criteria. To calculate the success of projects and their perception are interconnected with sustainability, a measurement model, supports the five sub-constructs of project success (Shenar and Divir, 2007). Project success is a dependent variable of the study; five sub-constructs of "project success" are discussed as follows:

Project efficiency: Project efficiency calculates the project completion in terms of time and budget. It represents a short-term gauge. The accomplishment of resource constraints depicts an efficient and well-managed project but there is no guarantee of ultimate project success and in the long-term, it provides benefits to the organization. This dimension calculates the

budgetary performance of finances, timeline, and other efficiency measures (Shenhar and Dvir, 2007).

Impact on the customer: The dimension relating to the impact on customers represents the key stakeholders whose perception is important for the assessment of project success. This dimension remarkably focuses on the satisfaction and need of customers or businesses. This dimension measures customer satisfaction, the performance of the product performance, practical requirements, technical conditions, the extent of product quality, and the degree of customer loyalty (Shenhar and Dvir, 2007).

Impact on team: It reveals how the team members were affected by the project and how good project managers energize and motivate the team members for making the projects an exciting and unforgettable experience. The dimension of impact on the team measures the combined impact in terms of team satisfaction, team loyalty, and retention of a team member or future opportunities within the organization after the completion of the project. It also evaluates the investment by the company for members of the team and their development, degree of growth and knowledge attained by the members of team, afresh learned expertise, and new management and professional competencies achieved by the team (Shenhar and Dvir, 2007).

Business and direct success: It portrays the project's instant and direct impact on organization or business. It measures the sales levels, income, profits and other cash flow in a business setting. Sometimes, it is shown through a classic business plan, that outlines projected development, sales, and profit in the future from the subsequent product, whereas the investment benefit analysis plan connects the investment to anticipated returns involved in some cases (Shenhar and Dvir, 2007).

Preparing for the future: It considers the benefits in the long run and illustrates the role of prospects created and role of project support towards the organization in infrastructure the development for the future. The classical actions may comprise discovering new horizons of businesses or product lines, a new development in terms of technology while future setup may include organizational capabilities, procedures, and added technical skills (Shenar and Dvir, 2007).

2.4 Project Sustainability Management

The term sustainability is defined by Wimberly (1993, p. 1) as “to be sustainable is to provide for food, fiber, and other natural and social resources needed for the survival of a group and to provide in a manner that maintains the essential resources for present and future generations”. This definition of sustainability close to widely used definition of Commission on Environment and Development.

Certainly, sustainability is characterized paying attention to short and long-term ecological, social, and financial implications of decisions as well as activities within an organization. Sustainability is a huge phenomenon now affecting the way successful organizations perform their operation, and that will eventually happen in the future. Yet more, governance is forced to work in a compressed landscape of natural, social, and economic environments while concurrently creating new sources of value for stakeholders. Sustainable initiatives and policies in the projects can be understood as altering the product design, selection of material, allocation of resources, and waste management practices. The roots of project sustainability management are linked with the history of sustainable development.

Sustainable development is an expression from the 1960, whereas it is found back to ages when environmentalists began arguing about the effect of economic growth on the environment. In reality, when this term started to evolve, many experts and scholars suggested several new concepts, the WCED describes it as “a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs” (Brundland, 1987, p. 17). This is most well-known definition; it can be found in the “Brundtland Report”, which is based on ecological conservation and financial growth (Brundtland & Khalid, 1987). Sustainability is described as "development that is environmentally and socially sustainable in the present without undermining the capacity of future generations to meet their own needs." It wants to help set the basis for a symphonic affiliation between the people and the atmosphere, and among the people (Brundtland, 1987, p. 41).

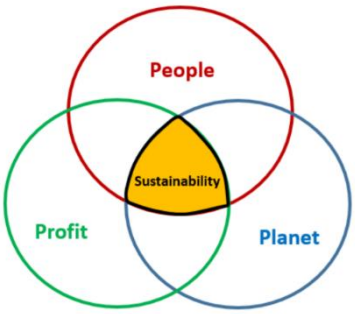

Figure 2.1: Triple 'P' Concept by John Elkington (1997)

In addition to definitions, this review provides a significant of concepts of sustainability. As far as conflicting meanings of sustainability are concerned, it is widely agreed that sustainability unites three components: economic development, social representation, and environmental safety (Olaloye and Ikhide, 1995; Koppenjan and Enserink, 2009). A holistic image of the financial aspects of a business, combining the bottom line, financial status, and profitability is known as the triple bottom line (Adams, Bessant, & Phelps, 2006; Elkington & Rowlands, 1999). Explanation of sustainability given by John Elkington (1997) indicated that "Sustainability is about the balance or harmony between economic, social, and environmental sustainability" i.e., somehow defining Triple-P (People, Earth, Profit). Following that, a more appropriate and more generally accepted definition of sustainability has emerged that includes the concept of TBL and integrates the principles of ecological, financial, and societal dimensions (Elkington, 1998). In its place of rather fully focusing on economic needs, the theory of development requires the idea of the TBL to attain short and long-term achievement by making a fair usage of assets, while still ensuring deference for social requirements and preserving generations coming in the future (Kleindorfer, Singhal, & Van Wassenhove, 2005; Knoepfel, 2001; Baumgartner and Ebner, 2010; Thomas and Lamm, 2012; Gimenez et al., 2012; Silvis and Shipper, 2014). The definition implies that the three dimensions are interconnected. An unachievable accomplishment would be to attempt to grow the different dimensions and avoid their related issues at the same time (Elkington, 1998; Savitz, 2013). Silvius and Schipper (2014) stated, sustainability has three facets and it is about integrating or aligning social, environmental, and economic values. As shown in Fig 2.2, the outset of sustainability has become universal (Purvis, Mao, and Robinson, 2019).

The first pillar of sustainability i.e., “economic” refers to developing wealth at multi-levels moving from the delivery of project towards society while considering the financial viability of overall business operations. In addition to the market side, the economic component also looks at financial dimensions, including cash flows, income, and the capital valuation of shareholders. Preserving assets and retaining the capital of shareholders is also significant, as is optimizing profit and wealth formation, and also lowering costs, and creating wealth through the absorption of added value interest. It refers to the mechanism of preserving, protecting, and handling resources amicably. It also considers the overall protection of the environment where the project is being run. The environmental factor takes an interest in protecting the atmosphere and also with the role of management, use, and conservation of natural resources including climate, soil, water, raw materials, including minerals. This component of the model focuses on sustainability in energy consumption, global warming, and maintaining local environments while at the same time minimizing waste, safety hazards, emissions, noise, and dangerous, poisonous, and unsafe products.

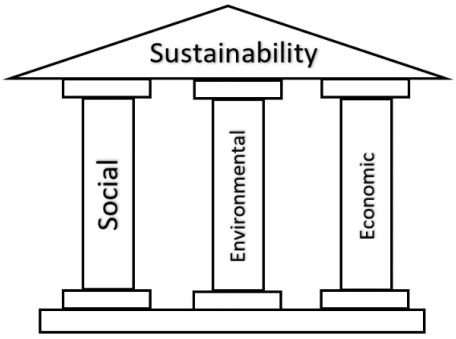

Figure 2.2: Pillars of sustainability (Purvis, Mao and Robinson, 2019)

The social aspect of the sustainability model includes treating people with dignity and giving them equal opportunities and enhancing the well-being of the masses (Bjärstig, 2017). The social side includes issues with people and communities, as well as with maintaining social capital and harmony in the society. It means trying to reconcile competing interests by focusing on forming mutual trust and engaging both within and outside of a social structure while also promoting diversity and providing equal opportunities. It also helps to promote projects as well as improve the overall value of lifecycle (Penzenstadlar and Femer, 2013; Marten and Carvalo, 2017; Elkington, 1998; Saviz, 2013; Becker et al., 2015; Marnewick, 2017). These three aspects of sustainability have also been considered in previous similar

studies (Ugwu, Kumaraswamy, Wong, & Ng, 2006; Shen, Wu, & Wang, 2002). Likewise, this triple ‘P’ concept is also undertaken by Martens and Carvalho (2017) and developed a framework. Sustainability is a term that has more than a hundred definitions, and almost everyone in the industry believes that there needs to be a more holistic concept of sustainability that is of equal importance (Aarseth et al. 2017). Sustainability in terms of project management can also be viewed from the triple bottom line perspective (Cojoianu, Clark, Hoepner, Veneri, & Wójcik, 2020).

Triple bottom line is a scenario that promotes awareness of economic, ecological, and community relevant facets of infrastructure projects. However, a collection of sustainability techniques is required to incorporate sustainability activities in projects that will lead to project success (Presley, Meade, & Sarkis, 2007). According to this notion, Stanitsas, Kirytopoulos, & Leopoulos (2020) suggested that project managers who leverage the proposed framework's sustainability strategies will dramatically strengthen and increase their original activities, and improve the likelihood of project success. In the recent decade, the intersection between projects and sustainability attained attention from project management professionals and researchers (Silvius et al., 2013). The recent literature has also started to discover the intersection in the sustainability and projects but there is increased fragmentation within this research domain (Sabini, Muzio, & Alderman, 2019). Certainly, Silvius and Schipper (2014) have tried to combine the literature under a shared definition. Despite Silvius and Schipper's (2014) effort at incorporation, Huemann and Silvius (2017) recognized the fragmentation and differentiated the project sustainability management PSM and sustainable project management SPM. While developing a concrete ground, the author stated that the project sustainability management PSM covers projects when delivered while following sustainable procedures and SPM covers projects that bring a sustainable product or service.

One way or another, consideration of project sustainability management is crucial to creating a more sustainable future due to the potential influence it may have on projects which produce almost one-third of global GDP (Økland, 2015). Many scholars have asserted that it is a critically important requirement for project sustainability management since projects require a multitude of resources and must communicate daily with their surrounding environment; as a result, projects are seen as a crucial instrument for enhancing sustainability in organizations as well as on a worldwide level (Silvius et al., 2012; Gareis, Hueman,

Martinuzi, Weniger, & Sedlako, 2013; Marten and Carvalo, 2014; Huemann and Silvius, 2017; Marten and Carvalo, 2016). A sustainable solution in the files of projects can be seen from various perspectives. According to Carvalo and Rabechni (2011), there are two kinds of approaches to sustainability: an internal and an external approach. The project manager's internal viewpoint has to do with the PM process and PM regions, at start of the project through entire PLC; project lifecycle. Sustainable development is reflective of both project social and environmental impacts, along with an enlarged view of social and environmental impacts in general. In any project, sustainability and project management seem to be intricately related (Silvius, 2012; Gareis, Heumann, & Martinuzzi, 2009; Aarseth et al., 2017) and we refer to this linkage as project sustainability management. This is done by having project sustainability management in place which encompasses all aspects of the project's life cycle (which includes financial, social, and environmental aims) using the TBL approach (Elkington, 1998).

Project sustainability management focuses on creating long-term economic worthwhile protecting environmental and social assets. Progressively, project management is adopting project sustainability management as part of organizational strategy to harvest paybacks such as penetrating new markets, developing sustainable products and finding suitable solutions, cutting manufacturing costs, enlightening customer relations, mitigating risk, and attracting employees. The project sustainability management has been getting projecting focus on various project settings and distinct sectors including the services sector, constructions, and infrastructure projects as well (Sabini et al., 2019). Especially, in construction projects, project sustainability management is being deliberated fundamental in realizing strategic objectives at organization level (Khalifeh et al., 2019) while considering issues pertinent to the construction and environment. The importance of project sustainability management in the infrastructure projects in various perspectives of the TBL approach, green construction projects, and integration of financial and natural factors for project sustainability management is highlighted in various studies (Khodadadzadeh, 2016; Wang, Wei, and Sun, 2014; Mostafa and El-Gohary, 2014; Zhang, Wu, Shen, and Skitmore, 2014). This is due to the enormous allocation of considerable volumes of wealth and finances for infrastructure, communication, and housing related infrastructure projects in recent decades (Chang,

Soebarto, Zhao, & Zillante, 2016; Zhang et al., 2014; Gan, Zuo, Y, Skitmore, & Xiong, 2015). Ultimately, the boom in the construction industry has influenced the economy, society, and environment destructively (Darko & Chan, 2016). Sustainability management in infrastructure projects ensures that excessive energy depletion and damaging workings of such projects are condensed by applying social and environment oriented manners and approaches (Zaman, Abbasi, Nawaz, & Siddique, 2020). The combination of fiscal, ecological, and societal responsibilities in the sustainability agenda helped in making progress towards more sustainable construction.

Carvalho and Rabechini (2015) stated that the project perspective of PSM includes consideration of sustainability in project management. This perspective should resolve issues sustainability related issues in the perspective of tipple bottom line. According to Carvalo and Rabechni (2017) and Silvis and Shipper (2015), PSM describes both perspectives of project and product and comprising following five dimensions:

Design for Environment: The integration between project management and Design for Environment can nurture the contribution to ecofriendly sustainability. As starting development; considering the prospects of stakeholders with the venture's objective on sustainability, forming accomplishment standards connected to environmental influences of the project. In views of Glavič and Luckman (2007), Eco-design refers to a process of "product development that takes into account the complete life cycle of a product and considers environmental aspects at all stages of a process, and include eco-efficiency, remanufacturing, reprocessing, source reduction, waste minimization in the life cycle".

Environmental technologies: Environmental technology is an organized awareness and its utilization for the well-organized consumption of natural resources as well as lowering wastes or reprocessing wastes, to limit or decrease the chances or degree of the dangers and decrease contamination (Glavič and Luckman, 2007). According to Kuehr (2007), environmental technology was categorized based on ecological effectiveness: "measuring technologies on the environment, cleansing technologies or end-of-pipe approaches, cleaner technologies, clean technologies or zero impact technologies".

PM process & knowledge areas: Project Management process & knowledge areas should focus matters relevant to sustainability in TBL perception (Carvalho and Rabechini, 2015). It is focused on familiarizing sustainability in the project management scope, stakeholder

communication, and procurement. As Silvius and Schipper (2014) recognized that there are various opportunities for considering sustainability procedures in every phase of project management.

Green procurement and partnership: The green procurement in the project management area is still in the developing stage. In the context of sustainability, complex projects (Lenferink, Tillema & Arts, 2013), and governing atmosphere matters (Zhu and Sarckis, 2006) are further relevant through sustainability concerns. The difficulty in choosing subcontractors for green construction services is a major challenge in green building project management (Hwang and Ngg, 2013). In Green Procurement and partnership some external stakeholders, including pressures from customer and regulatory bodies are important (Kuei, Madu, Chow & Chen, 2015).

Social responsibility: Social responsibility is considered to be a key aspect of meeting TBL perspectives. In light of the International Standards of social responsibility (ISO, 2010), the important values of social responsibility are transparency, answerability, ethics, stakeholder orientation, regulations implementation, and consideration of human rights (ISO, 2010).

2.5 Sustainability Strategies

The appearance of globalization has engaged the world in a host of beneficial activities, with successful outcomes such as the rise of global GDP from fifty trillion US dollar in 2000 to 75 trillion US dollar in 2016. It has also, on the other perspective, introduced a range of dynamic environmental concerns and risks (UN-DESA, 2017). Over time more of the population has become aware on sustainability and it aims to use the increased attention to find a cohesive solution to the problems associated with sustainable economic, social and environmental activities (Coji'anu et al., 2020)

The governments of many nations are further attentive of their commitment to guarantee sustainability, consequently, even though it is just on a local basis. Past research studies have shown how policymakers demand that businesses conducting initiatives set in place policies, action plans, and success measures that can help lead to economic change in the region where the project is being applied (Yanarella and Bartilow, 2000).

On the origin of TBL methodology, project sustainability management blends the processes of project management with aims of monetary, communal and ecological sustainability (Elkington, 1998). Project sustainability management (PSM), on the other hand, necessitates a significant investment of time and money, predominantly in case of building projects. Consequently, resource restrictions are increasing, requiring project managers to come up with novel explanations for sustainable rehearses in order to preserve viable superiority in the worldwide production and building development sector (Khalilzadeh, Akbari, & Foroughi, 2016).

Because of the broad variety of stakeholders (e.g., environmental authorities, neighborhoods, customers, and workers) who are affected by the project, project management and other policy makers form “a staggering burden of pressures”, such as from environmental agencies, states, residents, and the workforce. It is important to note that multiple constraints need to be balanced together with the inclusion a promise of a fair return on investment as well as long-term practicality. In order to solve this issue, it is imperative that project management software packages be designed with sustainability in mind (Martens and Carvalho, 2017). Under the TBL principle of sustainability, companies should concentrate on mitigating their harmful ecological and social effects to the point where they are reaching a level of performance and obtaining a financial advantage, as postulated by Marten and Carvalo (2014).

In regions of developing countries, the deployed projects greatly donate to the growth of the local industry (Aarseth et al., 2011). The society and local government find it challenging to deal with sustainable development, that is no doubt major and one of the significant problems presented by projects. A large requirement is showing up for the integration of sustainability principles into policies and activities (Labuschagne, Brent & Van Erck, 2005). Such plans, or rather sustainability strategies, are required to assist players such as the government, companies, and organisations in developing and implementing projects without jeopardizing future generations' resources. Strategies could be tactics and guidelines utilized to thrive (Artto, Kujala, Dietrich, & Martinsuo, 2008). Strategy means to choose different activities for delivering value (Porter, 1996). As elaborated by Aarseth et al., (2017), in terms of sustainability strategies, these are “Plans focusing on the fulfillment of their sustainability-related goals under conditions of uncertainty. Strategies are often described as

plans and directions to deliver value successfully, whereas sustainability strategies specifically deal with the challenges and opportunities of sustainability" (Arseth et al., 2017).

Definitely, a strategy that relies on the achievement of sustainability-related targets in the situation of uncertainty can be called sustainable. By strategy, we are referring to defining various practices that can add benefit (Porter, 1996). Strategies are typically called plans and activities because they include different methods that steer distinct projects toward success (Artto et al., 2008). However, sustainability strategies include policies that concentrate on ensuring sustainability and address existing and potential sustainability issues and opportunities. Aarseth et al., (2017) categorized sustainability strategies in three major dimensions i.e., project organization, host organization, and Mutual.

The findings of Arseth et al (2017) presented over all 3x dimensions of sustainability strategies; i.e., project organization strategies, host organization strategies, and mutually adopted strategies by project and host organization. Project organizations are to set premeditated and pre-emptive sustainability goals and focus on sustainability matters while evolving project activities. One of the distinct strategy is to support contractors in applying ecological rehearses and incorporating sustainability issues in design phase of the project by developing performance indicators and appraisal techniques. Project hosts outline sustainable guidelines by evolving regulations, protocols, plans, and procedures to support sustainability and more influence the sustainability of project rehearses through sustainable practices.

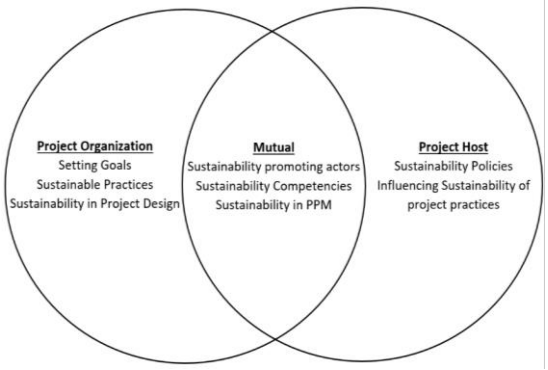

Figure 2.3 Sustainability Strategies Framework (Arseth et al., 2017)

Mutually, project organizations and project host organizations tap sustainability promoting actors, like NGOs, etc. as sustainability strategies. Developing sustainability

competencies in project managers and government officials is also considered one of the mutual sustainability strategies in the framework. Furthermore, project organizations and project host organizations mutually consider sustainability in project portfolio management as a sustainability strategy. In the next paragraphs, dimensions of sustainability strategies are discussed separately.

The first group deals with the project organization's sustainability plans by adapting their strategies of investing in an asset and running the organization, while the second deals with the project's governing organization's goals of approving and governing the investment object (Aarseth et al., 2017). While discussing the strategies for incorporating sustainability, Nassos and Avlonas (2020) highlighted the role of a roadmap presented to the organizations further stressing over the development of policies for better governance of sustainability. The obligations for the organizations are underscored by emphasizing that organizations will implant sustainability considerations into corporate policies to guide decision-making processes.

The project organizations adopt sustainability strategies either to overcome the adverse influences on the commercial setting or to deliver positive input the society. There exists a considerable body of literature that shows that set intentional and planned sustainability objectives by the project organization is important in supporting sustainability strategies. Project organizations focus explicitly on sustainability issues while developing the strategic plan of the project. Aarseth et al (2017) declared “setting sustainability goals” as an effective strategy for positioning the project and its overall activities and operations. They further elaborated that it could be a strategy on the part of project organizations to pay special attention to the cases where sustainability matters come across the other issues of the project.

In a study of building related projects, Herazo et al. (2012) established that linking the key issues of sustainable development with the client’s overall strategic management brought facilitating conditions for the administration of projects. While considering the advantages of integrating sustainability concerns with the financial goals of the organizations Verrier, Rose, & Caillaud (2016) added eco-friendly and societal dimensions of sustainability into economic earnings. Shen, Tamm & Jie (2010) emphasized integrating sustainable construction practices as a strategy in project feasibility study for promoting sustainability in

projects. The project organizations can focus on sustainability issues by giving distinct consideration to the cases where sustainability matters come across other apprehensions while developing project plans (Arseth et al., 2017).

Project organizations concentrates on developing such practices which are close to sustainability and are proved to be the key sustainability strategies. Project organizations can develop sustainable supplier practices and can further support suppliers to implement sustainability strategies. Aarseth et al (2017) highlighted various sustainable supplier practices and declared it one of the sustainability strategies. There are instances of using ecological materials (Jailon and Pon, 2008) and ecofriendly, economic, and societal benefits of by means of pre-fabrication as mentioned by Eriksson, Olander, Szentes, & Widén, (2014). Shi, Fang, Wu, Xu, Sun, & Yu, (2012) reported that in Shanghai World Expo 2010, project organizations developed guidelines for sustainable supplier practices. Ross, Bowen, & Lincoln (2010) highlighted that project working in South Africa included seven sustainable practices to successfully integrate sustainability strategies in housing projects.

Project organizations also supported contractors in applying sustainable rehearses like using prefabrication and green material for achieving sustainability in construction projects (Jailon and Poon, 2008; Eriksson et al., 2014). The strategy of "sustainable supplier practices" is a smart business plan in itself. It provides a variety of possibilities for producers of environmentally friendly customers, manufacturers of sustainable materials and practices, and individuals that take an active interest in social well-being. More often than not, these organizations would have a competitive edge. It is possible that they will gain the goodwill of their local community and see their contributions mirrored in the bottom line. This need for sustainable growth means that industry and society can go on the path of a sustainable economy.

Project organizations achieve sustainability by incorporating sustainability issues in project design documents as well. Aarseth et al (2017) designed a sustainability strategies framework by including sustainability-related matters in project design documents. The sustainability issues could be incorporated in the primary phases of projects. Through developing performance indicators and appraisal techniques such as value management and lifecycle assessment, project organizations can emphasize sustainability in project design.

Abidin and Pasquire (2007) stated that inculcating sustainability in project design shows the strategic choice of project organizations for achieving sustainability. The authors presented methods for incorporating sustainability through developing performance indicators and assessment techniques like life cycle assessment. Heravi, Fathi, & Faeghi (2015) and Sanchez (2015) presented techniques from analysis to initiate indicators of sustainability to emphasize sustainability in the design phase of construction projects. An alternative indicator set proposed by Zhong and Wu (2015) as assessment tools and strategies with the aim to focus on project sustainability management. The table shows sustainability strategies that were applied by the project organizations. These sustainability strategies include i). Setting sustainability goals ii). Developing sustainable practices iii). Sustainability in project design.

Table 2.1: Sustainability strategies adopted by project organizations

Authors	Setting sustainability goals	Developing sustainable supplier practices	Emphasizing sustainability in project design
Herazo et al., 2018	✓		
Marcelino Sadaba et al., 2015	✓		✓
Martens and Carvalho, 2016	✓		
McNabb, D. E. (2019)	✓		
Manninen & Huiskonen (2019)	✓		
Samara et al., 2020	✓	✓	✓
Li et al., 2019		✓	✓
Al Balkhy et al., 2021		✓	
Kiani Mavi et al., 2021			✓
Wang et al., 2014			✓
Heravi et al., 2015			✓
Sanchez, 2015			✓
Zhong and Wu, 2015			✓

Note. Adapted from Aarseth et al., (2017)

The organization that is project host actually it can contribute to "setting sustainability policies" to be used as a sustainability strategy. As highlighted by Aarseth et al., (2017), The host organizations can design sustainable project policies by creating rules and regulations, as well as guidelines, to help projects stay on track. The host organizations can further support state and governing matters in a way that supports sustainability in projects. As a result, each of the project's host organizations adopts a distinct sustainability plan to further maximize the project's capacity for achievement and minimize the potential drawbacks. There are a

variety of sustainability strategies that are evident, and they have been included in prior reports on project sustainability, but they have not been taken together into a coherent approach. To help explain project context, it is necessary to point out the particular institutions that may influence or be impacted by the project, including the geographic area, as well as state or civic associations. Aarseth et al., (2017) established that host organizations incorporate sustainability plans in their ecosystems by designing policies that meet the needs of their projects about sustainability, such as policy, rules, customs, and industry standards. In the Dutch construction sector, Bossink (2002) highlighted while focusing on the sustainability, importance of policies, environmental laws, and incentives in the attainment of sustainability. It becomes challenges that the importance of sustainability policies at the state level is highlighted in the background of developing economies but where actual implementation and realization of sustainability practices is a big challenge (Ross et al., 2010; Chen and Chambers, 1999). In large complex projects' preparation and design phase, environmental and impact assessment and sustainability valuations as underscored by Hill and Bowen (1997) have noteworthy influences on the society and situation, and these assessments could be an instrumental part of sustainable policies (Aarseth et al., 2017). In the context of project hosts' sustainability strategies Block and Peredis (2013) found the role of "entrepreneurial political leadership" towards providing guidelines for urbanization as sustainable development. The authors recognized the governing role of institutions and political leadership in promoting sustainability through policies and rules.

Project hosts support the integration of sustainability into project practices by introducing technical systems. Aarseth et al (2017) highlighted that it is a strategy to incorporate sustainability in projects by introducing various kinds of procedural techniques, mechanisms and consistent processes e.g., building tools (Bossink, 2002), pre-fabrication (Jaillon and Poon, 2008) and waste management systems (Jailon and Che-Sen, 2010). The project host organizations can influence the sustainability of project practices by giving technical solutions and standardized practices at the industry level. The host organization can support sustainability by developing waste management structures, environmental management arrangements, and design apparatuses (Bossink, 2002). As suggested by Jaillon and Chi-Sun, (2010) the prefabrication in replacement of conventional construction is also an example of sustainable project practices that help in industry-level standardization and

enhance possibilities for more sustainable construction. Jailon and Poon (2008) highlighted that in the host organizations context, various committees and bodies can play role in replacing the conventional construction practices with prefabrication-related practices. Table 2.2 shows sustainability strategies applied by project hosts. These sustainability strategies include a). Sustainability policies b). Sustainability of project.

Table 2.2: Sustainability strategies adopted by project hosts organizations

Authors	Sustainability policies	Sustainability of project practices
Goh et al., 2020	✓	
Martí et al., 2017	✓	
Samara et al., 2020	✓	✓
Li et al., 2019		✓
Ali and Ahmed, 2019	✓	✓
McNabb, 2019		✓

Note. Adapted from Aarseth et al., (2017)

Both project organisation and the project host organisation can include sustainability-promoting players through promoting skills and competencies, as well as including officials and representatives of non-governmental groups to function as legitimacy actors (Aarseth et al., 2017). Various researchers including Mathur, Price & Austin, (2008), Ross et al, (2010), and Yunas and Yang 2014 found inclusion of local stake-holders, representative of non-governmental organizations in the process of planning, advancement, execution, and decision making of infrastructure projects particularly, as an influential strategy for supporting sustainability. While discussing the role of local stakeholders Ross et al., (2010) endorsed that sustainability in projects could be achieved by engaging local stakeholders through setting mutually agreeable targets. Furthermore, the consensus among the stakeholders plays important role in this context (Yunus and Yang, 2014). Previous research studies have shown the importance of engaging local stakeholders in project organization, including post-disaster housing projects in Colombia and Turkey (Johnson, Lizarralde, & Davidson, 2006), water management in Vietnam (Beausejour, 2009), and post-tsunami reconstruction (Zuo, Potangaroa, Wilkinson, & Rotimi, 2009).

As sustainability strategies, project organizations can invest in formal training programs in order to expand competencies and skillsets of the managers. On part of the project host, sustainability capabilities of governmental and supervisory actors could be

developed. Arseth et al (2017) highlighted developing sustainability competencies as a mutual sustainability strategy to be used by both project host and project organization. Among the project organizations and hosts, at managers' level, at governmental and public level as well, development of sustainability competencies could be a mutual sustainability strategy (Aarseth et al., 2017). It is expected that better educated governmental or regulatory body staff and even the general public about sustainability issues could contribute effectively the project sustainability management. Several researchers proposed various strategies to develop competencies such as imparting training to the executives and government officers and the representatives of society (Gao, Hou, Zhang, Zhang, & Gong, 2006), training higher education academic researchers in sustainable development and urbanization (Genuas and Theobald, 2015). The focus on developing competence amongst project managers regarding sustainability issues is essential for successful delivery of sustainable construction projects as endorsed by Tabassi, Roufechaei, Ramli, Bakar, Ismail & Pakir (2016). Furthermore, as recommended by Liu, Wang & Long (2010) training project participants formally about sustainability make them realize the significance of sustainable development.

In the sustainability strategies framework developed by Aarseth et al (2017), emphasis of inclusion of sustainability in project portfolio management, acts as a sustainability strategy that benefits both the project organization and project host organization and be considered mutually. Project organization may use an outline for selection of project or in early phases of appraisals sustainability could be included. On the other hand, project hosts while selecting projects for funding, may emphasize sustainability issues. Sustainability emphasis in project portfolio management could also be a mutual sustainability strategy (Aarseth et al., 2017) and could be practiced by both i.e., project organization and project host. The emphasis on sustainability in PPM refers to the funding, approval, and implementation of sustainable initiatives. Sanchez (2015) proposed a four steps model to integrate sustainability in projects and portfolio selection is key step. Sandoval, Veiga, Hinton, & Sandner (2006) suggested a model regarding forecasting the contribution or effect of proposed projects over the society and environment. Similarly, Zhang, Wu, Skitmore, & Jiang (2015) presented a decision model to appraise those models which can contribute to the sustainability of urban development. Table 2.3 shows mutual sustainability strategies adopted by project organizations and host organizations. However, these

sustainability strategies include i). Inclusion of sustainability actors, developing competencies, emphasis in portfolio management.

Table 2.3: Mutual sustainability strategies

Authors	Inclusion of sustainability actors in project organization	Developing sustainability competencies	Sustainability emphasis in project portfolio management
Koistinen et al., 2020	✓		
Leone et al., 2021	✓	✓	
Martens and Carvalho, 2016		✓	
Marcelino Sadaba et al., 2015		✓	
Sanchez, 2015			✓
Samara et al., 2020	✓	✓	✓
Genus and Theobald, 2015	✓	✓	
Yunus and Yang, 2014	✓		
Ali and Ahmed, 2019	✓	✓	✓
Tabassi et al., 2016		✓	
Khalili-Damghani and Tavana, 2014			✓
Marsina et al., 2019			✓
Zhang et al., 2015			✓

Note. Adapted from Aarseth et al., (2017)

The lack of sustainability strategies could be one of the main reasons of failure of projects in the public sector of Pakistan. The sustainability strategies can play supporting role for project sustainability management and project governance. The significance of the sustainability strategies is to make the project sustainable and successful that is an evolving prerequisite in emerging economies like Pakistan. The public sector organizations in Pakistan have shown declined performance for many years but very limited research is available to identify the factors involved in the managing sustainability of project and for their success or delayed failure of projects. As mentioned in previous literature project sustainability management has been given very limited consideration. That is the reason, the strategies for managing projects sustainably and governing these project successfully becomes mandatory in public sectors organizations. It is significant to comprehend that contribution of sustainability strategies in increasing chances of project success rate and role of project sustainability management the way it helps in governing the projects in sustainable and successful direction.

2.6 Project governance and project success

In the recent decades, project governance has been considered a success factor in projects. The relationship was assessed empirically in qualitative case studies. The results of qualitative case studies indicated that project governance affects project success (Bekker and Steyn, 2008). Project governance partially impacts project success Joslin and Muller (2016). A significant component of organizational success is to have logical viewpoints of effectiveness and productivity as well as providing a way of linking governance to the practical aspects of management. One aspect is of conforming with stakeholders that is to affirm that governing in such a way that the actions performed and decisions made while in power were done in a way that attained legitimacy within the given context (Müller, 2009). This description is provided by Suchman (1995) defines governance structure as legitimacy and refers that “it is a generalized perception or assumption that the actions of an entity are appropriate, proper, or desirable within some socially constructed system of norms, values, beliefs, and definitions.”

Governance defines the social expectations of an organization confirms that a project is aligned with the objectives that it is trying to achieve (Aoki, 2001), same is the case in projects. Governance structures are described as "regulative, normative, and cognitive structures and activities that provide stability and significance for social behavior" (Scott, 1991, p. 33). Laws, guidelines, legislation, standards, practices, ethics, and cultures are all referred to as institutions or governance structures in project organizations. In this situation, the government is far more interested in supporting organizations by monetary stimuli than helping them through appreciating governance structure conducive for sustainable development in the projects management. Nevertheless, project organizations shape their governance structures due to various pressures around them (Derakhshan et al., 2019). In terms of pressures, there are three forms of organizational pressures including are forced, normative, and copied (DiMaggio & Powel, 1983) that further lead to formation of governance structure of the organizations. Coercive isomorphism is pressure brought to bear by organizations that have resources that an organization relies on. One who has mastered mimetic isomorphism is considered an expert at imitating efficient organizations during periods of ambiguity. Normative isomorphism is to be adherent to the practices and criteria

adopted by technical networks, further contributing in the governance sustainability in the projects (Misopoulos, Michaelides, Salehuddin, Manthou, and Michaelides, 2018). Whereas most important aspect of the governance structure is orientation of the organization, either is stakeholder oriented or shareholder oriented organization in terms of governance. Similarly, the control structure of the organizations is also maintained based on behavior control or outcome control governance structure (Joslin and Muler, 2016). Previous researchers posed project governance as an important antecedent of successful project delivery (Joslin and Muller, 2015; Biesenthel and Wildan, 2014; Turner and Simester, 2000). The boarder findings literature about project governance and project success originate further questions (Joslin and Muller, 2015; Wang and Chen, 2006). Therefore, it is hypothesized:

H_1: Project governance has a positive effect on project success.

When it comes to the dimensions of project governance, the literature highlights stakeholder-oriented governance and behavior control. In a project organization where the priorities of the shareholder are given importance over the stakeholder's benefits, that indicates a shareholder-oriented governance structure (Davis et al., 1997; Clarke, 1998). The stakeholder definition as per Freeman (1984) view is the organizations or individuals might be affected by the projects or vice versa. The stakeholder-oriented organizations consider stakeholders and safeguard their benefits while achieving the organizational goals (Clarke, 1998).

The actions of conformance with social values and stakeholder values pertain to the degree organization's acts are publicly recognized as well as endorsed by numerous inside and outside stake-holders (Kostovaa, Routh, & Daacin, 2008) and comply commonly utilized principles, laws, and opinions (Sonpar, Pazaglia, & Kornijanko, 2010). When organizations give in cultural demands as well as adhere social standards in line with such organizational frameworks and procedures, are basically satisfied by acquiring enhanced credibility, money, and survival capabilities for their operations (Yang & Konrad, 2011). In some cases, an organization conforms with stakeholders' values for personal gain and legitimizes acts that achieve the highest profit or utility for stakeholders or society in general. The moral validity of an action is contingent on the ethical acceptance of that action.

Conventionally, organizations focus on rising shareholder's capital, often at the detriment of the needs of society and stakeholders. The apparent contrariness of stakeholder theory stems from the fact that it is contradictory to this form of organization (Freeman, 2002). The basic principle of stakeholder theory is that businesses want to take into justification a broader spectrum of stake-holders than just shareholders' money. The organization's stakeholders are certain people or associations who are influenced by, or who have the power to influence, the organization's operations and outcomes (Freeman, 1984). For Sirgy (2002), they can be divided in three categories: internal, external, and distal. Internal are individuals who serve in divisions, departments, or the board of directors. External stakeholders are owners, contractors, creditors, society, and the environment. Stakeholders are competing businesses, consumer and advocacy organizations, government agencies, and labor unions, all of which compete for the remaining sector. One crucial principle underpinning stakeholder theory is that a large percentage of corporate decision-making authority and resources should be surrendered to the stakeholders (Stieb, 2008).

The research on the association of governance orientation and project success lacks, but Eskerod and Huemann (2013) highlighted the prominence of stakeholders for the prosperous completion of projects. Muller and Turner (2007) underscored the importance of stakeholder orientation as a governance structure that may add to the success of projects. Thus it is hypothesized:

H_{1a}: Stakeholder oriented governance of projects has a positive effect on project success.

Similarly, for a successful project, the processes are mandatory as highlighted in the governance-related research of projects (Klakegg et al., 2009). Corporate managers can act opportunistically by empowering management with the power to decide how corporate resources are distributed to achieve goals that are not in line with shareholders' interests (Jensen and Meckling, 1976). For instance, we can see this in the principal-agent problem where the principal and agent are acting solely in their self-interest and optimizing utility (Mitnick, 1973). The authors (Davis et al. 1997) conclude that the factors involved in this action are attributed to Maslow's (1987) hierarchy of needs, at lower levels. Information asymmetry creates issues when one group has usually additional or well informed than the other (Wiseman, Cuevas-Rodríguez, & Gomez-Mejia, 2012). Although this situation does

have an impact, that may increase the risk of moral hazard and until this is addressed, this risk will continue to grow (Poblete and Spulber, 2012). Extensive efforts to tackle the issue involve agreements and enticements that push mediators to behave in compliance with their leaders, who are kept under control using relevant systems. Project governance, when implemented in the organization while contributing to stakeholders' interests, can help to mitigate the threats and issues involved within the system.

The importance of process i.e., behavior control-oriented governance is also stressed in the literature on PM maturity models (PMI, 2013). In contrast, Crawford et al (2008) prefer the availability of situational governance structure for successful impletion of projects. There could be balance in too much process focused or outcome controlled (Turner and Muller, 2004). The authors including Crawford, Cook, Hobs, Labschgne, Remngton, & Chan (2008) and Turner & Muller (2004) don't rely on the definite choice of behavior-oriented project governance structure rather support the requirement of the contingency of project governance structures as per situation and need. In some cases, where behavior-oriented project governance structures resulted in project failure, the outcome-oriented project governance structure is suggested instead of being too process-focused (Muller, 2009). The variation in governance structures' applicability implies a relationship between control structure and project success. Based on variety of notions about process orientation it is hypothesized that:
H_{1b}: Behavior controlled governance of projects has a positive effect on projects success.

2.7 Project governance, sustainability management and success

As sustainability and project success are further impacted by sustainability related issues, such as stakeholder-oriented governance that becomes even more focused in the future. Organizations' strategic goals must be repositioned to prioritize project sustainability management in order to achieve long-term sustainable success in project delivery. Project managers are well placed to enable this change process by employing project management governance approaches (Kohl, 2019). As governance approaches grow increasingly reliant on their governed organizations and stakeholders, there will be greater pressure on governing institutions to ensure their projects and practices are more responsive to environmental and

cultural diversity, as well as providing their constituents with meaningful results and practices. Thus, to serve as a check against operational damage, governance is intended to help produce an even balance between what could be done and what should be done at all levels of the organization to ensure long-term sustainability.

Governance and sustainability are becoming more intertwined (Müller, 2009). Project sustainability management contributes to the successful completion of projects while decreasing negative social and environmental impact by adopting specific sustainability strategies (Carvalo and Rabechni, 2017; Arseth et al, 2017). For project sustainability management, governance remains essential and concept of sustainability progresses with the alignment of governance structure (Kemp, Parto and Gibson, 2005; Kendall and Willard, 2015). In terms of radical transformations and sustainability it could be advantaged from a governance methodology that further leads to sustainability (Grin, Rotmans, & Schot, 2010; Kemp et al., 2005).

The theoretical model may be viewed by the lens of stakeholder theory (Freeman, 1984), in which stakeholders can exert an impact on project governance and project sustainability management. Project governance can consider stakeholders' needs when assessing project performance, and this can be achieved by accounting for TBL viewpoints in sustainability management of projects while enhancing the likelihood of project success (Silvis and Shipper, 2015). In terms of the inquiry that how good the project is expected to be, stakeholders are presumed to do well by profitability and sustainability. The authors are of the point of view that it is the responsibility of governing bodies to introduce sustainability management in projects for improving project success. Project governance focusing stakeholders' requirements specially in the building development industry may strengthen the project performance through project sustainability management (Banihashemi et al., 2017). Martens and Carvalho (2016) submitted that sustainability impacts project success positively. Therefore, investigating following hypothesis is important:

H_2: Project Sustainability Management mediates between project governance and project success.

2.8 Moderating effect of Sustainability Strategies

The sustainability strategies contribution in the project governance and project sustainability management association has not been measured earlier. Project sustainability management (PSM) necessitates a large amount of resources, especially once it comes to managing construction projects. As a result, resource restrictions are increasing, forcing project managers to develop sustainable practises, methods and solutions in order to keep their competitive edge in the worldwide construction business (Khalilzedeh et al., 2016). Project organisations must establish sustainability strategies that are tailored to the realities and demands of society. Sustainability strategies could be a tool to improve sustainability management (Aarseth et al., 2017). The adoption of sustainability strategies could be instrumental for project governance and further instilling project sustainability management in the infrastructure projects marking lifetime beneficial effects on the economy, society, and environment (Armenia, Dangelico, Nonino & Pompei, 2019). Furthermore, moderator variables are usually used to help in expounding the relationship of two variables. A moderating variable is variable that has the ability to improve, weaken, cancel, or otherwise change the relationship between predictor and outcome variable. Hence, sustainability strategies are considered as a moderating variable on between project governance and project sustainability management linkage. It is assumed that the sustainability strategies may amplify the adoption of project sustainability management through effective project governance focusing on the stakeholder's perspective (Wong, San Chan and Wadu, 2016; Hwang, Zhu and Tan, 2017). Furthermore, sustainability strategies are assumed as an imperative contributor as a facilitator in the management and governance of projects (Herazo et al., 2012). Hence, it is hypothesized that:

H_3: Sustainability strategies positively moderate the relationship between project governance and project sustainability management, in such a way that the relationship is stronger with increased adoption level of sustainability strategies.

Project organizations used to focus on sustainability subjects while creating and evolving project strategies (Herazo et al., 2012). The strategies of project organizations support the suppliers in implementing sustainable practices for managing the sustainability in the projects (Liu et al., 2010; Jailon and Pon, 2008). Strategies like emphasizing

sustainability in design of project support project governance and project sustainability management (Sandavol et al., 2006; Waang et al., 2014). Project organizations govern the projects by paying exceptional attention to the areas where other matters of projects come across to the sustainability management of the projects (Marcelino et al., 2015; Martenz and Carvalo, 2016; Oachoa, 2014; Verier, Rose, Cailaud, & Reemitta, 2014).

Projects organizations adopt sustainability strategies such as sustainable goals setting in the initial phases of project helpful in instigating the project governance and sustainability management (Robichaud and Anantatmula, 2011). The findings of earlier researches such as Jaillon and Poon (2008) and Eriksson et al. (2014) underscored that project organizations use sustainability strategies like sustainable supplier practices for project governance and project sustainability management. Projects can be governed and managed successfully by adopting sustainable supplier practices (Silvius et al., 2012) because Sustainable practices appeared to be visible strategies for project sustainability management and governance, and the role of sustainable supplier practices are essential part of project governance and sustainability management (Song, Xu, and Liu, 2017). As revealed by the Heravi et al., (2015) the project organizations also inculcate sustainability in project design as a sustainability strategy and inculcation of sustainability in project design can play its role as a sustainability strategy in strengthening the relationship of project governance and sustainability management. In literature few studies highlighted the importance of setting sustainability targets during the design phase to direct and manage the projects according to the stakeholders' satisfaction (Wang et al., 2014; Lapinski, Horman, & Riley, 2006; Robichaud and Anantatmula, 2011).

The development of sustainability policies for governance and sustainability management are specific strategies adopted by the project host organizations for sustainability management (Nassos and Avlonas, 2020). Project host organizations purposefully stress project organizations to incorporate sustainability in project practices. The amalgamation of sustainability in practices of projects results in project sustainability management through the development of technical systems, development and construction tools, pre-fabrication, and waste systems as sustainable project practices further leading to the better governance of projects (Jaillon and ChiSun, 2010). Project host organizations govern projects by utilizing strategies that support sustainable project policies through developing laws and regulations to manage the sustainability of projects (Chan and chambers,

1999; Bocsink, 2002, Rose et al., 2010; Meech et al., 2006). Sustainability strategies like prompting sustainability of project rehearses help govern the projects smoothly for managing their sustainability by introducing technical systems such as prefabrication etc. (Bocsink, 2002; Jailon and Che-Sen, 2010; Jailon and Pon, 2008).

Both organisations may work with actors who promote sustainability, build sustainability skills, and prioritise project portfolio management. (Mhathur et al., 2008; Labushagne et al., 2005; Gao et al., 2006). The host and project organizations can mutually benefit from these strategies in managing project sustainability and completing projects successfully. Mutually both organization include sustainability encouraging actors by engaging the local public as stakeholders and NGOs in project-related decision making (Mhathur et al., 2008; Rose et al., 2010; Yunas and Yeng, 2014). In public sector infrastructure projects mutual strategic efforts of project host and project organization through the inclusion of stakeholders may contribute tremendously to the sustainable development (Kerzner, 2017). Project organizations and project host organizations may utilize the strategies of developing project managers' competencies (Tabbasi et al., 2016) as project manager's competencies development could be a mutual strategy for improving project sustainability management.

Mutually both organizations can develop sustainability management competencies of the project participants for significant results regarding sustainability management to govern and manage the projects successfully (Liu et al., 2010; Robichad and Anantatmulla, 2011; Aarseth et al., 2017). The mutual strategy of project host and project organizations also includes sustainable project portfolio management that moderates project governance and project sustainability management linkage. A rational selection of a portfolio is one of the four steps in governing sustainability issues in project management and may act as a mutual sustainability strategy to be adopted by the both project host and project organizations (Sanchez, 2015). In practice, the project organizations and hosts can agree on several strategies for governing and managing projects sustainability (Arseth et al., 2017). Hence it is hypothesized that:

$H_{3(a,b,c)}$: Project organizations', project host and mutual Sustainability strategies positively moderate the relationship between project governance and project sustainability management

in such a way that the relationship is stronger with the increased adoption level of project organizations', project host and mutual sustainability strategies.

2.9 Conditional indirect effect of Sustainability Strategies

In the domain of projects, recently, sustainability appears as a critical issue that must be thoroughly researched in project-based organizations from the beginning, when the project organization is established and the roles and duties of the suppliers and managers, and also governance mechanisms, are specified (Aarseth et al., 2017; Morris, 2013). Projects have shifted their focus from product manufacture to value addition (Winter, Smith, Morris, and Cicmil, 2006). As a result, researchers and practitioners are becoming more concerned about the insufficiency of the conservative project success criteria of cost, time, and scope (Baccarini, 1999; Atkinson, 1999; Andersen, 2014). The need for value addition could be addressed by employing value-driven project frameworks i.e., project sustainability management (PMI, 2016).

Furthermore, project sustainability management may be augmented by inducing the impact caused by sustainability strategies (Arseth et al., 2017) and project performance can be enhanced through sustainability strategies (Dijkstra, van Beukering, & Brouwer, 2020). Principally strategies highlighting the primary rendezvous and addition of various stakeholders to growing organization for better management of sustainability in it increase the stakeholder oriented governance structure and sustainability management (Lenferink et al., 2013; Yunus and Yang, 2014; Ross et al., 2010; Arseth et al., 2017) for successful completion of the projects. This suggests that Sustainability Strategies may function as a moderating variable, which impacts upon the extent to which project governance is translated into positive management of project sustainability towards the successful completion of the projects. Hence, it is hypothesized that:

$H3_d$: Sustainability strategies will moderate the indirect relationship between project governance and project success through project sustainability management, such that this indirect relationship will be stronger when there is a higher adoption level of sustainability strategies.

2.10 Theoretical Reflection

In this study, stakeholders could be found as a noticeable fragment of the developed research model. Keeping in the broader perspective of the research questions of this thesis, the study integrates stakeholder theory (Freeman, 1984) to explain the underlying concept. The researcher sets stakeholder theory as a launching pad of departure for this study. Actually, in research of social, environmental, and sustainability management domains, stakeholder theory is being considered most frequently (Fraynas & Yamaheki, 2013; Monitel & Delgeado, 2014).

Before understanding the combination of stakeholder theory with the governance and sustainability management of the projects, it is necessary to understand the term stakeholder. Freeman (1984, p. 25) describes stakeholders as "those groups and individuals who can affect or be affected" by the activities associated to creation of value and profession. This theory emphasis on the unified connections between a commercial businesses and clienteles, contractors, workers, stockholders, societies, and others having stake in organization. Stakeholder theory states that apart from shareholders, whoever is influencing or being influenced by the organization should be taken into account (Freeman, 1984). Stakeholder theory continues to gain in popularity among both practitioners and academics (Agle, Donaldson, Freeman, Jensen, Mitchell, & Wood, 2008). When it comes to project management, stakeholder theory focuses on describing the stake-holders' concerns must be reflected in projects (Blomquist and Müler, 2006; Xiee, Xia, Hu, Shan, Le, & Chan, 2017). The stakeholder's perspective in projects is making projects a stronger strategic competence for organizations (Hung, 2011) while promoting sustainable activities to generate values for stakeholders (Burke and Logsdon, 1996; Porter and Kramer, 2019).

The investigation of the study revolves around the notions of project governance, project sustainability management, sustainability strategies, and project success. Stake-holder theory is one of the best prevalent theories applied to corporate governance and sustainability management research (Frynas & Yamahaki, 2016; Yusoff and Alhaji, 2012). The intended investigation could be probed with the lens of stakeholder theory based on its attributes highlighted in the ensuing paragraphs.

According to Muller (2009), stakeholder theory articulates that an organization's governance concentrating on all stakeholders brings better performance. In line with the stakeholder theory, it is the project governance that helps project teams to understand and respond to all stakeholders. The governance of organization may give representation to the stakeholder (Donaldson and Pretson, 1995). Project governance concentrates on various stakeholder groups; however, stakeholder theory has the potential to understand the project governance framework (Derakhshan, Turner, & Mancini, 2019).

The consideration of project stakeholders' benefits takes position in the success criteria when practitioners shifted from mare product manufacturing to value addition (Winter, Smith, Moris, & Cimil, 2006). In terms of the criteria of project success criteria used in this study's framework focuses value generated by project for internal and external stakeholders (e.g. benefits for the project staff, clients, business itself and preparation for future etc.). The theme of making value for stake-holders can be understood through the lens of stakeholder theory that aims at adding value for stakeholders (Freeman, Harison, Wiks, Pamar & de Cole, 2010). In terms of value-added outcomes, the basic dynamics of stakeholder theory articulates that organizations should meet needs of having stake in the actions and outcomes of the organizations (Miles, 2012). Similarly, the Sustainability management and sustainability strategies construct of the study has close relation with the stakeholder theory as Silvius and Schipper (2014) believe that project sustainability management aims at realizing benefits for stakeholders along with their proactive participation. Hence, the perspectives of stakeholder theory have an overarching syncretism on the conceptual framework that better explains it theoretically.

In this study, stakeholders could be found as a noticeable fragment of the developed research model. In the aspect of shareholder-orientation of the project organization is shown when the organization prefers the shareholder's wealth growth over the needs of stake-holders (Davis, Schoorman, & Donaldson, 1997; Clarke, 1998). On the other hand, stakeholders are defined differently, rather Freeman (1984) takes stakeholder as the people or organizations influence the matters of organizations or vice versa. Stakeholder-oriented organizations consider their stakeholders and stabilize their needs while achieving the goals of the organizations (Clarke, 1998). Joslin and Muller (2016) underscored that project

managers in some cases believe the beneficiaries of projects therefore, they prefer the stakeholder's satisfaction as a priority

The following table attempts to explain the research model and its relevance with theory in light of the postulates of the stakeholder theory:

Table 2.4: Relevance of Stakeholder Theory with the Research Model

Stakeholder Theory (Freeman, 1984)	
Stakeholder Theory	**Relevance to Research Model**
The Stakeholder Theory argues that: - In the traditional view, organizations mainly prefer increasing shareholders' wealth rather at the expense of society's and stakeholders' interests. While stakeholder theory takes opposing to this opinion of organization. Stakeholder theory stresses the interconnected relationships between a business and its customers, suppliers, employees, investors, communities and others who have a stake in the organization - The theory contends that a company should add value for all stakeholders, keeping view the needs and requirements of the relevant stakeholders, not just shareholders. - Stakeholder theory articulates that the governance structure of the organization when concentrates on the requirements of the stakeholders, it consequently brings better performance. - It articulates that organizations should meet the needs of those who have stake in the outcomes of the projects	The relevance of research model based on: - When it comes to the project management, stakeholder theory makes projects a stronger strategic competence for organizations while promoting sustainable activities to generate values for stakeholders - In line with the stakeholder theory, project governance is a value system, set of responsibilities, processes, and policies, that allow projects to achieve organizational objectives and foster implementation in best interest of all stake-holders and the organization itself - PSM balances environmental, social, economic aspects of project-based working to meet current needs of stakeholders without compromising future generations - Project sustainability strategies are prioritized set of actions aimed at realizing outcomes as benefits for stakeholders through proactive participation
The theory allows for investigation of project governance, project sustainability management and sustainability strategies linkages for successful completion of infrastructure projects	

2.11 Research Model

The below figure presents a research model developed for the current study. The hypothesized research model of this study consists of four research variables. It portrays that project governance not only possess the direct effect on project success but it also holds the indirect effect on project success through the mediation effect of project sustainability management. Furthermore, model illustrates that this indirect effect is further moderated by the sustainability strategies and its three dimensions. This indicates that the effect of project governance on project success is conditional in nature that is dependent upon the magnitude and nature of the influence of project sustainability management and sustainability strategies.

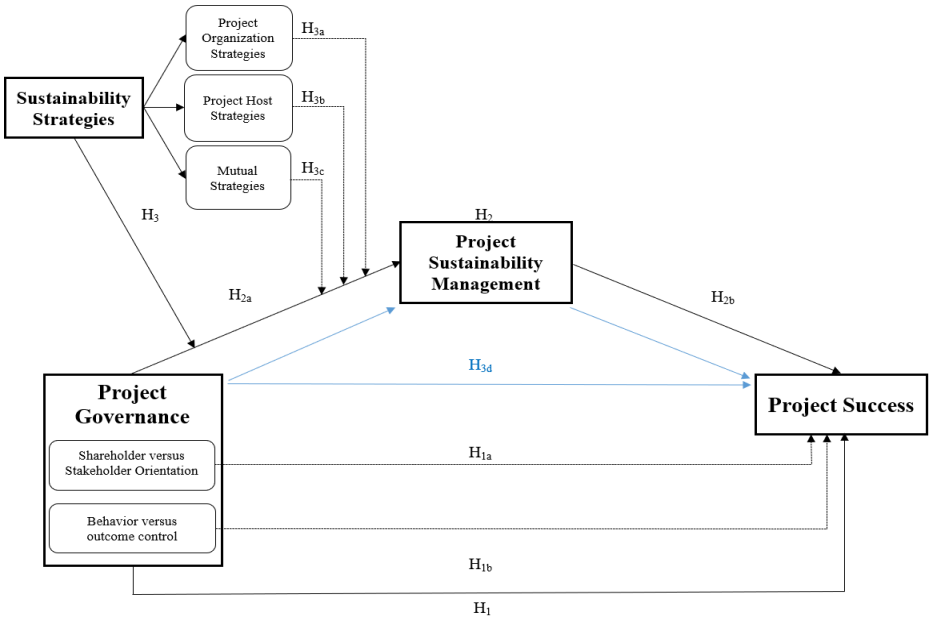

Figure 2.4: Research Model

2.12 Chapter Summary

In terms of the summary, this chapter has discussed in detail the existing theoretical contexts, conceptual models and different empirical studies of existing literature concerning the research problems of this study. This study highlighted major research gaps based on literature review and in order to address these research gaps, eleven testable research hypotheses have been developed.

CHAPTER 3

RESEARCH METHODOLOGY

The objective of this chapter is to deliberate research methodology of this research study. Starting from research philosophy this chapter discusses various methodological perspectives by explaining action plan for the current study, by emphasizing on balanced investigation of research problem, research questions and research hypotheses through setting appropriate research strategy, techniques and tools for data collection, procedures of sampling and data analyses. The study begins with an exploration of its philosophical assumptions, and it then moves on to various research techniques that are utilized to discover answers for the central research questions of this study. Research design is presented which explains research methods, population, sampling, respondents, and data collection methods. In the next section instrumentation, tool development, and operationalization of variables are described. The last section of the chapter explains descriptive statistics, validity, and reliability of measures, techniques to be used for the next phase i.e., the data analysis phase of this study.

3.1 Research Philosophy

The essence of research philosophy is understood as beliefs and assumptions pertaining to knowledge expansion. It is the first layer out of six essential layers of research onion that describes the whole research paradigm (Saunders et al., 2012). The research philosophy including the ontological, epistemological and axiological assumptions of this study are explained as follows. Ontology helps in recognizing the nature and existence of the objects being researched. It refers to the study of reality and recognizing how things exist (Saunders et al., 2012). The ontological assumption of this study is based on the stakeholder's perspective of project right from governance, sustainability management through strategies

till the successful completion of the projects. Epistemology refers to the scope of knowledge and nature of reality (Saunders et al., 2012). It tells how to know the known. The epistemological stance of this study tries to overview the governance and sustainability management of infrastructure projects through the lens of stakeholder theory (Freeman, 1984). Whereas axiology refers that how the researcher investigates the beliefs. It involves the standards and practices to be utilized in the exploration of these beliefs (Saunders et al., 2012). Therefore, keeping in view this epistemological stance, it paves the approach for the development of a theoretical framework of this study. Based on these ontological, epistemological, and axiological assumptions, this research work carries the positivist research philosophy under which a generalizable body of knowledge may be generated with emphasis on quantifiable results. In this connection, the research survey strategy has been used with a deductive approach. The deductive approach starts with the formation of research questions or hypotheses and tries to find the answer to posed research questions through the collection and analysis of data.

3.2 Research Strategy

The overall research strategy of the study is designed as depicted in figure 3.1. A comprehensive literature review has generated a theory-based framework and integrated research model. Research hypotheses of the study were developed from the review of literature. To test the developed hypothesis, the study adopted quantitative research methods. For data collection, this study utilized structured questionnaires. Through the qualitative method, the study developed a tool built on the previous research framework (Aarseth et al., 2017). The rest of the part of the questionnaire was designed from adopted questionnaires. After the collection of data, the next step was to examine the data. The detailed steps of data analysis were done by following complete protocols of data normality and data cleansing. Model fitness was achieved through the assessment of fitness indices and further tested the hypotheses through structural equation modeling. The data analysis of collected data enables the researcher to draw findings. The study concludes based on results, findings and implications. Future research recommendations are presented at the end of this study.

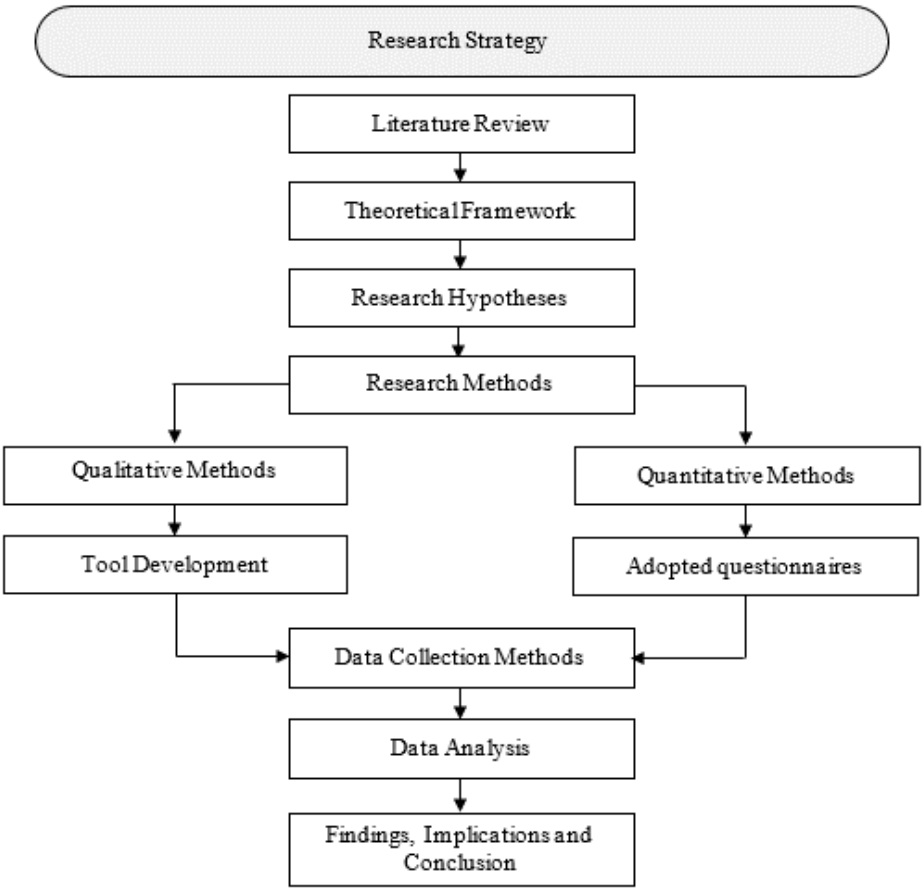

Figure 3.1: Research Strategy

3.3 Research Design

All decisions regarding research study's assumptions for research problems, detail of methods, data collection, data analysis, and all the plans and procedures of the study yield research design; as there are three major types of research designs including Qualitative, Quantitative, and mixed methods research design (Creswell, 2014). Embracing the positivist philosophy, this study integrates a theory-testing approach. The research design of the study is non-experimental, explanatory, and cross-sectional that was used to investigate the relationship between project governance and project success through the mediating effect of project sustainability management and the moderating effect of sustainability strategies. This study centers its research on positivist epistemology. Positivism considers that reality is

single, tangible, and measurable. This study focuses on the operationalization of constructs to infer specific meanings for each variable that can be rendered measurable. The measurement of the variables is based on the collection and analysis of facts rather than feelings (Remenyi, Williams, Money & Swartz, 1998). Positivism constitutes an "Objective" outlook; in which the objects of interest have separate entities than the researcher, augments the stance that the collected data is less susceptible to bias. Similarly, this study undertakes an objective view where the researcher and the facts are independent, allowing objectivity of the findings.

It is also important to observe that the positivist approach is undertaken in a way that is free of value bias. This study does the same by keeping an objective approach and assuming that reality is fixed and can be measured through quantitative techniques to present and confirm certain social facts and discover the universal laws in the social world. In this study, the positivist philosophy helped to produce a research strategy that uses the existing theory to develop hypotheses. However, the hypotheses for testing project governance and project success association are derived from the perspectives of stakeholder theory (Freeman, 1984). Those hypotheses were tested for confirmation or refutation leading to further addition of knowledge to the existing literature that could be used for future research. A highly structured methodology is to be followed to facilitate the investigation (Gill & Johnsons, 2010) and render the hypotheses quantifiable through the statistical analysis tools available. The hypotheses in this research are derived from the association of the variables defined in the extant literature available on the subject along with the theoretical support for these relationships. Since the results of the study were derived through empirical analysis. The data gathered is through the operationalization of the variables and using the survey strategy; the results are generalizable to the population; as the positivism philosophy suggests.

The study is an explanatory form of research to prove the causal relationships that exist between the variables. It uses deduction as a process to deduce hypotheses from the existing theories. The deductive approach uses the extant literature available on the subject matter through which the hypotheses are derived. These hypotheses would be tested for confirmation through statistical analysis. This research in a bias-free environment considers that the researcher would have minimum interference to keep the objectivity.

This study adopts the survey research strategy to incorporate the deductive approach for hypothesis testing. Danziger and Kraemer (1991) consider survey research better than other research strategies. Survey research has its nature to generate quantitative data from population and results can be generalized over the population; which is a major contribution to the existing literature. The study used a quantitative research method that support investigation between the relationships of variables during the testing of hypotheses (Barbour and Barbour, 2003; Neuman, 2003; Salkind, 2003) and minimize the possibility of biases (Thies, 2002).

In this research, four types of variables are used to define the scope of study including project governance (independent variable), project sustainability management (mediating variable) sustainability strategies (moderating variable), and project success (dependent variable), and are not under the control of the researcher. Before conducting the survey, this study predicates a model through literature that identifies the relationships that may exist between these variables and helps in developing hypotheses. For the hypotheses testing structured questionnaires were adapted into the context of the study for the variables used. A questionnaire for sustainability strategies' data collection was developed based on a framework established by the previous researchers (Aarseth et al., 2017). This study used quantitative research methods to determine the relationships of project governance with project sustainability management, project success, and sustainability strategies.

3.4 Population and Sampling

The major objective of the study is to analyze the antecedents of project success infrastructure sector projects in Punjab, Pakistan. The government funded infrastructure projects are taken as the main drivers for growth and broad development of the society (Anwar, Xiao, Akter & Rehman, 2017). Due to the major role of projects it is anticipated that the Asia-Pacific market is going to signify nearly 60% of global infrastructure expenditure by reaching the year 2025 (PwC, 2014). It would be significant to investigate and support the mentioned goals and targets of UN-SDGs, as infrastructure sector projects are center points for putting Pakistan on sustainable trajectory (GOP, 2018).

Similarly, the Government of Pakistan's 11th five-year plan (2013-18) highlighted that the infrastructure sector will get 48 percent share of the overall program, followed by the social sector (i.e., 35 per cent). This study only focused public sector projects due to visible decline in their performance and completion (Ahmed and Muhammad, 2014). The public sector projects, unlike private projects, face noticeable issues of weak governance and malpractices (Ling and Tran 2012; Locatelli, Mariani, Sainati and Greco, 2017). Hence for data collection the employees of infrastructure public sector projects were approached in Pakistan. These project employees are the major resource of the infrastructure sector projects; they govern and contribute in project sustainability management and project success. Moreover, the respondents chosen by previous similar studies were also project managers/project directors from different areas of infrastructure sectors (Wang, Rasool, Zaho, Samma and Iqbal, 2021; Ali, Ahmed and Israr, 2018; Yang et al., 2013; Müller et al., 2012; Yang et al., 2011; Anantatmula, 2010; Geoghegan and Dulewicz, 2008;), who are eventually responsible to initiate, manage, control and complete the projects successfully. Particularly, in terms of governance, sustainability management and successful completion of projects, the role of project managers and project directors are considered significant. In project governance, either stakeholder oriented or behavior control governance, Muller, Zhai, Wang and Shao (2016) considered the project manager responsible with a persuasive level of decision authority. In terms of sustainability, nevertheless actual responsibility may differ by project, the project managers would always have a decisive and influencing role (Xue, Rasool, Gillani and Khan, 2020; Silvius and Nedeski, 2011). That is why, the project managers and project directors were taken as key respondents of this study.

The target population of the current study came from the completed projects of public sector infrastructure projects. The completed projects are used to measure project success, whereas on-going projects are used to measure project performance. The web repository of MIS section projects wing of Planning Commission was showing that 256 projects of infrastructure sector submitted PC4 during the fiscal year of 2017-18, as shown in table 3.1. The projects of infrastructure sector categorized in sub-sectors by Planning Commission including Transport and Communication, Information Technology and Telecommunication, Energy, and Construction.

The completed infrastructure public sector projects in 2017-18 were 256 and as per list provided by the Planning Commission Islamabad, the project directors and project managers involved in completing these projects were 1245 in number. The determining population up to one year of 2017-18 enabled researcher to investigate the prescribed research questions about the project life cycle spanned over multi years, like more than five years in many cases. This bracket of period did not hamper gaining insight of changing trends over the years. The research collected data for this study over a duration of six weeks in Dec 2019. During this period two reminders with the intervals of fourteen days were served to the relevant respondents. Since the respondents of the study were not contacted or categorized due to their current organization. Alternatively, same as done in the previous studies such as Ul Musawir et al (2017), the respondents of this study were asked to give data about only one project they worked in it and this project must have completed not beyond two years (i.e. 2017-18), so as to alleviate the loss of detail and inaccuracies in the data (Iarossi, 2006).

Table 3.1: Sub-Sectors of infrastructure sector and number of projects in 2017-18

Sub-Sectors of Infrastructure Sector	Projects	Project employees
Transport & Communication	103	497
IT & Telecommunication	41	201
Energy (Fuel & Power)	25	118
Construction (Housing & Drainage)	87	429
Total	256	1245

In terms of project governance, project sustainability management and project success the relevance of project directors and project managers as key respondents is evident from previous studies. Xue, Rasool, Gillani and Khan (2020) considered project managers as key personnel for the PSM and successful completion of projects. Similarly, Forgues & Koskela (2009) endorsed the part of PDs in ensuring governance and project manager's role in leading the team for the successful completion. Taking into account, project directors and project managers were considered as key respondents (project employees) for this study. It is important to mention that each subsector of these projects tabulated in Table 3.1, the ratio of PDs to PMs was 1:4 approximately.

The geographical location of these projects was spread all over the country but as the project repository of Planning Commission shows that in previous years almost major portion of completed projects are completed and in Punjab province, from there a big representation of respondents who completed their projects could be approached for the study. The unit of analysis for the study is projects. Similar to the previous studies (Muller, Geraldi and Turner, 2012; Yang et al., 2012; Yang, Chen & Wang, 2012) projects were taken as unit of analysis of research studies.

3.4.1 Determination of sample size and respondents

Sampling is the process of picking an adequate number of components as sample that truly represents the entire population (Sekaran, 2006). The population frame of this research consists of 1245 participants including project directors and project managers. As per sample and population formula developed by Krejcie and Morgan (1970), minimum sample size was calculated and simple random sampling technique was used. The following formula helped in determining the sample size from a finite population:

$$S = \frac{X^2\ NP\ (1\text{-}P)}{d^2\ (N\text{-}1) + X2\ P\ (1\text{-}P)}$$

Whereas;

N = total population size (1245)

P = Population proportion (0.5 or 50%)

d = degree of accuracy (0.05 or 5%)

X = 1.96 at 95%

$$S = \frac{(1.96)^2\ (1245)\ (0.5)\ (1\text{-}0.5)}{(0.05)^2\ (1245\text{-}1) + (1.96)^2 (0.5)\ (1\text{-}0.5)}$$

$$S = 293$$

A sample of 300 respondents was adequate from the 1245 respondents representing population of the infrastructure sector of Punjab Pakistan by applying sampling formula (Krejcie and Morgan, 1970). Moreover, to confirm the sample size adequacy, G*power (version 3.1.9.7) designed by Faul et al. (2009) was applied. For calculating sample size F test from test group was taken and statistical test named "Linear multiple regression: Fixed model R^2 deviation from Zero" from the dropdown menu as suggested by Faul et al. (2009). The sum of predictors was set to three. The default values were used. The outcome displayed minimum 219 sample size showing less value than our already taken sample; thus, sample of study i.e. 300 is reasonable. The screenshots of the software used and output of the process are placed at Appendix-A.

In the research of business and social science disciplines Boyd (2006) suggested acceptable confidence interval level of 95 percent and margin of errors ±5 percent to draw the appropriate sample size from the targeted population. Hence, this study circulated 300 questionnaires among sampled 300 respondents. Project manager / project directors were sampled as respondents who have completed public sector infrastructure projects in Punjab, Pakistan. In agreement with Chollet, Brion, Chauvet, Mothe, & Géraudel (2012) project managers are responsible for success of the projects. The list of total employees along with details of project directors and project managers was obtained from Chief for infrastructure projects, Planning Commission, Government of Pakistan.

3.4.2 Selection of sample and sampling technique

The study adopted a simple random sampling technique to find the minimum size of 293 participants. A random sampling technique is a kind of probability sampling technique in which every member of the whole population frame carries an equal chance of selection for a sample of the study (Sekaran, 2001). The random sampling technique provides a better representation of the population in the selected sample with enhanced generalizability of results (Sekaran, 2001). Saunder et al., (2009) clarified and recommended the application of a simple random sampling technique in cases when researchers do not require face-to-face

contacts and no relevant strata exist in the sampling frame with no periodic patterns, such studies may choose simple random sampling technique. In this study, the responses from the project directors and project managers do not require face-to-face contact for the filling of the research questionnaire. In addition, the population frame does not constitute any prominent cluster or strata. Therefore, this study used a simple random sampling strategy for the selection of sample size from the population frame in light of the illustration of selecting the probability sampling strategy by Saunder et al. (2009). Thus, three hundred participants were selected under the simple random sampling technique. The methodology followed in the selection of sample under simple random sampling strategy is placed at Appendix-B.

3.5 Data collection methods

In the latest research techniques, there are diverse methods and sources of data collection (Ghauri and Gronhaug, 2005). Hinkins (1995) stated that most of the researchers in management sciences choose surveys for data collection. To validate the research hypotheses, earlier studies on project governance and project success have utilized the questionnaire as a data collection method. Therefore, in accordance with the quantitative study that works on positivist philosophy and a deductive orientation a survey methodology is best suited for the current study. The data collection from respondents of this cross-sectional study was done by using the questionnaire method. A self-administered method was used by distributing the questionnaires among the respondents of the study. The questionnaire was disseminated amongst 300 project directors /project managers of completed projects of the infrastructure sector in Punjab.

3.5.1 Questionnaire Method

As the survey method is the best and suitable method and efficient mechanism for data collection for quantitative study (Sekaran, 2006). In quantitative research tool for data collection is a questionnaire, therefore, a survey questionnaire was selected. This study

adopted questionnaires from previous studies. Only part V (questionnaire for sustainability strategies) was not developed by the previous researcher that is why, this study developed it from the framework presented by Aarseth et al., (2017).

The questionnaire covered all variables of the study comprising five parts. The questionnaire's first section contains items to get demographic data from the sampled respondents including their gender, age, educational level, job designation, experience, project type, project duration and project budget. The second part of the survey was set to assess the dimensions of project governance. The third part of the questionnaire was designed to measure the dimensions of project sustainability management. The fourth part of the questionnaire was developed to gauge the dimensions of project success. The fifth part of the questionnaire was designed to measure three dimensions of sustainability strategies through Sustainability Strategies Questionnaire (SSQ). It was developed and validated by the researcher. The measurement scale for the questionnaire was a five-point likert's scale. A complete questionnaire of all four variables utilized for data collection is attached at Appendix-C.

3.6 Instrumentation and operationalization

To measure the variables, the data collection tools for this study were adapted from earlier research studies, to measure the dimensions of project governance (independent variable) and project success (dependent variable) in the presence of project sustainability management (mediating variable). As a part of this study, an instrument was developed for measurement of dimensions of sustainability strategies (moderator).

Independent variable project governance was operationalized through two dimensions. Stakeholder verses shareholder orientated governance being first dimension addresses preference of the organizations for stakeholders or shareholders during governance. On the other hand, the control orientation exercised by the organization in project, i.e., behavior versus outcome control, shows the preference of the organization given to the behavior or outcome control structure for governance (Müler and Lecouvre, 2014). To measure the independent variable project governance a questionnaire developed by Muller

and Lecoeuvre (2014) was adopted. The dependent variable project success was operationalized through the "Project Success Assessment Questionnaire" developed by Shenhar and Dvir (2007), by using 25 items. Project success is an aggregation of five dimensions; "project efficiency, impact on the customer, impact on the team, organizational and business success, and preparing for the future". The project Success Questionnaire was adopted from Shenhar and Dvir (2007) for the measurement of five dimensions of project success. Mediating variable project sustainability management (PSM) was operationalized through PSMQ developed by Carvalho and Rabechini (2017). Project sustainability management is an aggregation of five dimensions; Design for environment, environmental technologies, PM areas of process and knowledge focusing on sustainability, green procurement and partnership, and social responsibility. To measure mediating role of project sustainability management a questionnaire developed by Carvalo and Rabechni (2017) was adopted. Moderating variable sustainability strategies was operationalized by the researcher through the Sustainability Strategies Questionnaire (SSQ) based on the Sustainability Strategies framework of Aarseth et al., (2017), by using 22 items to assess the dimensions. A three-dimensional construct of sustainability strategies was adopted from the framework developed by Aarseth et al., (2017). An instrument for the measurement of three-dimensional construct of sustainability strategies was developed and addressed the gap that they did not attempt to develop an instrument to measure the sustainability strategies (email attached as Appendix-D). The scale was validated for the measurement of the construct of sustainability strategies. The scale development and validation process were followed from previous studies (Sarkin, Groessl, Carlson, Tally, Kaplan, Sieber, & Ganiats, 2013; Akter, D'Ambra, & Ray, 2013).

3.7 Scale Development

In the section of developing scale for the sustainability strategies dimensions as identified by framework developed by Aarseth et al., (2017), the comprehensive and stringent processes of items creation and items sorting were done at this point. The primary objective of the item creation process was to confirm content validity. That content validity was

preserved by picking the right specific items for the construct. Just from the other side, in line with the pattern followed by Akter et al., (2013), and previous research (Storey, Straub, Stewart, and Welke, 2000; Lewis, Snyder, and Rainer Jr, 1995) the purpose of sorting items was to assure construct validity by making sure that items move closer together and further apart throughout the sorting process.

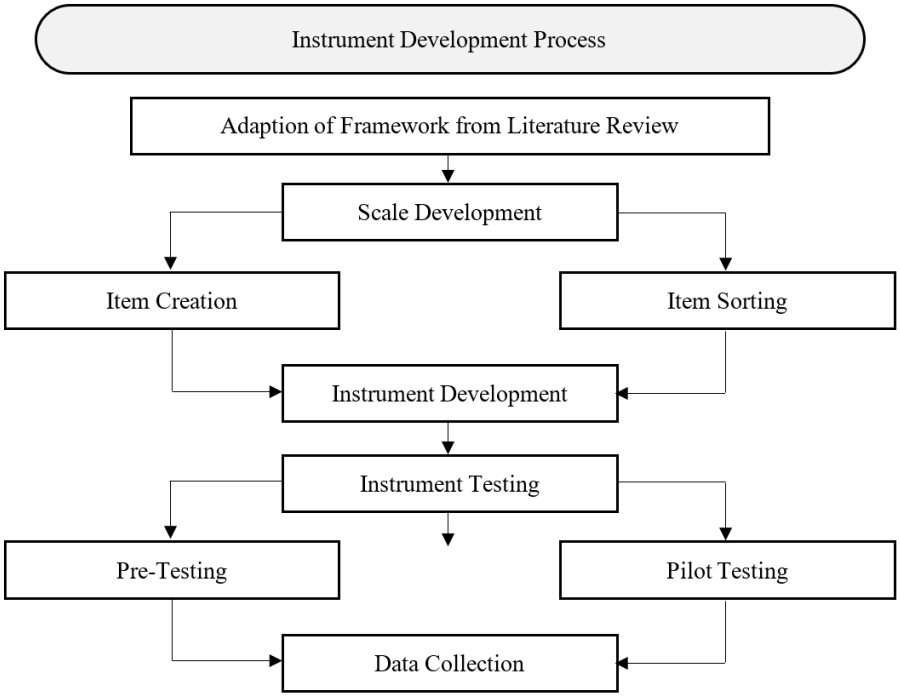

Figure 3.2: Instrument development process adapted from Akter et al., 2013

3.7.1 Item Creation

The item creation process was thoroughly conducted to ensure content validity. Taking valid content is necessary in instruments for guaranteeing that concepts are extracted from the literature containing the true essence of theory and philosophy of the propose to gauge. Content validity of the items can be established through the literature reviews and panels of expert judges (Straub, 1989). The literature of positivist philosophies does not have a strong agreement on the techniques and ways of defining content validity, hence, to

establish content validity few rounds of reviewing the instrument with multiple panels of experts or judges is very suitable (Straub, Boudreu, and Gafen, 2004).

The source of the content for items was extracted from the literature review and framework validated by Aarseth et al (2017), in line with the suggestions of Straub (1989) and Akter et al (2013). At this stage, items were recognized and shifted to the items pool relevant to the dimensions of the construct as per the suggested framework of Aarseth et al., (2017). The language and content of the most of items were adapted from this framework to develop scales for the sustainability strategies. The alpha value of Cronbach's coefficient i.e., 0.60 was used as the cut-off value to confirm the reliability of the psychometric attributes while shortlisting items for the multiple dimensions of sustainability strategies. The format of a 5-point Likert scale was used for sustainability strategies in line with the same scales as used in the other studies of similar nature. Finally, pools of items for three dimensions of sustainability strategies were created by following a rigorous scrutiny of the prevailing items based on the Aarseth et al., (2017) framework and the accumulation of new statements to modify in the context of the study. The items that appeared confusing or redundant were removed. A summary of instrument development process is placed at Appendix-E

3.7.2 Item Sorting

The primary goal of this step was to determine whether the concept or construct was valid and whether there was better coverage of the subject matter and the accuracy of the test items for each dimension of the variable. The first step was to determine the relevancy of the domain with the help of a group of judges comprising three members; user, professor and professional having industrial experience of the project management domain. The members applied the Q-sort procedure to each item to see how it was related to sustainability strategies. Basically Q-Sort procedure is an adapted rank-ordering technique where items are settled in a sequence that seem correct as per viewpoint of the experts working under identified terms. This procedure gives the apprehended patterns of the items listed. Those patterns can then be examined to determine and sort groups of patterns, supporting effective inductive reasoning. Using the Q-sort technique, we discovered that there were significant differences in the

degree of "correct" posting of items across different categories of construct, which allowed us to confirm construct validity by identifying convergence and divergence of items. In the two sorting rounds, there were two sets of judges (including one user, one professor and one professional). Each of these judges had background of both the education sector and public sector project management industry. At this stage after sorting total items classified into relevant dimensions were 30 (item list placed at Appendix-F).

Furthermore, the Q-sort algorithm was tested and the results were compared to those of two rounds of the sorting test to determine the extent to which the Q-classification sort's scheme was reliable. Inte-rater reliability was tested by Cohen's Kappa coefficient it is the most commonly used measure of reliability of inter-rater panel or experts (Boudreau, Gefen and Straub, 2001; Straub, Boudreau, & Gefen, 2004). Basically, inter-rater reliability becomes important when there is a scenario of several raters or judges who code the similar data (Miles and Huberman, 1994). However, reliability ensure that items should be linked to each other under the coverage of same construct, definitely, interrelated to each other. It becomes problematic and the data cannot be trusted when the developing instrument is deficient of construct validity. There are various methods to establish reliability but in any way, it is obligatory for systematic authenticity.

Table 3.2: Inter-rater reliability (Cohen's Kappa) of two rounds

Placement Ratios	**Round 1**	**Round 2**	**Avg. (2 rounds)**
POSS	0.82	0.84	0.83
PHOSS	0.74	0.78	0.76
MSS	0.86	0.92	0.89
Average	**0.81**	**0.85**	**0.83**
Raw Agreement	0.86	0.82	0.84
	0.84	0.86	0.85
	0.88	0.94	0.91
Average	**0.86**	**0.87**	**0.87**
$K = \frac{pr(a) - pr(e)}{1 - pr(e)}$	0.83	0.79	0.81
Pr(a) is the observed percentage agreement, *Pr(e)* is the probability of random agreement	0.81	0.82	0.82
	0.84	0.91	0.88
Average	**0.83**	**0.84**	**0.83**

POSS=Project Org. Sustainability Strategies, PHOSS= Project Org. Sustainability Strategies, MSS = Mutual Sustainability Strategies

The percentage of objects placed in the target construct, which was 83 percent, was used to determine reliability. The inter-judge raw agreement ratings and accompanying Kappa values, which averaged 0.87 and 0.83, respectively, as reported in Table 4.2, are also included in this overall placement ratio. These results indicated that the reliability coefficients were good since they are consistently above the threshold level, i.e. Kappa > 0.65. (Moore and Benbasat).

So, based on the overall findings, once the assessment concluded, the items were arranged into Likert scale, with overall findings showing that the selection process generated a good number of items per pool with a total number of 22 items.

3.8 Instrument Testing Process

The initial version of the sustainability strategies questionnaire was designed in simple English language with 22 questions relating to three dimensions of sustainability strategies, which were tested by collecting online data from respondents serving in projects of planning commission of Pakistan and having diverse experience of public sector projects. Therefore, the instrument Sustainability Strategies – SSQ for measurement of sustainability strategies was developed and validated by this sample data. Besides developing and validating SSQ, this preliminary study also addressed the research gap as suggested by Aarseth et al., (2017) that they did not attempt to develop an instrument to measure the sustainability strategies in the context of project success.

Summary of instrumentation and operationalization regarding each variable is given in the following table:

Table 3.3: Summary of instrumentation and operationalization

Variables	Items	Adapted from
Project Governance	**20**	
Shareholder vs stakeholder orientation	10	Muller and Lecoeuvre (2014)
Behavior vs outcome control	10	
Project Success	**25**	
Project Efficiency	5	Shenhar and Dvir (2007)

Variables	Items	Adapted from
Impact on user	5	
Impact on team	5	
Organizational Success	5	
Preparing for the future	5	
Project Sustainability Management	**27**	
PM focusing on sustainability	12	
Green procurement and partnership	3	
Environmental technologies	4	Carvalho and Rabechini (2017)
Design for Environment	4	
Social responsibility	4	
Sustainability Strategies	**22**	
Project organization's strategies	8	
Project host organization's strategies	8	Developed by the researcher
Mutual sustainability strategies	6	

3.8.1 Pretesting of Questionnaire

Before the pilot study, pretesting of questionnaire to be used for the current study was conducted by using 12 convenient samples (experts from the education and project sector) to ensure that the content of questions, the diction, the arrangement and design, the order, the directions, difficulty level in the questions, and the range and appropriateness of scale (5-point Likert). The final version of the questionnaire was refined based upon suggestions/comments on pre-test responses including context-specific adjustments.

3.8.2 Pilot Testing of Questionnaire

To assess the initial measurement of scale, a total of 63 responses were collected for the pilot study from similar respondents employed as PDs and PMs in the (PSDP) public sector infrastructure projects of in Punjab province. By using the varimax rotation procedure the factor analysis was conducted with 63 responses collected from the participants. In the

case of all variables of the study, the outcomes of the pilot study confirm the least condition of Cronbach alpha (0.70). Thus, the reliability of the refined instrument was established.

Table 3.4: Construct reliability of Pilot study (n=63)

Variables	Mean	SD	No. of items	Reliability (Alpha)
Project Governance				
Shareholder vs stakeholder orientation	3.36	0.93	10	0.92
Behavior vs outcome control	3.30	0.96	10	0.93
Project Success				
Project Efficiency	2.90	0.89	05	0.88
Impact on user	2.96	0.87	05	0.87
Impact on team	2.89	0.90	05	0.90
Organizational Success	3.06	0.84	05	0.85
Preparing for the future	3.14	0.96	05	0.89
Project Sustainability Management				
PM focusing on sustainability	3.46	0.85	12	0.94
Green procurement and partnership	3.48	0.90	3	0.81
Environmental technologies	3.39	0.76	4	0.90
Design for Environment	3.31	0.85	4	0.94
Social responsibility	3.23	0.87	4	0.82
Sustainability Strategies				
Project organization’s strategies	2.62	1.07	8	0.89
Project host organization’s strategies	2.82	1.10	8	0.86
Mutual sustainability strategies	3.25	1.11	6	0.83

3.8.3 Data Collection

These selected project directors and project managers of infrastructure sector projects were reminded repetitively for the return of filled questionnaires. Numerous telephonic, email reminders, and personal visits to Planning Commission and their respective offices were the

challenges of this survey process. A total of three hundred (300) research questionnaires were floated. In response two hundred and fifty-two (252) completely filled questionnaires were received with an overall response rate of 84 percent.

3.9 Demographic Analysis

The demographical information related to gender, age, educational level, job designation, experience, project type, project duration, project budget, etc. of participants of the study are discussed below. The total strength of respondents was 252. In the pool of respondents, 87% were male followed by 13% females. Respondents had different ages ranges whereas the visible part of the sample is the respondents of 25-35 years' ages that makes it 60%. The educational level of participants has four subgroups i.e., bachelor, master PMP, and above Masters. the highest ratio of education is Masters. They represented 36% of the total sample. Job designation was of two (2) cadres as per information received from the participants. The participants were the project director and project managers. Project managers appeared major portion of the sample with an 80% ratio. According to the information provided by the respondents, work experience was divided into three categories; i.e., up to 10 years, 11-20 years, and above 20 years' experience of at work. In terms of experiences, 65% of respondents had experience below five (5) years. They represented the majority with a 34 % ratio, followed by 31% of people who had experience between 5-10 years. According to this data, respondents who worked on newly built type projects were 95 % of the total participant. Rest 5 % worked upon refurbishment or renovation-related projects. Project type was categorized as New Built and Renovated projects. As per the information provided by respondents, 95 % of projects were newly built, rest 5% were renovation-related projects. In terms of total projects i.e. 256, only 09 projects were renovated and 243 projects were newly launched. The project budget had three (3) categories; small, medium, and large. The small budget consisted of 60 million or fewer Rupees. Small budget projects were handled by 47% of participants followed by 38% medium-sized projects. In terms of geographic distribution (i.e. 09 divisions of Punjab) of 256 infrastructure projects 45%, 25% and 10% projects were completed in Lahore, Multan and Rawalpindi divisions

respectively, followed by the 20% projects completed in rest of the 06 divisions including Bahawalpur, DG Khan, Faisalabad, Gujranwala, Sahiwal and Sargodha divisions. A detailed demographic analysis of respondents is given in the following Table 3.5:

Table 3.5: Demographic analysis of respondents

Variable	Category	Count	Percentage %
Gender	Male	219	87
	Female	33	13
Age (Years)	25-35	151	60
	36-45	30	12
	45+	71	28
Education	Bachelors	59	23
	Masters	91	36
	PMP	23	10
	Above Masters	79	31
Job Designation	Project Director	51	20
	Project Manager	201	80
Experience	Upto 10 Years	164	65
	11-20 Years	45	18
	Above 20 Years	43	17
Project Type	New Built	239	95
	Renovation	13	5
Project Budget	Small (≤ 60M)	118	47
	Medium (>60 M and ≤ 1000M)	96	38
	Large (> 1000M)	38	15

3.10 Data Analysis Techniques

Before going for further analysis, it is a critical preliminary step to specify formative versus reflective construct. The direction of causality in reflective constructs is from

construct to measure. The indicators for reflective constructs are required to be correlated. In this study, the constructs are reflective. The research hypotheses were developed to answer the research questions which were analyzed and tested by using different statistical techniques after the collection of data from the target population. To perform data analysis. The following data analysis techniques were employed to test the hypotheses of the current study.

Descriptive statistics: Techniques performed to analyze quantitative data collected for the study which shows the characteristics of sample data including values of mean, maximum, minimum, standard deviation, skewness, and kurtosis. Descriptive statistics are calculated during analysis by using Statistical Package for the Social Sciences (SPSS).

Construct reliability: Reliability is about the consistency of measurement where a variable or a list of variables measures to the intended extent in a consistent and repeatable manner (Mirabella, 2008). The term reliability refers to the consistency which is measured by calculating the value of Cronbach‘s Alpha (α) where the value 0.7 is considered suitable and the value above 0.8 is considered meritorious indicating a higher degree of internal uniformity (Carmines and Zeller, 1979; Litwin, 1995; Nunnally, 1978). The reliability of the measures was assessed by using Cronbach‘s Alpha (α) value.

Construct Validity: The validity of measures was assessed through factor analysis. Hair et al. (2010, p.126) conceptualized validity as “the extent to which a scale or set of measures accurately represents the concept of interest”. The content validity of sustainability strategies was based on Aarseth et al., (2017) sustainability strategies framework. The scale for the measurement of sustainability strategies was developed as part of the current research by seeking guidance from the framework developed by Aarseth et al., (2017) and following the process of tool development from previous research (Amundsen and Martinsen, 2014; Akter et al., 2013; Sarkin et al., 2013; Schmiedel, Vom Brocke, & Recker, 2014). The procedure of tool development was employed and the contents of the Sustainability Strategies Questionnaire (SSQ) were validated by different experts. The current study sought mainly to establish that the items were appropriate for respondents from Infrastructure Sector projects, by following the validity of earlier studies. The factor analysis approach can be used to either decide whether a certain structure for latent variables is accurate or whether the variables have been defined correctly (Pison, Rousseeuw, Filzmoser, & Croux, 2003).

Gorsuch (1990) stated that “a prime use of factor analysis has been in the development of both the operational constructs for an area and the operational representatives for the theoretical constructs” (p. 350).

There are two basic types of factor analysis, namely “Exploratory Factor Analysis” and “Confirmatory Factor Analysis”.

Exploratory Factor Analysis: Exploratory Factor Analysis (EFA) is used to confirm the earlier measurement model with a stated number of hidden constructs and particular indicators as stated by Alhija (2010). According to Hair et al. (2010), Principal Component Analysis (PCA) is used to determine the factor structure of the instruments subject to fulfillment of three conditions: a) The value should be greater than 0.60 for Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy that ensures an acceptable “degree of inter-correlations” among variables; b) Barlet’s test ($p<0.001$) that shows the presence of correlation among variables; c) Evidence of correlation among variables, thus showing value greater than 0.3.

Confirmatory Factor Analysis: This study uses a combination of absolute and incremental fit indices to decide the fitness of the one-factor model and overall measurement model. In addition, the goodness of measurement model was tested by employing the commonly used 2-index combinational presentation and their thresholds suggested by Hair et al. (2010).

Structural Equation Modeling: The study uses SEM that has the capacity for testing multiple simultaneous relationships by doing a single systematic analysis (Hair et al., 2010). Structural equation modeling can give the model fit indices which are its added advantage over partial least square SEM (Yuan & Chan, 2005).

Conditional effect estimation: In addition to the examination of direct relationships between variables, sometimes researchers require to find the conditional effect of various variables in a relationship between predictor and outcome variables (Muller, Judd and Yzerbyt, 2005). Hayes (2013) categorized conditional effects into three models i.e., mediation effect, moderating effect, and conditional process models (moderated mediation). Despite two separate models of mediation and moderation, examining moderated mediation effect in a single model gives better results (Fairchild and MacKinnon, 2009). In this study, the mediation effect of project sustainability management, moderation effect of sustainability strategies, and their moderated mediation effect are also examined. The models of the study

are developed based on hypotheses including simple moderation, simple mediation, and moderated mediation. The study tested hypotheses using Hayes process macros (PROCESS). The PROCESS models and analyses are based on an ordinary least square-based path analytical framework to test for both direct and indirect effects (Hayes, 2012). The current analysis employed three PROCESS models 1 (simple moderation), model 4 (simple mediation), and model 7 (moderated mediation).

Bootstrapping: All indirect effects were subjected to follow-up bootstrap analysis with 5000 bootstrap samples and 95% bias-corrected confidence intervals. Hayes (2013a) suggests the use of bootstrapping as it yields more accurate results. Preacher and Hayes (2008) explained that bootstrapping evaluates the significance of indirect effect through estimating confidence intervals (CI). Through bootstrapping, one can evaluate whether CI obtained from repeated samplings contain zero or not. If the CIs upper and lower limit contains zero, then it shows the non-significance of the indirect effect, otherwise shows the significance of the indirect effect. This study employed bootstrapping to examine the significance of indirect effects of project governance on project success through project sustainability management. This process bootstrapped 5000 samples to get class interval capping upper and lower limits. The biased class interval was used instead of percentile intervals to get more accurate results.

3.11 Ethical Consideration

Ethical consideration was at the top priority during this study. The respondents of the study have assured the confidentiality of the information received from them. They made assured that this information would only be used for this academic research. The respondent's personal information including their contact details or names were not asked. Participation in the survey was fully at the respondents' disposal. Only those respondents who filled the questionnaire showed positive consent and confirmed their availability voluntarily. Therefore, pre-requisites for the research study regarding ethical issues were adequately addressed.

CHAPTER 4

DATA ANALYSIS AND FINDINGS

In this chapter the results of statistical techniques and test applied to the collected data are reported and explained in detail. Data was screened and normality of data was checked. Descriptive and demographic analysis of the data was performed. Confirmatory and exploratory factor analysis was performed. Reliability of the scales and variables were measured. The research hypotheses were tested through the regression among the independent variable and dependent variables. For all the statistical analysis this study used SPSS (Social Statistical Package for Social Science) along with Hayes PROCESS (Model 1,4 & 7) and AMOS (Analysis of Moment Structures) statistical software. It is a user-friendly program for visual SEM through which the user can stipulate, view and adjust the model graphically (Ong & Puteh, 2017). It uses simple drawing tools and is most effective and reliable numeric methods to perform computation and display results. In simple words, it integrates a graphical interface that is easy to use with a modern computing engine for SEM. In comparison to other SEM programs, AMOS goes beyond usual capabilities, for instance, when dealing with missing data it performs state of the art estimation rather than relying on ad-hoc procedures. This study used structural equation modeling (SEM) as a statistical technique that is applied to test and examine the hypothesized relationships of the variables of a research model.

4.1 Descriptive statistics

The normal distribution of data is a prerequisite of the covariance-based structural equation modeling; therefore, the normality of data was checked after taking out the outliers. The normality of responses was checked by examining the skewness and kurtosis of the data. The skewness and kurtosis values for the construct in the study were within the acceptable

threshold values (skewness <+/-3 and kurtosis <+/-10). This indicates the normal distribution of data (Kline, 2005).

Table 4.1 shows the mean, standard deviation, absolute values of skewness and kurtosis. The data shows that mean values for all construct is above 3.0, with standard the deviation is less than 1.0. the skewness values for all constructs ranged between 0.22 and 0.59 whereas the kurtosis ranged between 0.29 and 0.92. To check the normal distribution of the entire data, the item-wise skewness and kurtosis of the data were also calculated. The results (attached in Appendix – G) show minimum to maximum values of skewness (-0.9 to 0.4) and kurtosis (-1.2 to 0.42) of the data remained in the range suggested normal distribution of data.

Table 4.1: Descriptive Statistics

Items	Minimum	Maximum	Mean	Std. Dev	Skewness	Kurtosis
PG	1.40	4.70	3.23	.880	-0.229	-0.924
PSM	1.48	4.56	3.35	.676	-0.356	-0.565
SS	1.18	4.68	3.37	.854	-0.500	-0.571
PS	1.48	4.56	3.45	.744	-0.597	-0.296

Table 4.2 reflects that there were no missing values and 252 complete questionnaires were utilized for the study.

Table 4.2: Missing values

	Gender	Age	Education	Designation	Experience	Project budget	Project type
Valid N	252	252	252	252	252	252	252
Missing	0	0	0	0	0	0	0

4.2 Common Method Bias

Common method bias is a source of measurement error. It misleads the empirical results. Various researchers explained a few sources of common method biases. There reasons and sources include respondent's attitude (Johns, 1994; Schmitt, 1994), perceptions and ambiguous correlations in their mind (Smither Collins, & Buda,1989), social desirability

such as responding favorably instead of real facts (Ganster, Hennessey & Luthans, 1983) and sometimes it appears leniency in respondent's attitude (Schriesheim, Kinicki, & Schriesheim, 1979). In order to address common method bias in this study, the researcher used the most commonly used technique i.e., Harman's single-factor test.

Through the process of exploratory factor analysis all the variables of the study were inserted and an un-rotated factor solution was examined. This showed the number of factors necessary required for variables' variance. In case, a visible amount of common method bias exists, one factor holds maximum covariance among measures. One single factor was extracted that showed only 20.852% variance that remained <50%. Hence verifying that the study has no influence of common method bias.

4.3 Multi-collinearity

The constructs of the study were examined to check any issues of multi-collinearity. Tolerance and variance inflation factor VIF can be measured to test assumptions of multi-collinearity (Hair et al., 2010). Tolerance is known as the amount of variability of the selected independent variable not explained by the other independent variable. The high values of VIF indicate a high degree of collinearity or multi-collinearity among the variables. Table 4.3 shows the values of tolerance and VIF for independent and dependent variables used in this study. The results are below cut off values of tolerance (>0.1) and VIF (<10.0) as suggested by (Hair et al., 2010; Pallant, 2010). That shows the data suitability for multivariate analysis. A detailed table of multi-collinearity statistics is attached in Appendix – H.

Table 4.3: Multi-Collinearity Statistics

Model	**Tolerance >0.1**	**VIF <10.0**
Project Governance	.879	1.137
Project Sustainability Management	.763	1.311
Sustainability Strategies	.847	1.180

a. Dependent Variable: Project Success

4.4 Outliers

Outliers are those responses which are reasonably higher or lower than other values in a data set (Pallant, 2010). To identify outliers, we can use descriptive of the data set. The mean values and five percent (5%) trimmed mean of variables should be very much similar to each other, that shows absence of outliers in a data (Pallant, 2010). Two mean values calculated for the variables of the study are shown in Table 4.4 which are very much similar to each other in case of each variable. Summary of outliers is presented in Table 4.4.

Table 4.4: Summary of outliers (mean and 5% Trimmed mean)

Variables	Mean	5% Trimmed Mean
Project Governance		
Shareholder vs stakeholder orientation	3.19	3.21
Behavior vs outcome control	3.27	3.29
Project Success		
Project Efficiency	3.37	3.40
Impact on user / customer		
Impact on team	3.48	3.52
Organizational Success	3.49	3.53
Preparing for the future	3.39	3.43
Project Sustainability Management		
Design for Environment	3.42	3.45
Environmental technologies	3.32	3.35
PM areas focusing on sustainability	3.44	3.49
Green procurement and partnership	3.53	3.58
social responsibility in the project	3.29	3.31
Sustainability Strategies		
Project Organization Strategies	3.44	3.48
Project Host Organization Strategies	3.30	3.33
Mutual Strategies	3.35	3.38

4.5 Assessment of Measurement Model through EFA

As Fontaine (2005) explained that EFA is used to investigate structural equivalence. In multivariate statistics, exploratory factor analysis (EFA) is a statistical method used to uncover the underlying structure of a relatively large set of variables. It should be used when the researcher has no a priori hypothesis about factors or patterns of measured variables. In this study, the scale of sustainability strategies is formally developed and scales of project governance, project sustainability management, and project success were adapted, which required performing an exploratory factor analysis of that variable along with the overall model.

This section describes each variable and its dimensions through the use of exploratory factor analysis (EFA). It is generally used to determine the factor arrangement of a variable and also to observe its internal reliability. To decide a number of factors eigenvalues are generated by a process called Principal Components Analysis (PCA) and represent the variance accounted for by each underlying factor. The extraction technique of Principal Components Analysis (PCA) is for the factor structure of the instrument. EFA permits all items to load on all factors. Scholars classically practice maximum likelihood to assess factor loadings, as it is only one of estimators utilized for EFA. Harrington (2009) explained that loadings equal to 0.32 or below are considered poor, up to 0.45 are fair, up to 0.55 are considered good while up to 0.63 are very good, whereas equal to or >0.71 are considered outstanding. According to Leech, Barrett, and Morgan (2005), the least loading factor requirements as established at 0.50 are considered acceptable. The items that did not fit into the components were then removed for the main study. The same technique was repeated for all four variables of the measurement model. The loadings are rotated when an initial solution is found. Rotation is a technique for increasing high loads while reducing low loads to produce the simplest construction is feasible. Orthogonal rotation is one of the rotation types that means the factors are assumed to be uncorrelated with one another. This study used varimax rotation which is one kind of orthogonal rotation.

There are 20 items of project governance that are entered for exploratory factor analysis with varimax rotation as reflected in Table 4.5. Factors with an eigenvalue higher than 1.0 are retained (Hair et al., 2009) being one criterion. After execution of the test, project governance comes up with a two-factor model including stakeholder versus shareholder-

oriented governance and behavior versus control-oriented governance. The factor loading and cross-loading (> 0.4) were observed. EFA results revealed that all items were having high factor loading (> 0.4) hence no items were removed (Hair et al., 2009). For independent variable project governance, KMO assumptions have been checked and it was seen that the values were within a suitable range. KMO (> 0.70) results can be seen in table 4.5. Therefore, the criteria are followed to check the reduction of dimensions. The Kaiser-Meyer-Olkin (KMO) for the project governance is 0.952 i.e., considered good (Kaiser and Rice, 1974). The rotated component matrix of the first dimension accounted for a variance of 33.13 percent. The rotated component values of all items in this dimension are >0.4 hence none of the items was deleted. The Cronbach alpha for stakeholder vs shareholder was 0.94 which is > 0.7, showing high reliability of scale (Cronbach, 1951; Santos, 1999). The second dimension is behavior versus outcome control having 10 items having a factor variance of 31.01 percent and a Cronbach alpha of 0.93 showing high reliability of the construct. The total variance of the construct is reported as 64.14 percent.

Table 4.5 : EFA Results – Project Governance

Items	**Stakeholder vs Shareholder**	**Behavior vs Outcome**
SSO1	.796	
SSO2	.753	
SSO3	.774	
SSO4	.789	
SSO5	.757	
SSO6	.757	
SSO7	.764	
SSO8	.745	
SSO9	.793	
SSO10	.725	
BOC1		.769
BOC2		.712
BOC3		.754
BOC4		.794

Items	Stakeholder vs Shareholder	Behavior vs Outcome
BOC5		.781
BOC6		.759
BOC7		.751
BOC8		.745
BOC9		.769
BOC10		.746
KMO	.952	
Factor Variance	33.13%	31.01%
Total Variance	64.14%	
Cronbach's alpha	.94	.93

The project sustainability management is a mediator of this study having five dimensions. It has twenty-seven items. The items were entered for performing exploratory factor analysis with Varimax rotation. Factors with eigenvalue higher than 1.0 were retained (Hair et al., 2009) being first criterion. Considering the variance explained is another criterion, 61.72 percent, that is >=50% (Beavers, Lounsbury, Richards, Huck, Skolits, and Esquivel, 2013) as shown in table 4.6.

The result shows that project sustainability management comes up with five factor model (Focus on sustainability, green procurement, environmental technology, design for environment and social responsibility). The values of factor loading and cross-loading (> 0.4) are also observed. EFA results revealed that all items are having high factor loading (> 0.4) except three items, hence these items were removed (Hair et al., 2009).

For mediating variable project sustainability management, KMO assumptions have been checked and it was seen that the value is within a suitable range i.e., 0.918 (> 0.70). Therefore, the criteria are followed to check the reduction of dimensions. The rotated component matrix of sustainability focus dimension accounted for a variance of 23.68 percent. The rotated component values of items in this dimension are > 0.4. The Cronbach alpha for sustainability focus is 0.93 which is > 0.7, showing high reliability of scale (Cronbach, 1951; Santos, 1999).

The second-dimension green procurement having 3 items, a variance of 10.68 percent and a Cronbach alpha of 0.82 showing high reliability of the construct. The rotated component values of items in third dimension environmental technologies accounted for a variance 10.60 that is >0.4. The Cronbach alpha for environmental technologies is 0.84 which is > 0.7, showing high reliability of scale (Cronbach, 1951; Santos, 1999). The fourth dimension is design for environment, having 04 items except one item that has factor loading <0.4, a variance of 8.43 and Cronbach alpha of 0.81 (i.e., >0.7). The fifth dimension is social responsibility, having 04 items, all items have factor loading values >.40, a variance of 8.33 and Cronbach alpha of 0.85 i.e., >0.7 showing high reliability of scale.

Table 4.6 : EFA Results – Project Sustainability Management

Items	**Focus on sustainability**	**Green Procurement**	**Environmental Technologies**	**Design for Environment**	**Social Responsibility**
PMFS1	.793				
PMFS2	.749				
PMFS3	.775				
PMFS4	.739				
PMFS5	.819				
PMFS6	.750				
PMFS7	.757				
PMFS8	.770				
PMFS9	.741				
PMFS10	.785				
GPP1		.781			
GPP2		.751			
GPP3		.758			
ET1			.757		
ET2			.769		
ET3			.797		
ET4			.744		
DFE1				.810	
DFE2				.755	

Items	Focus on sustainability	Green Procurement	Environmental Technologies	Design for Environment	Social Responsibility
DFE3				.783	
SR1					.751
SR2					.635
SR3					.682
SR4					.709
KMO	.918				
Factor Variance	23.68%	10.68%	10.60%	8.43%	8.33%
Total Variance	61.72%				
Cronbach's α	.93	.82	.84	.81	.85

The table 4.7 shows items of sustainability strategies used for doing exploratory factor analysis through Varimax rotation. However, factors with eigenvalue higher than 1.0 are retained (Hair et al., 2009) being first criterion. Considering the variance explained is another criterion, 68.83 percent, that is >=50% (Beavers et al., 2013). The results show that sustainability strategies appear with three factor model (Project organization's strategies, project host organization's strategies and mutual strategies). The values of factor loading and cross-loading (> 0.4). For sustainability strategies, KMO assumptions have been checked and it was seen that the value is within a suitable range i.e., .956 (> 0.70). Therefore, the criteria are followed to check the reduction of dimensions. The first dimension has eight items having acceptable factor loading values. The rotated component matrix of project organization's strategies dimension accounted for a variance of 25.21 percent. The Cronbach alpha for first dimension is 0.93 which is > 0.7, showing reliability of scale (Cronbach, 1951; Santos, 1999). The second dimension having six items all having acceptable factor loading (> 0.4), a variance of 24.49 percent and a Cronbach alpha of 0.90 showing reliability of the construct. The rotated component values of all eight items in third dimension and are > 0.4. A variance of 19.13 percent and the Cronbach alpha for third dimension is 0.93 which is > 0.7, showing high reliability of scale (Cronbach, 1951; Santos, 1999).

Table 4.7 : EFA Results – Sustainability Strategies

Items	**Project organizations' strategies**	**Project host org strategies**	**Mutual strategies**
POS1	.773		
POS2	.811		
POS3	.843		
POS4	.814		
POS5	.740		
POS6	.808		
POS7	.766		
POS8	.801		
PHOS1		.732	
PHOS2		.788	
PHOS3		.761	
PHOS4		.784	
PHOS5		.754	
PHOS6		.712	
MSS1			.631
MSS2			.660
MSS3			.637
MSS4			.615
MSS5			.664
MSS6			.587
MSS7			.615
MSS8			.608
KMO	.956		
Factor Variance	25.21%	24.49%	19.13%
Total Variance	68.83%		
Cronbach's Alpha	.93	.90	.93

The table 4.8 shows 25 items of project success considered for exploratory factor analysis through varimax rotation. It is the one criterion that factors with eigenvalue higher than 1.0 are retained (Hair et al., 2009). Considering the variance explained is another criterion, 69 percent, that should be >=50% (Beavers et al., 2013). The results show that project success appears with five factor model (project efficiency, impact on customer, impact on team, business success and preparing for future). The values of factor loading (> 0.4) are observed. EFA results revealed that all items are having acceptable factor loading (> 0.4). For dependent variable project success, KMO assumptions have been checked and that is .928 i.e. >0.7, it is within a suitable range. Therefore, the criteria are followed to check the reduction of dimensions. The rotated component matrix of project efficiency dimension accounted for a variance of 13.88 percent. The rotated component values of items in this dimension are > 0.4. The Cronbach alpha for project efficiency is 0.88 which is > 0.7, showing high reliability of scale (Cronbach, 1951; Santos, 1999). The second-dimension impact on customer having 5 items have factor variance of 13.57 percent and a Cronbach alpha of 0.83 showing high reliability of the construct. The rotated component values of items in third dimension impact on teams are > 0.8 and have factor variance 13.15 percent. The Cronbach alpha for impact on teams is 0.85 which is > 0.7, showing high reliability of scale (Cronbach, 1951; Santos, 1999). The fourth dimension is business success, having 05 items all having acceptable factor loading values (>0.7), a factor variance of 12.18 percent and Cronbach alpha of 0.87 i.e., >0.7. The fifth dimension is preparing for future, having 05 items all having acceptable factor loading values (>0.4), a variance of 12.08 and Cronbach alpha of 0.83 i.e., >0.7 representing high scale reliability.

Table 4.8 : EFA Results – Project Success

Items	**Project Efficiency**	**Impact on customer**	**Impact on team**	**Business / org Success**	**Preparing for future**
PE1	.660				
PE2	.694				
PE3	.676				
PE4	.657				
PE5	.659				

Items	Project Efficiency	Impact on customer	Impact on team	Business / org Success	Preparing for future
IOC1		.703			
IOC2		.575			
IOC3		.694			
IOC4		.697			
IOC5		.686			
IOT1			.716		
IOT2			.732		
IOT3			.623		
IOT4			.743		
IOT5			.668		
DBOS1				.667	
DBOS2				.818	
DBOS3				.762	
DBOS4				.704	
DBOS5				.770	
PFF1					.718
PFF2					.655
PFF3					.624
PFF4					.706
PFF5					.631
KMO	.928				
Factor Variance	13.88%	13.57%	13.15%	12.18%	12.08%
Total Variance	64.86%				
Cronbach's Alpha	.88	.83	.85	.87	.83

4.6 Assessment of Measurement models through CFA

Confirmatory Factor Analysis (CFA) measures psychometric models. It tests theoretical models and evaluates their suitability for acceptance. It is one of the forms of Structural Equation Modeling – SEM. There are some important parameters based on which model acceptability judgment is being made such as Chi-Square, however, multiple fit indices (e.g. CFI, NFI, IFI, SRMR, RMSEA, TLI, and PClose) are used to form an accurate judgement in order to accept the model. In SEM, three kinds of indices are important for evaluating the model fit. First are absolute indices, e.g., Standardized Root Square Residual (SRMR), Chi-Square test and Goodness of Fit Index (GFI), Root Mean Square Error of Approximation (RMSEA). Parsimonious indices are used to assess the discrepancy between implied and observed covariance matrices by taking into consideration the model complexity. The incremental indices are used to evaluate the parsimonious or absolute fit about a baseline model that is usually a null model e.g. Comparative Fit Index (CFI), Normed Fit Index (NFI) (Hancock & Mueller, 2013). The most reported indices include CFI, IFI, TFI, NFI and RMSEA, as it is not necessary to include all indices, which are computed in the program output (McDonald & Ho, 2002).

A confirmatory factor analysis on the sample data (n=252) using AMOS 22.0 (Arbuckle, 1994) was conducted by researcher. This was to assess the latent structure which consists of all constructs in the proposed conceptual model with method of maximum likelihood estimation. The first and second order confirmatory factor analysis is done in this section for each variable. At both orders including first order and second order, the validity of model and goodness of fit of the model was assessed by using the plugin developed by Gaskin and Lim (2016). The composite reliability, convergent and discriminant validity of project governance, project success, project sustainability management and sustainability strategies are assessed through values of composite reliability (CR), Average variance extracted (AVE), maximum squared variance MSV. The threshold values of CR > 0.7 whereas MSV should be less than CR and AVE as well (Hair et al., 2006; Cudeck et al., 2001).

The model-fit indices at first order and second order level are also observed. The model-fit includes comparative and absolute fit indices. The incremental or comparative fit indices include incremental fit indices (IFI), Normed-fit index (NFI) and Comparative-fit

Index (CFI). The threshold value of NFI is > .90 (Bentler and Bonnet, 1980) and the cutoff value of IFI and CFI is > .95 (Hu and Bentler, 1999). However, absolute fit indices determine how well the model fits the sample data (McDonald and Ho, 2002). The Chi-Square (χ^2/df) value is the traditional measure for evaluating overall model fit that ranges from 1 to 3 (Kline, 2005). Root Mean Square Error of Approximation (RMSEA) value should be <0.07 (Steiger, 2007) whereas its value less than 0.03 represents an excellent fit. Tucker-Lewis index (TLI) should be > 0.95 as suggested by Bentler and Hu (1999). The values of standardized root mean square residual (SRMR) <0.08 are deemed acceptable (Hu and Bentler, 1999). In the next section, assessment of all four variables at first and second-order level is done through confirmatory factor analysis.

4.6.1 Measurement models of project governance

Measurement model of project governance explains the model fitness through reliability and validity of first order and second order models. The table 4.9 shows composite reliability, convergent and discriminant validity of project governance at first order level:

Table 4.9: Composite reliability, convergent and discriminant validity of PG

	CR	**AVE**	**MSV**	**SSO**	**BOC**
SSO	0.944	0.627	0.255	0.792	
BOC	0.931	0.573	0.255	0.505***	0.757

SSO = Stakeholder vs Shareholder orientation, BOC = Behavior vs outcome control
P < 0.100, *p < 0.050, **p < 0.010, ***p < 0.001

The table 4.9 shows that the values of CR of both constructs of project governance are above the threshold of 0.7. The AVE values are above 0.5 and values of MSV are less than the values of AVE and CR. The diagonal values are higher than the correlation values that shows discriminant validity of constructs of project governance. The correlation between both constructs of project governance shows that both constructs have highly significant correlation with each other.

In the next step first order model-fit indices of project governance are observed. The estimates are observed in comparison with the threshold or cutoff values. Therefore, based on the estimates the fitness level of the measurement model of project governance at first level is shown in the table 4.10:

Table 4.10: First order Model-fit indices of dimensions of PG

Index	Threshold Level	Estimate	Fitness Level
χ^2	--	254	--
Df	--	169	--
χ^2/df	> 1 and < 3	1.50	Excellent
CFI	>0.95	0.974	Excellent
SRMR	<0.08	0.037	Excellent
RMSEA	<0.07	0.045	Excellent
PClose	>0.05	0.765	Excellent
IFI	>0.95	0. 975	Excellent
TLI	>0.95	0. 971	Excellent
NFI	>0.90	0. 928	Good

The model fit indices at first order of project governance shows excellent model-fitness. The value of chi-square is well below 3 showing overall model fit. The comparative fit index CFI is 0.974 i.e. above from 0.95, SRMR index is 0.037 that is well below from 0.08. The value of RMSEA is below 0.07 that is 0.04. The value of PClose is observed 0.765 that is well above from 0.05. The values of IFI and TLI are greater than 0.95 which are 0.975 and 0.971 respectively. The value of NFI is 0.928 that is above the cutoff value 0.90. This recommends that the two dimensions are acceptable to measure project governance. The figure of project governance first order measurement model is placed at Appendix-I.

The confirmatory factor analysis of second order of project governance was done after the first order confirmatory factor analysis. The two dimensions were linked to project governance as shown in figure placed at Appendix-I. Second order model-fit indices of project governance are observed. The estimates are observed in comparison with the threshold or cutoff values. Therefore, based on the estimates the fitness level of the measurement model of project governance at second level is shown in the table 4.11:

Table 4.11: Second order Model-fit indices of dimensions of PG

Index	Threshold Level	Estimate	Fitness Level
χ^2	--	254	--
Df	--	169	--
χ^2/df	> 1 and < 3	1.50	Excellent
CFI	>0.95	0.974	Excellent
SRMR	<0.08	0.037	Excellent
RMSEA	<0.07	0.045	Excellent
PClose	>0.05	0.765	Excellent
IFI	>0.95	0. 975	Excellent
TLI	>0.95	0. 971	Excellent
NFI	>0.90	0. 928	Good

The model fit indices at second order of project governance shows excellent model-fitness. The value of χ^2/df is well below 3 showing overall model fit. The comparative fit index CFI is 0.974 i.e. above from 0.95, SRMR index is 0.037 that is well below from 0.08. The value of RMSEA is below 0.07 that is 0.04. The value of PClose is observed 0.765 that is well above from 0.05. The values of IFI and TLI are greater than 0.95 which are 0.975 and 0.971 respectively. The value of NFI is 0.928 that is above the cutoff value 0.90. The above statistics show that all the 20 items converge into project governance construct through two dimensions. These 20 items are spread over two dimensions: stakeholder vs shareholder and behavior vs outcome control. Ten items load to the first dimension and 10 loaded on second dimension without any cross loading.

4.6.2 Measurement models of project sustainability management

Measurement model of project sustainability management explains the model fitness through reliability and validity of first order and second order models. The table 4.12 shows composite reliability, convergent and discriminant validity of project sustainability management at first order level:

Table 4.12: Composite reliability, convergent and discriminant validity of PSM

	CR	AVE	MSV	PMfS	GPP	ET	DFE	SR
PMfS	0.938	0.604	0.302	0.777				
GPP	0.822	0.606	0.236	0.485***	0.778			
ET	0.848	0.583	0.222	0.425***	0.255**	0.763		
DFE	0.812	0.59	0.207	0.362***	0.390***	0.226**	0.768	
SR	0.855	0.597	0.302	0.549**	0.472***	0.455***	0.455***	0.772

PMfs = PM focus on sustainability, GPP = Green procurement, ET = Environmental technologies, DFE = Design for environment, SR = Social responsibility
P < 0.100, **p < 0.010, ***p < 0.001

The table shows that the values of CR of all five constructs of project sustainability management are above the threshold of 0.7. The AVE values are above 0.5 and values of MSV are less than the values of AVE and CR. The diagonal values are higher than the inter-dimension correlation values that shows discriminant validity of constructs of project sustainability management. The correlation between all five constructs of project sustainability management show that all five constructs have highly significant correlation with each other.

In the next step first order model-fit indices of project sustainability management are observed. The estimates are observed in comparison with the threshold or cutoff values. Therefore, based on the estimates the fitness level of the measurement model of project sustainability management at first level is shown in the table 4.13:

The model fit indices at first order of project sustainability management shows excellent model-fitness. The value of χ^2/df is well below 3 showing overall model fit. The comparative fit index CFI is 0.985 i.e., above from 0.95, SRMR index is 0.039 that is well below from 0.08. The value of RMSEA is below 0.07 that is 0.029. The value of PClose is observed 1.0 that is well above from 0.05. The values of IFI and TLI are greater than 0.95 which are 0.985 and 0.983 respectively. The value of NFI is 0.917 that is above the cutoff value 0.90. This recommends that the all five dimensions are acceptable to measure project

sustainability management. The figure of project sustainability management first order measurement model is placed at Appendix-I.

Table 4.13: First order Model-fit indices of PSM

Index	Threshold Level	Estimate	Fitness Level
χ^2	--	291.447	--
Df	--	242	--
χ^2/df	> 1 and < 3	1.204	Excellent
CFI	>0.95	0.985	Excellent
SRMR	<0.08	0.039	Excellent
RMSEA	<0.07	0.029	Excellent
PClose	>0.05	1	Excellent
IFI	>0.95	0. 985	Excellent
TLI	>0.95	0. 983	Excellent
NFI	>0.90	0. 917	Good

The confirmatory factor analysis of second order of project sustainability management was executed after the first order confirmatory factor analysis. The all five dimensions were linked to project sustainability management as shows in figure placed at Appendix-I. The estimates are observed in comparison with the threshold values. Therefore, based on the estimates the fitness level of the measurement model of project sustainability management at second level is shown in the table 4.14.

The model fit indices at second order of project sustainability management shows excellent model-fitness. The value of χ^2/df is well below 3 showing overall model fit. The comparative fit index CFI is 0.984 i.e. above from 0.95, SRMR index is 0.044 that is well below from 0.08. The value of RMSEA is below 0.07 that is 0.02. The value of PClose is observed 1.0 that is well above from 0.05. The values of IFI and TLI are greater than 0.95 which are 0.984 and 0.982 respectively. The value of NFI is 0.915 that is above the cutoff value 0.90. The above statistics show that all the 24 items converge into project sustainability management construct through five dimensions.

Table 4.14: Second order Model-fit indices of PSM

Index	Threshold Level	Estimate	Fitness Level
χ^2	--	299.682	--
Df	--	247	--
χ^2/df	> 1 and < 3	1.213	Excellent
CFI	>0.95	0.984	Excellent
SRMR	<0.08	0.044	Excellent
RMSEA	<0.07	0.029	Excellent
PClose	>0.05	1	Excellent
IFI	>0.95	0. 984	Excellent
TLI	>0.95	0. 982	Excellent
NFI	>0.90	0. 915	Good

There are 24 items and are spread over five dimensions: PM focusing on sustainability, green procurement and partnership, Environmental technologies, Design for environment, social responsibility. Ten items loaded to the first dimension (PMfS), three items loaded on second dimension (GPP) and third dimension (DFE) and four items loaded on fourth dimension (ET) and fifth dimension (SR) each. These items loaded without any cross loading.

4.6.3 Measurement models of sustainability strategies

Measurement model of sustainability strategies explains the model fitness through reliability and validity of first order and second order models. The table 4.15 shows composite reliability, convergent and discriminant validity of sustainability strategies along with its dimensions (Project Organization Strategies, Project Host Organization Strategies, Mutual Strategies) at first order level.

The table 4.15 shows that the values of CR of all three constructs of sustainability strategies are above the threshold of 0.7. The AVE values are above 0.5 and values of MSV are less than the values of AVE and CR. The diagonal values are higher than the inter-

dimension correlation values that shows discriminant validity of constructs of sustainability strategies.

Table 4.15: Composite reliability, convergent and discriminant validity of SS

	CR	AVE	MSV	POS	PHOS	MSS
POS	0.938	0.655	0.607	0.809		
PHOS	0.901	0.604	0.254	0.419***	0.777	
MSS	0.935	0.643	0.607	0.779***	0.504***	0.802

POS = Project organization strategies, PHOS = Project host organization strategies, MSS = Mutual sustainability strategies
***p < 0.001

The correlation between all three constructs of sustainability strategies show that all three constructs have highly significant correlation with each other. In the next step first order model-fit indices of sustainability strategies are observed. The estimates are observed in comparison with the threshold values. Therefore, based on estimates the fitness level of the measurement model of sustainability strategies at first level is shown in the table 4.16:

Table 4.16: First order Model-fit indices of sustainability strategies

Index	Threshold Level	Estimate	Fitness Level
χ^2	--	237.922	--
Df	--	206	--
χ^2/df	> 1 and < 3	1.155	Excellent
CFI	>0.95	0.992	Excellent
SRMR	<0.08	0.031	Excellent
RMSEA	<0.07	0.025	Excellent
PClose	>0.05	1	Excellent
IFI	>0.95	0. 992	Excellent
TLI	>0.95	0. 991	Excellent
NFI	>0.90	0. 942	Good

The model fit indices at first order of sustainability strategies shows excellent model-fitness. The value of χ^2/df is well below 3 showing overall model fit. The comparative fit index CFI is 0.992 i.e., above from 0.95, SRMR index is 0.031 that is well below from 0.08. The value of RMSEA is below 0.07 that is 0.025. The value of PClose is observed 1.0 that is well above from 0.05. The values of IFI and TLI are greater than 0.95 which are 0.992 and 0.991 respectively. The value of NFI is 0.942 that is above the cutoff value 0.90. This recommends that the all three dimensions are acceptable to measure sustainability strategies. The figure of sustainability strategies first order measurement model is placed at Appendix-I. The confirmatory factor analysis of second order of sustainability strategies was executed after the first order confirmatory factor analysis. The all three dimensions were linked to sustainability strategies as shown in figure placed at Appendix-I. The estimates are observed in comparison with the threshold values. Therefore, based on the estimates the fitness level of the measurement model of sustainability strategies at second level is shown in the table 4.17:

Table 4.17: Second order Model-fit indices of sustainability strategies

Index	Threshold Level	Estimate	Fitness Level
χ^2	--	237.922	--
Df	--	206	--
χ^2/df	> 1 and < 3	1.155	Excellent
CFI	>0.95	0.992	Excellent
SRMR	<0.08	0.031	Excellent
RMSEA	<0.07	0.025	Excellent
PClose	>0.05	1	Excellent
IFI	>0.95	0.992	Excellent
TLI	>0.95	0.991	Excellent
NFI	>0.90	0.942	Good

The model fit indices at second order of sustainability strategies shows excellent model-fitness. The value of χ^2/df is well below 3 showing overall model fit. The comparative fit index CFI is 0.992 i.e. above from 0.95, SRMR index is 0.031 that is well below from 0.08. The value of RMSEA is below 0.07 that is 0.025. The value of PClose is observed 1.0

that is well above from 0.05. The values of IFI and TLI are greater than 0.95 which are 0.992 and 0.991 respectively. The value of NFI is 0.942 that is above the cutoff value 0.90. The above statistics show that all the 22 items converge into sustainability strategies construct through three dimensions. These 22 items are spread over three dimensions: project organization strategies, project host organization strategies, mutual sustainability strategies. Eight items loaded to the first dimension (POS), six items loaded on second dimension (PHOS) and eight items loaded on third dimension (MSS). These items loaded without any cross loading.

4.6.4 Measurement models of project success

Measurement model of project success explains the model fitness through reliability and validity of first order and second order models. The table 4.18 below shows composite reliability, convergent and discriminant validity of project success at first order level:

Table 4.18: Composite reliability, convergent and discriminant validity of PS

	CR	AVE	MSV	PE	IOC	IOT	DBOS	PFF
PE	0.88	0.595	0.513	0.772				
IOC	0.839	0.51	0.503	0.70***	0.714			
IOT	0.854	0.54	0.448	0.67***	0.60***	0.735		
DBOS	0.875	0.583	0.345	0.58***	0.5***	0.44***	0.763	
PFF	0.831	0.501	0.513	0.71***	0.60***	0.62***	0.46***	0.70

PE = Project Efficiency, IOC = Impact on customer, IOT = Impact on teams, DBOS = Direct business / organization success, PFF = Preparing for future
P < 0.100, ***p < 0.001

The table 4.18 shows that the values of CR of all five constructs of project success are above the threshold of 0.7. The AVE values are above 0.5 and values of MSV are less than the values of AVE and CR. The diagonal values are higher than the inter-dimension correlation values that shows discriminant validity of constructs of project success. The

correlation between all five constructs of project success show that all five constructs have highly significant correlation with each other.

In the next step first order model-fit indices of project success are observed. The estimates are observed in comparison with the threshold or cutoff values. Therefore, based on the estimates the fitness level of the measurement model of project success at first level is shown in the table 4.19:

Table 4.19: First order Model-fit indices of project success

Index	Threshold Level	Estimate	Fitness Level
χ^2	--	433.173	--
Df	--	290	--
χ^2/df	> 1 and < 3	1.494	Excellent
CFI	>0.95	0.954	Excellent
SRMR	<0.08	0.059	Excellent
RMSEA	<0.07	0.044	Excellent
PClose	>0.05	0.859	Excellent
IFI	>0.95	0.954	Excellent
TLI	>0.95	0.948	Excellent
NFI	>0.90	0.874	Good

The model fit indices at first order of project success shows excellent model-fitness. The value of χ^2/df is well below 3 showing overall model fit. The comparative fit index CFI is 0.954 i.e., above from 0.95, SRMR index is 0.059 that is well below from 0.08. The value of RMSEA is below 0.07 that is 0.044. The value of PClose is observed 1.0 that is well above from 0.05. The values of IFI and TLI are greater than 0.95 which are 0.954 and 0.948 respectively. The value of NFI is 0.874 that is acceptable and supported. As NFI value can be accepted if it is above 0.8. This recommends that the all five dimensions are acceptable to measure project success. The figure of project success first order measurement model is placed at Appendix-I.

The confirmatory factor analysis of second order of project success was executed after the first order confirmatory factor analysis. The all five dimensions were linked to project success as shown in figure placed at Appendix-I. The estimates are observed in

comparison with the threshold values. Therefore, based on the estimates the fitness level of the measurement model of project success at second level is shown in the table 4.20:

Table 4.20: Second order Model-fit indices of project success

Index	Threshold Level	Estimate	Fitness Level
χ^2	--	436.511	--
Df	--	295	--
χ^2/df	> 1 and < 3	1.48	Excellent
CFI	>0.95	0.954	Excellent
SRMR	<0.08	0.06	Excellent
RMSEA	<0.07	0.044	Excellent
PClose	>0.05	0.886	Excellent
IFI	>0.95	0.955	Excellent
TLI	>0.95	0.950	Excellent
NFI	>0.90	0.873	Good

The model fit indices at second order of project success shows excellent model-fitness. The value of χ^2/df is well below 3 showing overall model fit. The comparative fit index CFI is 0.954 i.e. above from 0.95, SRMR index is 0.06 that is below from 0.08. The value of RMSEA is below 0.07 that is 0.044. The value of PClose is observed 1.0 that is well above from 0.05. The values of IFI and TLI are greater than 0.95 which are 0.955 and 0.950 respectively. The value of NFI is 0.873 that is above the 0.80, that could be accepted and supported. The above statistics show that all the 25 items converge into project success construct through five dimensions. These 25 items are spread over five dimensions: project efficiency, Impact on customer, Impact on teams, Direct business / organization success and preparing for future. Five items loaded to the all five dimension each. These items loaded without any cross loading.

4.6.5 Complete measurement model

After performing confirmatory factor analysis of all variables separately at first and second order level, confirmatory factor analysis of the complete measurement model of the study was performed. The complete model comprises four variables. The measurement model was assessed for composite reliability, convergent and discriminant validity. The composite reliability, convergent and discriminant validity of complete measurement model considering the dimensions is placed at Appendix-I. The table 4.21 shows composite reliability, convergent and discriminant validity of all four variables of the complete measurement model:

Table 4.21: CR, convergent and discriminant validity of complete model

	CR	AVE	MSV	PG	SS	PS	PSM
PG	0.778	0.665	0.225	0.816			
SS	0.827	0.623	0.208	0.200**	0.789		
PS	0.884	0.607	0.197	0.307***	0.444***	0.779	
PSM	0.782	0.503	0.225	0.474***	0.456***	0.328***	0.709

PG = Project governance, SS = Sustainability strategies, PS = Project success, PSM = Project sustainability management
P < 0.100, ***p < 0.001

The table 4.21 shows that the values of CR of all four variables of the study are above the threshold of 0.7. The AVE values are above 0.5 and values of MSV are less than the values of AVE and CR. The diagonal values are higher than the inter-variable correlation values that shows discriminant validity of all variables of the study. The correlation between all four variables of the study show that all four variables have significant correlation with each other.

In the next step first order model-fit indices of complete measurement model are observed. The estimates are observed in comparison with the threshold or cutoff values. Therefore, based on the estimates the fitness level of the complete measurement model at first level is shown in the table 4.22:

Table 4.22: First order Model-fit indices of complete measurement model

Index	Threshold Level	Estimate	Fitness Level
χ^2	--	4886.709	--
Df	--	3808	--
χ^2/df	> 1 and < 3	1.283	Excellent
CFI	>0.95	0.961	Excellent
SRMR	<0.08	0.046	Excellent
RMSEA	<0.07	0.034	Excellent
PClose	>0.05	1	Excellent
IFI	>0.95	0.954	Excellent
TLI	>0.95	0.952	Excellent
NFI	>0.90	0.875	Acceptable

The model fit indices at first order of complete measurement model shows excellent model-fitness. The value of χ^2/df is well below 3 showing overall model fit. The comparative fit index CFI is 0.961 i.e., above from 0.95, SRMR index is 0.046 that is well below from 0.08. The value of RMSEA is below 0.07 that is 0.034. The value of PClose is observed 1.0 that is above from cutoff value 0.05. The values of IFI and TLI are greater than 0.95 which are 0.954 and 0.952 respectively. The value of NFI is 0.875 that is acceptable and supported. As NFI value can be accepted if it is above 0.8. This recommends that all four variables are acceptable to measure complete measurement model. The figure of complete measurement model at first order level is placed at Appendix-I.

The confirmatory factor analysis of complete measurement model at second order level was executed after the first order confirmatory factor analysis. The all four variables were linked with each other and their dimensions as shown in figure placed at Appendix-I.

The estimates are observed in comparison with the threshold values. Therefore, based on the estimates the fitness level of the complete measurement model at second order level is shown in the table 4.23:

Table 4.23: Second order Model-fit indices of complete measurement model

Index	Threshold Level	Estimate	Fitness Level
χ^2	--	5021.32	--
Df	--	3892	--
χ^2/df	> 1 and < 3	1.29	Excellent
CFI	>0.95	0.958	Excellent
SRMR	<0.08	0.059	Excellent
RMSEA	<0.07	0.034	Excellent
PClose	>0.05	1	Excellent
IFI	>0.95	0.942	Excellent
TLI	>0.95	0.941	Excellent
NFI	>0.90	0.866	Good

The model fit indices at second order of complete model shows excellent model-fitness. The value of χ^2/df is in between 1 and 3 showing overall model fit. The comparative fit index CFI is 0.958 i.e., above from 0.95, SRMR index is 0.059 that is below from cutoff value 0.08. The value of RMSEA is below threshold 0.07 that is 0.034. The value of PClose is observed 1.0 that is above 0.05. The values of IFI and TLI are greater than 0.95 which are 0.942 and 0.941 respectively. The value of NFI is 0.866 that is above the acceptable range 0.80, that could be accepted. The overall model fitness based on fitness indices, composite reliability, convergent and discriminant validity is at excellent level that allows further testing of structural model through structural equation modeling (SEM).

4.7 Reliability Analysis

Reliability may be defined as accurate and repeatable measurement where one or more variables, objects, or collections of variables are used in a specific way and so is capable of reaching the specified measurement objectives (Mirabella, 2008). It relates to the accuracy which is calculated through measuring the value of Cronbach's Alpha (α), where the value of

0.7 is deemed acceptable and values beyond this value are considered exemplary. These values identify a higher degree of internal consistency (Carmines and Zeller, 1979; Litwin, 1995; Nunnally, 1978) as shown in table 4.24.

Table 4.24 : Reliability of final scales

Variables	**Total No. of Items**	**Final Items**	**Cronbach Alpha**
Project Governance – Independent Variable			
Stakeholder vs shareholders Orientation	10	10	.94
Behavior vs Outcome Control	10	10	.93
Project Sustainability Management – Medicating Variable			
PM focusing on Sustainability	12	10	.93
Green planning and procurement	03	03	.82
Environmental Technologies	04	04	.84
Design for Environment	04	03	.81
Social Responsibility	04	04	.85
Sustainability Strategies – Moderating Variable			
Project organization's strategies	08	08	.93
Project host organization strategies	06	06	.90
Mutual sustainability strategies	08	08	.93
Project Success – Dependent Variable			
Project Efficiency	05	05	.88
Impact on Customer	05	05	.83
Impact on Team	05	05	.85
Direct Business Org Success	05	05	.87
Preparing for future	05	05	.83

A reliability analysis was performed to verify that the data is reliable or not. Cronbach Alpha explains that the value should be between 0.7 and 0.9, which is considered more

reliable. The values of almost all the variables in this research are falling in the range of 0.7 to 0.9, which is good and the data is reliable, which could be used for the analysis described.

4.8 Correlation Matrix

Correlation matrix shows coefficient of correlation between variables. Correlation matrix of the variables of the study is displayed in table 4.25. This matrix explains the relationship between the variables of the study including project governance, project sustainability management, sustainability strategies and successful completion of projects. The relationship of SS→PS remains significantly positive in this matrix i.e., 0.432. It also gives level of relationship between dependent and independent variables. Correlation framework could be helpful since it showed the analytical relationship among variables. It explained that project governance and project sustainability management are positively and significantly correlated (0.347). Moreover, it is revealed that SS→PS is significant and positive (0.280). Being moderating variable of the study sustainability strategies also have significant and positive relationship with PSM and PG.

Table 4.25: Correlation Matrix

	1	2	3	4
Project Success	1.00			
Project Governance	.265*	1.00		
Project Sustainability Management	.280*	.347	1.00	
Sustainability Strategies	.432	.152	.390	1.00

* Correlation is significant at the 0.01 level

4.9 Hypotheses Testing

This study tested relationship of variables through structural equation modeling (SEM) in AMOS 22. The direct effects and relationships among the variables are examined and hypothesis defined in the study are tested. The direct effect PG → PS alongwith its dimensions

is examined. Later, direct effect of PG→PSM and direct effect of project sustainability management on project success is examined.

Hayes (2013) PROCESS macro model 1,4 and 7 applied in SPSS for testing hypothesized framework of moderating relationships. The algorithm of PROCESS Macro yields same outcomes as of SEM, structural equation modelling (Hayes, Montoya & Rockwood, 2017); hence it need fundamental skills to accomplish intricate analysis, like this study have mediator and moderator at the same time (Hayes, 2017). The overall theoretical framework is split into different structural models based on hypothesis of the study.

4.10 Direct effects

The hypotheses-wise relationship of variables tested through path analysis and reported in the following section. The direct relationships are reported first, followed by the indirect relationship of the study. The results are based on the beta coefficient of standardized regression weights along with the Critical Ratio and their statistical significance as represented in Table 4.26.

H_1: *Project governance has significant effect on Project Success.*

The standardized beta coefficient value for the direct path between project governance and project success is 0.421 with significant p-value <0.001. The critical ratio for this relationship is estimated to be 3.865, that is ≥ 1.96 proving the path statistically significant. Therefore, the hypothesis H_1 is accepted. This implies that project governance has significant effect on project success (β= 0.421, p<0.001).

H_{1a}: *Stakeholder oriented governance has significant effect on Project Success.*

The standardized beta coefficient value for the direct path between stakeholder-oriented governance and project success is 0.272 with significant p-value <0.001. The critical ratio for this relationship is estimated to be 4.513, that is >1.96 proving the path statistically significant. Therefore, the hypothesis H_{1a} is accepted. This implies that stakeholder-oriented governance has significant effect on project success (β= 0.272, p<0.001).

H_{1b}: *Behavior control governance has significant effect on Project Success.*

The standardized beta coefficient value for the direct path between behavior control governance and project success is 0.146 with significant p-value of <0.05. The critical ratio for this relationship is estimated to be 2.275, that is >1.96 proving the path statistically significant. Therefore, the hypothesis H_{1b} is accepted. This implies that behavior control governance has significant effect on project success (β= 0.146, p<0.05).

H_{2a}: *Project governance has significant effect on project sustainability management.*

The standardized beta coefficient value for the direct path between project governance and project sustainability management is 0.476 with significant p-value <0.001. The critical ratio for this relationship is estimated to be 5.118, that is >1.96 proving that the path is statistically significant. Therefore, the hypothesis H_{2a} is accepted. This implies that project governance has significant effect on project sustainability management (β= 0.476, p<0.001).

H_{2b}: *Project sustainability management has significant effect on project success.*

The standardized beta coefficient value for the direct path between project sustainability management and project success is 0.350 with significant p-value <0.001. The critical ratio for this relationship is estimated to be 3.846, that is >1.96 proving that the path is statistically significant. Therefore, the hypothesis H_{2b} is accepted. This implies that project sustainability management has significant effect on project success (β= 0.350, p<0.001).

Table 4.26 : Hypothesis testing of direct relationships

Hyp	Predictor	Outcome	Estimate	S.E.	C.R.	p-value	Status
H_1	PG ⟶	PS	0.421 ***	0.109	3.865	≤0.001	Accepted
H_{1a}	SSO ⟶	PS	0.272 ***	0.060	4.513	≤0.001	Accepted
H_{1b}	BOC ⟶	PS	0.146 *	0.064	2.275	≤0.05	Accepted
H_{2a}	PG ⟶	PSM	0.476 ***	0.093	5.118	≤0.001	Accepted
H_{2b}	PSM ⟶	PS	0.350 ***	0.091	3.846	≤0.001	Accepted

*Significant at: *p≤0.05 level, ***p≤0.001*
PG = Project governance, PS = Project Success, SSO = Stakeholder vs shareholder-oriented governance,
BOC = Behavior vs outcome control governance, PSM = Project sustainability management

4.11 Mediating effect of project sustainability management

According to Fritz and Lester (2016) mediator variables falls between the cause and effect in a causal chain. Mediator variables are the mechanisms through which change in one variable causes change in a successive variable. In mediation analysis of this study, we test hypothetical causal chain where project governance effects a project sustainability management and in turn mediating variable project sustainability management effects dependent variable i.e. project success. The following section comprises analysis of mediating relationship among the independent variable project governance and dependent variable project success.

H_2: *Project sustainability management mediates the relationship between project governance and project success.*

To assess the mediating effect of project sustainability management between project governance and project success, regression analysis was performed using Hayes PROCESS macros model 4. For testing the indirect effect bootstrapping approach is recommended and being used by various researchers (Hair et al., 2014; Hayes 2009; Shrout & Bolger, 2002). It is a non-parametric method based on resampling with replacement that is done many times. This approach is considered significant tool for analyzing the mediation effect (Hadi, Abdullah, & Sentosa, 2016).

Regression analysis was executed to assess the mediating effect of project sustainability management (PSM) between project governance (PG) and project success (PS), using Hayes process macros, model 4. The results show that project governance (PG) significantly predicts the hypothesized mediating variable, project sustainability management (PSM), i.e., the path "a" is significant with b=.266, SE=.045, p <.001 and that mediation variable, PSM, significantly predicts the criterion variable, PS; that is, the path "b", where b =.234, SE=.0701, p <.001. These results confirm the meditational condition that is the independent variable should predict the mediating variable, and further, the mediating variable should predict the dependent variable significantly.

The test results also showed that the total effect, i.e., the effect of the independent variable (PG) on the dependent variable, PS, in the absence of the mediator (PSM) is significant, i.e., the "c" path is significant with b = .223, SE =.051, p <.001. In addition,

project governance was found a significant predictor of the dependent variable, project success, in the presence of mediator variable PSM in the regression equation, i.e., path c' was also significant showing partial mediation of PSM between PG and PS with values. The estimation of the direct effect of PG on PS, by controlling PSM, was significant with the value of b = .161, SE = .053, p <.001. The results illustrate that a 12% variance in PS was caused by the predictors (R^2=.12). The indirect effect was estimated using the percentile bootstrapping approach with 5000 samples (Hayes, 2013), implemented with the PROCESS macro version 3.1 (Hayes et al., 2017). The results showed that indirect coefficient was significant with b = .08, SE= .03, 95% CI= [.0267, .01573]. In a nutshell, the beta coefficients for both paths a and b were found statistically significant; the direct and total effects, i.e., c and c' were found statistically significant. Hence, it is proved that project sustainability management (PSM) partially mediates the relationship between project governance (PG) on project success (PS).

Table 4.27: Mediating effect of Project Sustainability Management

	IV	**DV**	***B***	**SE**	**T-value**	**P-Value**	**LLCI**	**ULCI**
1	PG	PSM	0.2668	.0456	5.8515	0.000	.1770	.3566
2	PSM	PS	0.2347	.0701	3.3476	0.000	.0966	.3727
3	PG	PS	0.1611	.0539	2.9905	0.0031	.0550	.2373
			Effect	**SE**	**T-value**	**P-Value**	**LLCI**	**ULCI**
Total Effect (c)			.2237	.0516	4.3398	.000	.1222	.3253
Direct Effect (c')			.1611	.0539	2.9905	.0031	.0550	.2373
					Effect	**Boot SE**	**Boot LLCI**	**Boot ULCI**
Indirect Effect					.0841	.0334	.0267	.1573
						1	**2**	**3**
R^2						0.12	.11	.070
F-Statistics						34.23 (1,250)	15.40 (2,249)	18.83 (1,250)
P-Value						.000	.000	.000

Table 4.27 and table 4.28 show that the predictor variable PG in the model had a significant impact on the mediating variable PSM. Similarly, the mediating variable, PSM, has a significant impact on the outcome variable PS. Each hypothesis is evaluated based on the standardized coefficient, its critical ratio, significance level. The estimation of hypotheses demonstrated that hypothesized relationships (H_2) i.e., Project sustainability management mediate the relationship between project governance and project success, was significant and qualified the conditions for the mediation (partially).

Table 4.28: Summary of results – PSM mediates between PG and PS

Hypothesis	Direct without Mediator	Sig.	Direct with Mediator	Sig.	Indirect	P-values (bootstrap)	Mediation
PG→PSM→PS	0.2237	<.001	0.1611	<.001	.0841	.0267, .1573	Partial Mediation

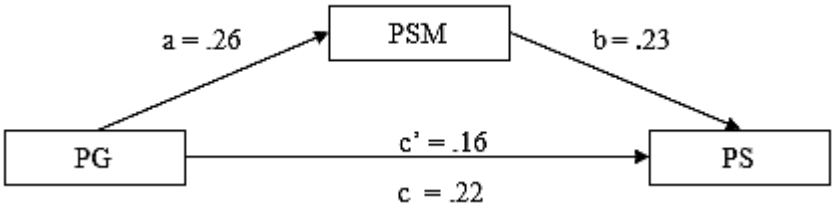

Figure 4.1: Mediation of PSM between PG and PS

4.12 Moderation Effect Analysis

This section consists of the evaluation of the simple moderation effect of Sustainability Strategies and its dimensions on the relationship between project governance and project sustainability management (H_3, H_{3a}, H_{3b}, H_{3c}).

4.12.1 Moderating effect of SS on PG and PSM

The study hypothesized that Sustainability Strategies moderate the relationship between Project Governance and Project Sustainability Management. The study evaluated

this relationship through Hayes process model 1(Hayes, 2013b). The results of the moderation test showed an overall model fit with all the three variables SS, PG, and PSM, included in the models with F (3,248) = 33.243, p <.001, R^2 =.28. The results of the predictors indicated that SS significantly influences PSM with b =0.28, t = 6.64, p <.001. It implies that SS and PSM are directly related and an increase in SS increases the effectiveness level of PSM. Similarly, while controlling SS, Project Governance significantly predicted PSM, b =.25, t=6.036, p <.001. It implies that PG and PSM are directly and positively associated and an increase in project governance causes an increase in the project sustainability management. The interaction term (PG x SS) significantly predicted PSM, b = .18, t = 4.156, p<.001. The interaction is significant as the change in r square is significant, *F (1,248) =17.279, p<.001, and R^2change=0.0497.* This shows that although the magnitude of change is small, yet significant for further use.

Table 4.29: Model Summary of Moderation effect of Sustainability Strategies

R	**R^2**	**SE**	**F**	**df1**	**df2**	**P**
0.5355	0.28	0.3305	33.2	3.00	248.00	0.0000

Table 4.30: Model Moderation effect of sustainability strategies

Model	**b**	**SE**	**t**	**p**	**LLCI**	**ULCI**
Constant	3.3369	0.0366	91.2799	0.0000	3.2649	3.4089
PG	0.25	0.0423	6.0365	0.0000	0.1719	0.3384
SS	0.28	0.0430	6.6452	0.0000	0.2013	0.3708
PGxSS	0.18	0.0441	4.1569	0.0000	0.094	0.2699

Table 4.31: Test of highest order unconditional interaction

	$R^2\Delta$	**F**	**df1**	**df2**	**P**
PGxSS	.0497	17.279	1	248.00	0.001

The second part of the output illustrated that the conditional effect of PG (x) on PSM (y) at the different values of (W) i.e. SS at mean and minus one SD from the mean, i.e., SD = +/-1.01. are significant for medium and higher values of SS, as for medium and higher

cases CI values are significant and contain no zero between CI (lower, upper), the results show that the conditional effect of PG (x) on PSM (y) is significant for higher and medium values of SS. The conditional effect of PG on PSM is insignificant for lower values of SS as CI values are insignificant and contain zero between LLCI and ULCI see table 4.32.

The table depicts at which adoption level of sustainability strategies (W) does the interaction effect significant on the PG (X) → PSM (Y). The results show that at lower adoption level of sustainability strategies the moderation effect is not significant. However, it is also found that at moderate and high adoption level of sustainability strategies, its moderation effect is significant.

Table 44.32: Conditional effect of PG on PSM at different values of SS

SS	Effect	S. E	LLCI	ULCI
-.8549	.0986	.0518	-.0035	.2007
.0000	.2551	.0423	.425	.3384
.8549	.4117	.0610	.2915	.5319

This conditional moderation effect of sustainability strategies on X and Y relationship can also be seen in the following graph:

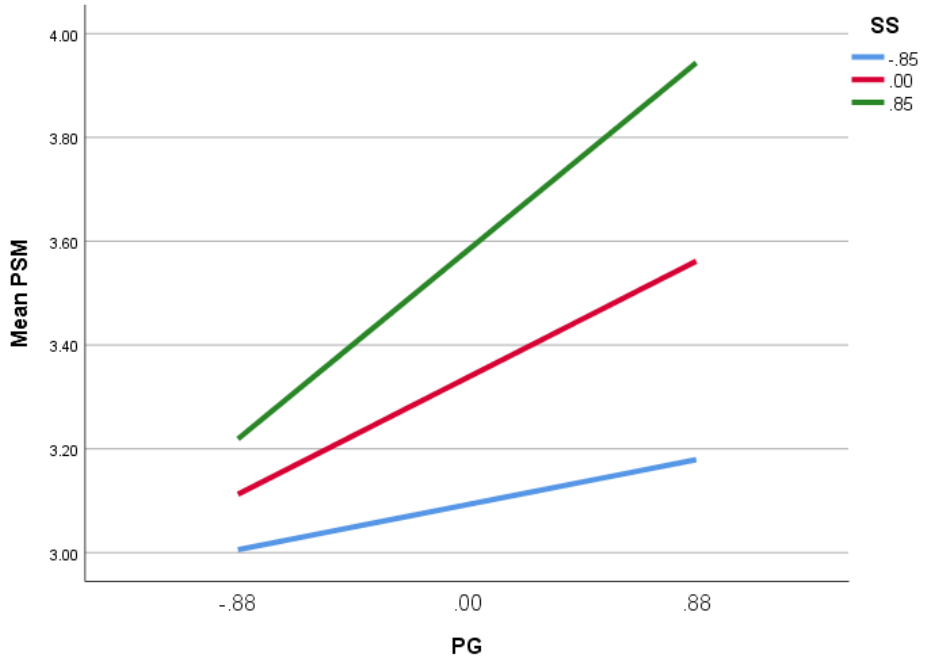

Figure 4.2: Conditional moderation effect of sustainability strategies

4.12.2 Moderating effect of POS on PG and PSM

The study hypothesized that Project Organization Strategies moderate the relationship of Project Governance and Project Sustainability Management. The study evaluated this relationship through Hayes process model 1(Hayes, 2013b). The results of the moderation test showed an overall model fit with all the three variables POS, PG, and PSM, included in the models with F (3,248) = 21.93, p <.001, R^2 =.20. The results of the predictors indicated that POS significantly influences PSM with b =0.16, t = 4.34, p <.001. It implies that POS and PSM are directly related and an increase in POS increases the effectiveness level of PSM. Similarly, while controlling POS, Project Governance significantly predicted PSM, b =.26, t=6.01, p <.001. It implies that PG and PSM are directly and positively associated and an increase in project governance causes an increase in the project sustainability management. The interaction term (PG x POS) significantly predicted PSM, b = .11, t = 3.06, p<.001. The interaction is significant as the change in r square is significant, *F (1,248) =8.79, p<.001, and R^2change=.028.*

The second part of the output illustrated that the conditional effect of PG (x) on PSM (y) at the different levels of W at mean and minus one SD from the mean, i.e., SD = +/-1.02. are significant for all values equal to and lower and higher than mean values of SS, as for all the three cases CI values are significant and contain no zero between CI (lower, upper), the results show that the conditional effect of PG (x) on PSM (y) is significant for all values higher, medium and lower values of POS, but these values are slightly higher than the lower level of POS, see table 4.33.

Table 4.33: Conditional effect of PG on PSM at different values of POS

POS	Effect	S. E	LLCI	ULCI
-1.0207	.1451	.0548	.0372	.2530
.0000	.2669	.0445	.1793	.3545
1.0207	.3887	.0658	.2595	.5183

4.12.3 Moderating effect of PHOS on PG and PSM

The study hypothesized that Project Host Organization Strategies moderate the relationship of Project Governance and Project Sustainability Management. The study evaluated this relationship through Hayes process model 1(Hayes, 2013b). The results of the moderation test showed an overall model fit with all the three variables PHOS, PG, and PSM, included in the models with F (3,248) = 25.19, p <.001, R^2 =.23. The results of the predictors indicated that PHOS significantly influences PSM with b =0.20, t = 5.41, p <.001. It implies that PHOS and PSM are directly related and an increase in PHOS increases the effectiveness level of PSM. Similarly, while controlling PHOS, Project Governance significantly predicted PSM, b =.23, t=5.47, p <.001. It implies that PG and PSM are directly and positively associated and an increase in project governance causes an increase in the project sustainability management. The interaction term (PG x PHOS) significantly predicted PSM, b = .13, t = 3.26, p<.001. The interaction is significant as the change in r square is significant, *F (1,248) =10*.64, *p<.001, and* R^2*change=.032.*

The second part of the output illustrated that the conditional effect of PG (x) on PSM (y) at the different values of the moderator at mean and minus one SD from the mean, i.e., SD = +/-1.01. are significant for medium and higher values of PHOS, as for medium and higher cases CI values are significant and contain no zero between CI (lower, upper), the results show that the conditional effect of PG (x) on PSM (y) is significant for higher and medium values of POS. The conditional effect of PG on PSM is insignificant for lower values of POS as CI values are insignificant and contain zero between LLCI and ULCI see table 4.34.

Table 4.34: Conditional effect of PG on PSM at different values of PHOS

PHOS	Effect	S. E	LLCI	ULCI
-1.0162	.1015	.0578	-.0124	.2154
.0000	.2391	.0437	.1531	.3251
1.0162	.3768	.0635	.2518	.5017

4.12.4 Moderating effect of MSS on PG and PSM

The study hypothesized that Mutual Sustainability Strategies moderate the relationship of Project Governance and Project Sustainability Management. The study evaluated this relationship through Hayes process model 1(Hayes, 2013b). The results of the moderation test showed an overall model fit with all the three variables MSS, PG, and PSM, included in the models with F (3,248) = 29.50, p <.001, R^2 =.26. The results of the predictors indicated that MSS significantly influences PSM with b =0.21, t = 5.94, p <.001. It implies that MSS and PSM are directly related and an increase in MSS increases the effectiveness level of PSM. Similarly, while controlling MSS, Project Governance significantly predicted PSM, b =.27, t=6.30, p <.001. It implies that PG and PSM are directly and positively associated and an increase in project governance causes an increase in the project sustainability management. The interaction term (PG x MSS) significantly predicted PSM, b = .14, t = 3.55, p<.001. The interaction is significant as the change in r square is significant, *F (1,248) =12*.61, *p<.001, and* R^2*change=.037.*

The second part of the output illustrated that the conditional effect of PG (x) on PSM (y) at the different levels of W at mean and minus one SD from the mean, i.e., SD = +/-1.02. are significant for all values equal to and lower and higher than mean values of SS, as for all the three cases CI values are significant and contain no zero between CI (lower, upper), the results show that the conditional effect of PG (x) on PSM (y) is significant for all values higher, medium and lower values of MSS, but these values are slightly higher than the lower level of MSS, see table 4.35.

Table 4.35: Conditional effect of PG on PSM at different values of MSS

SS	Effect	S. E	LLCI	ULCI
-1.0231	.1283	.0534	.0231	.2334
.0000	.2682	.0426	.1844	.3521
1.0231	.4082	.0623	.2855	.5309

4.13 Moderated Mediation Analysis

In the research studies, basically, moderators are those variables that affect the arrangement of relationship concerning two variables (Sauer and Dick, 1993). Moderated mediation or conditional mediation occurs when the indirect effect of mediating variable between and independent variable and the dependent variable is moderated by the moderating variable (Hayes, 2013). This study performed the moderated mediation to estimate the complete model of the study using Hayes (2013) process macros. The analysis of moderated mediation effect is performed in three steps; first assessment of moderation effect of moderator between predictor and outcome. Secondly assessment of mediation effect of mediator between predictor and outcome. In this section moderation analysis results are presented which were calculated by using PROCESS macro in SPSS. The study hypothesized that sustainability strategies used by the organizations support them in governing projects through project sustainability management. The sequence of estimations of models is given as follows.

H_{3d}: Moderated mediation effect of SS, between PG and PSM at different values of SS.

4.13.1 Moderated mediation effect of SS, between PG and PSM at values of SS

The main results of the conditional moderated mediation effect of Sustainability Strategies between project governance and project sustainability management at different values of sustainability strategies are estimated by using process model 7 developed by Hayes (2013). This regression analysis consists of four steps: (a) mediator and dependent variable model, (b) direct effect analysis, (c) conditional indirect analysis, and (d) index of moderated mediation.

The conceptual and statistical models provided in figures 4.2 and 4.3 illustrate the mediation effect of a mediator “Project Sustainability Management” and a moderator “Sustainability Strategies” is adopted from the Hayes Model 7 (2013).

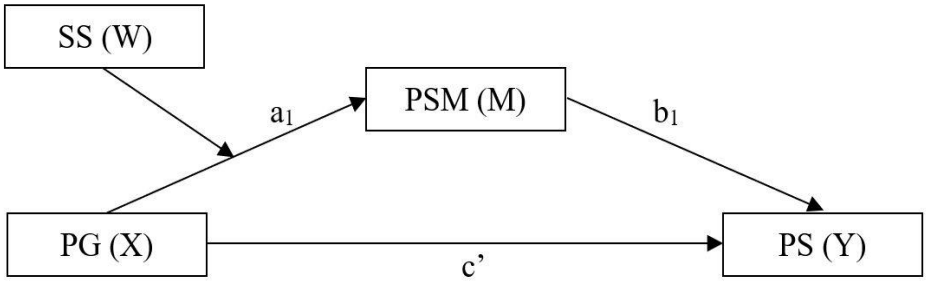

Figure 4.3: Conceptual Moderated Mediation Model PSM

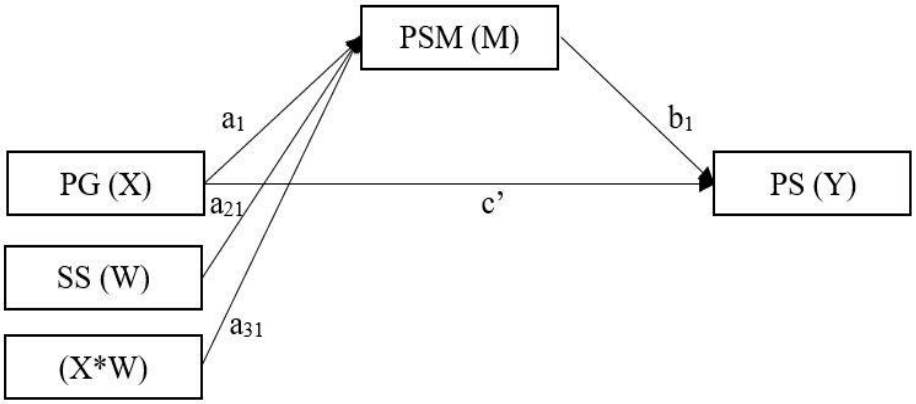

Figure 4.4: Statistical Model: Moderated Mediation PSM

The overview of each step and then the results and interpretation are given as follows. Table 4.36 illustrates the conditional process analysis.

The mediator variable model was to test the moderation effect of SS on PG and PS. Therefore, first, the direct impact of PG, SS and their interaction term on PSM was estimated, while (b) the dependent variable model was to test the impact of PG, PSM and SS on PS at the mean of SS as well as plus and minus one standard deviation from mean of SS. In addition, the conditional indirect analysis was estimated to test the impact of PG on PS through the mediation of PSM at the mean of SS as well as plus and minus one standard deviation from the mean of SS.

Table 4.36: Conditional PROCESS Analysis for SS (PG→PSM→PS)

	b	*SE*	*T*	*P*
Mediator Model-I PSM				
Constant	3.33	.03	91.27	<0.001
PG	.25	.04	6.03	<0.001
SS	.28	.03	6.64	<0.001
PG x SS	.18	.04	4.15	<0.05
R^2 change= .0497				
F(1, 248) = 17.27, *p<.001*				
Dependent variable Model-II	*b*	*SE*	*T*	*P*
Constant	2.66	.23	11.12	<0.001
PG	.16	.05	2.99	<0.05
PSM	.23	.07	3.34	<0.001
Direct effect from x to y	*B*	Boot *SE*	Boot LLCI	Boot ULCI
c’	.16	.05	.05	.26
Conditional Indirect Effect of SS on the mediating role of (PSM) at IA= M± SD (Mean Centered)				
SS	*Effect*	*Boot SE*	*Boot LLCI*	*Boot ULCI*
M-1 SD (-.85)	.09	.05	-.0035	.2007
M (0.00)	.25	.04	.1719	.3384
M+1 SD (.85)	.41	.06	.2915	.5319
Index of Moderated Mediation	Index	Boot *SE*	Boot LLCI	Boot ULCI
	.043	.0189	.0116	.0844

Note. N=252. PROCESS Model 7 enabled mean centering, Bootstrap default sample size = 5000. LL=low limit, UL= upper limit, CI= confidence interval. *p*<0.10, **p*<0.05., ***p*<0.01., ****p*<0.001.

The mediator variable model estimates, *F=33.24, R^2=.28, p<0.001* and dependent variable model estimates, *F*=15.40, *R^2=.11, p<0.001*, showed that both Model-I and II are fit, respectively. The results illustrated that PG positively predicts PSM (*b =.25, t=6.03, p<.001*), SS predicts PSM positively and significantly (*b =.28, t=6.64, p<.001*) and the interaction term of both SS and PG significantly predict the PSM (*b =.18, t=4.15, p<.001*). Furthermore, the tests for higher-order unconditional interaction showed that the effect of interaction is also significant with R^2change= .049, F=17.27, *p*<.001. The study through these

results identified that the moderation effect exists and is higher with a higher level of SS on PG and PSM, i.e., as the level of project governance increases, the effectiveness of sustainability strategies increases whether at lower or higher in SS, but its effectiveness is more with the high level of SS. These results fulfill the initial condition for the moderated mediation that the SS moderates the effect of PG on PS through the mediator PSM.

In the second stage, in the dependent model, the study found that project sustainability management predicts project success positively ($b = 0.23$, $t=3.34$, $p<.05$), whereas the direct effect of x (PG) on y (PS), while controlling mediator, is significant and positive in direction, i.e., PG positively predicts PS ($b =0.16$, $t=2.99$, $p<.001$). Moreover, to assess the conditional indirect effect on the basis of the moderator (i.e., SS at the mean and at ±1 standard deviation), all the three values are positively and significantly different from zero and significant. The results indicate that as the values of SS increase, the conditional indirect effect also increases (table 4.33). The results showed that conditional indirect effects of PG on PS through PSM are significant for all values of SS and the test of moderated mediation, based on analysis of the index of moderated mediation, is significant, b=.043, SE=.0189, 95 % CI [.0116, .0841]. Table 4.33 and figures 4.2 & 4.3 are provided to illustrate these results graphically.

Based on these findings, it is concluded that moderated mediation exists in the case of PSM, at different values of SS. Such that for all values of SS, the moderated mediation effects between PG and PS reduces as the level of SS increases, and second finding is that the increase in the effectiveness of the mediating effect of PSM is noted between PG and PS at higher values of SS. Hence our hypothesis is supported. The results of the study indicate that the mediation effect of PSM between PG and PS varies at different levels of SS. Therefore, while governing and managing sustainability of infrastructure projects for the project success, the sustainability strategies should not be neglected.

4.14 Summary of hypothesis testing

The study based on research questions and research objectives, developed ten hypotheses. The above section presented the comprehensive results of hypothesis testing

based on collected data. To summarize the chapter following table concludes the hypotheses results and status of their acceptation and rejection.

Table 4.37 : Hypotheses results – Research question and Research Objectives

Direct Relationships		
Hypothesis	**Structural Path**	**Remarks**
H_1	PG → PS	Supported
H_{1a}	SSO → PS	Supported
H_{1b}	BOC → PS	Supported
H_{2a}	PG → PSM	Supported
H_{2b}	PSM → PS	Supported
Mediation Effect		
H_2	PG → PSM → PS	Supported
Moderation Effect		
H_3	(PG x SS) → PSM	Supported
H_{3a}	(PG x POS) → PSM	Supported
H_{3b}	(PG x PHOS) → PSM	Supported
H_{3c}	(PG x MSS) → PSM	Supported
Moderated Mediation: (Conditions)		
H_4	SS (PG→PSM→PS)	Supported

CHAPTER 5

DISCUSSION AND CONCLUSION

This chapter consists of discussion, implications, and conclusion of the study. The chapter delivers critical debate on the results achieved in chapter four, based on the research questions and hypotheses. Implications of the study followed by the limitations and future research directions are discussed. At the end conclusion of the study is drawn briefly.

5.1 Discussion

This study examined effect of project governance, project sustainability management, sustainability strategies and project success. These concepts are examined from important streams of stakeholder's theory's underpinning. In the following section, summary of major findings according to the research hypotheses of the study are presented.

5.1.1 Project Governance and Project Success

The first three research hypotheses were tested to examine the effect of project governance on project success. In this section, the findings of these three research hypotheses of direct relationships are briefly discussed. First Research Objective (RO1) of the study was "To investigate effect of project governance on project success". This objective covers three set of hypotheses (H_1, H_{1a}, H_{1b}), which are discussed one by one in following paragraphs.

H_1: Project governance has positive effect on project success.

The results show that project governance has significant positive effect on project success. Governance has been suggested to be an important factor in project success. Joslin & Muller (2016) investigated relationship between project governance and project success and found a significant relationship. Public sector projects faced unsatisfactory performance

and fail due to weak project governance, highlighting the effect of project governance over the project success (Khan et al, 2019). Project governance generally and particularly for infrastructure projects becomes a need and significant challenge for successful completion of projects for developing countries like Pakistan (Khan et al., 2019; Lizarralde and Davidson, 2008). In this study project governance reflected significant relationship with dependent variable project success. The result of this study indicates that project governance significantly contributes towards project success.

H_{1a}: Stakeholder oriented governance has positive effect on project success.

The results show that stakeholder orientated governance has positive and significant impact on project success. The results are in accordance with the outcomes of previous studies of project governance (Joslin & Muller, 2016, 2015). The results corroborate with the conclusions of Joslin and Muller (2015), proving that organization with added stakeholder orientation have more likelihoods of project success. Renz (2007) also emphasized that the project governance should be realistic and supportive to the project stakeholders. Muller (2009) endorsed the postulates of legitimacy theory (Suchman, 2005) by explaining that an appropriate stakeholder perspective is necessary for governance activities, particularly the project and its management, to be accepted by society. Garland (2009) acknowledged the stakeholder orientation as a part of project governance for project success. Stakeholders' interests can be discussed and incorporated into project governance structures, according to the author. Likewise, the findings of this research tend to support the conclusions of Ojiako, Chipulu, Ashleigh, and Williams (2014), who reported that whenever project governance systems are handled carefully, the chances of success enhanced. The legitimacy of decisions could be established by preferring the stakeholder's-oriented project governance especially in the infrastructure projects. In line with the opinion of Biesenthal and Wilden (2014), it is highlighted that project governance is a mechanism that could possibly help project managers in addressing the stakeholder's concerns regarding successful completion of infrastructure projects particularly.

H_{1b}: Behavior control governance has positive effect on project success.

Behavior control governance showed significant influence on project success. However, the degree of hypothesis acceptance relevance is in accordance with the findings of previous studies of project governance (Joslin & Muller, 2016, 2015). Di Tullio & Staples

(2013) enlightens that it is the governance structure that forms the control mechanism of the projects. The behavior control system aligns the behavior of controlee with the priorities of the organization and enhances project performance. According to Di Tullio and Staples (2013) behavior controls are formal control systems in projects and it involves defining the procedures to attain project objectives. It is behavior control governance structure that focus on the process which are used to meet the project target and it ultimately influences project success. The results corroborate with the premise of pioneering studies including Henderson and Lee (1992) who were the first who owned this concept that in project success behavior control correlates the relationship. The concept of behavior oriented governance then evolved in very famous agile project management, that is quite suitable for improving project success (Müller and Lecoeuvre, 2014; Schwber, 2004, Müller and Martinsuo, 2015). Stakeholder orientation with behavior control is an agile approach to project governance that balances the interests of stakeholders and governs projects by strict process control for further completion of the projects successfully.

5.1.2 Project governance, project sustainability management and project success

Second Research Objective (RO2) of the study was "To investigate the effect of project governance on project sustainability management". This objective covers Hypothesis 2(a), which is discussed as follows.

H_{2a}: Project governance has significant effect on Project Sustainability Management.

The results show that project governance has positive and significant impact on project sustainability management. Project governance mechanisms acts like a catalyst in terms of project sustainability management. The challenges of project sustainability management in infrastructure projects can only be handled through effective project governance (Ullah, Khan & Kuang, 2021). In corroboration with the assertions of Ullah et al. (2021) this study acknowledges project governance as one of the key enablers of sustainability management of projects. Project governance in terms of stakeholders' orientation is also of great importance, it is required to manage the challenges of sustainability management in large infrastructure projects though governance structures of

stakeholders' management (Ma, Zeng, Lin, Chen, and Shi, 2017). Third Research Objective (RO3) of the study was "To investigate the effect of project sustainability management on project success". This objective covers Hypothesis 2(b), which is discussed as follows.

H_{2b}: Project Sustainability Management has significant effect on Project Success.

The results show that project governance has a positive and significant impact on project sustainability management. Sustainability management increases the performance level of organizations (Tharp, 2012), that's why sustainability is being incorporated into daily activities of many organizations (Marcelino-Sadaba et al., 2015). As Calero and Piattini (2015) acknowledged that the business models of the organizations are being redesigned just to gain competitive advantage and successful attainment of objectives. Sustainability management in projects helps in achieving radical changes required for project success (Labuschagne et al., 2005). Latest studies strongly recommended consideration of project sustainability management for sustainable and successful completion of projects (Khalifeh et al., 2019; Økland, 2015). Marten and Carvalho (2016) suggested that sustainability has a positive impact on project success. To address the research gap about the lack of confirmatory studies on the relationship between project sustainability management and project success, Carvalho and Rabechini (2017) found that project sustainability management influences project success positively. This study in corroboration with the recommendations of Khalifeh et al (2019), found that project sustainability management has a positive and significant effect on project success. After the emergence of sustainability in the project management discipline there is a number of studies that suggest the project sustainability management as a source of project success (Dubois & Silvius, 2020; Martínez Perales et al., 2018; Yazici, 2020). The success of a project depends on the key (economic, social, and environmental) aspects of project sustainability management as asserted by He, Chen, Wang, Zhu, Yang, Liu and Li (2019) and Carvajal-Arango et al., (2019). These findings support the hypothesized relationship of this study that project sustainability management significantly effects project success.

Fourth Research Objective (RO4) of the study was "To assess the mediating effect of project sustainability management between the relationship of project governance and project success". This objective covers Hypothesis 2, which is discussed in following paragraph.

H_2: Project Sustainability Management mediates between project governance and project success.

The study initially examined the relationship between project governance and project success (PG → PS), as discussed above under H_1, which supports our assumption that there exists a direct relationship between project governance and project success. Secondly, the study estimated the relationship between the project governance and project sustainability management (PG → PSM) and then the relationship between project sustainability management and project success (PSM → PS) under hypotheses H_{2a} and H_{2b} respectively. The results support the assumptions that there exists a direct relationship between project governance and project sustainability management, and there exists a direct relationship between project sustainability management and project success. Afterward, the total effect is measured and compared to the direct effect to estimate the mediation under H_2.

The results indicated that project governance has a positive significant impact on project sustainability management and project sustainability management on project success, which is likewise supported by above discussion of H_1, $H_{2a,}$ and H_{2b}. These hypothesized direct relationships were proved positively significant in relevance with the previous literature as well. The beta coefficients for both paths a and b, direct and total effects, i.e., c and ca were found statistically significant. Hence, it is proved that project sustainability management (PSM) partially mediates the relationship between project governance (PG) on project success (PS). The results support the findings of Banihashemi et al., (2017) stating that stakeholder's-oriented governance of projects in the construction industry is mediated by project sustainability management to improve project performance. The authors are of the point of view that it is the responsibility of governing bodies to introduce sustainability management in projects for improving project success. He et al., (2019) also supported the influence of project sustainability management on project success through effective stakeholder management in project governance. These previous studies asserted the hypothesized mediated relationship of project sustainability management in the relationship of project governance and project success.

5.1.3 Project governance, sustainability strategies and PSM

Fifth Research Objective (RO5) of the study was "To assess the moderating effect of sustainability strategies on the relationship between project governance and project sustainability management". This is first study of its kind to investigate the relationship of project governance and project sustainability management in presence of sustainability strategies as moderator, that has not been considered by the earlier studies.

This objective covers Hypothesis 3, 3(a), 3(b) and 3(c) which are discussed in following paragraphs.

H_3: Sustainability strategies positively moderate the relationship between project governance and project sustainability management in such a way that the relationship is stronger with the increased adoption level of sustainability strategies.

The study investigated the degree of moderation of sustainability strategies with project governance and its relationship with project sustainability management in the context of public sector infrastructure projects of Punjab province. The findings of our study illustrated that sustainability strategies moderate the relationship between project governance and project sustainability management. The study findings further revealed that when the overall effect of sustainability strategies increases, the effectiveness level of project sustainability management also increase for all values of project governance and the stakeholder oriented governance reflects in the sustainability management of the projects. The study findings further validated the argument of Aarseth et al., (2017) who presented sustainability strategies used by project stakeholders to support project sustainability management. The results corroborate with the assertions of Aarseth et al., (2017) that there is an underlying role of sustainability strategies in the management of projects sustainability through strategic and stakeholder-oriented governance.

The manifestation of sustainability strategies supports the adoption of project sustainability management through effective project governance focusing on the stakeholder's perspective, as reported by Wong, San Chan & Wadu (2016) and Hwang, Zhu & Tan (2017). This seems true in our case too that as long as projects are governed while considering sustainability strategies at high and medium levels, this may support sustainability management of projects. The consideration of sustainability strategies at a low level would not contribute significantly to project sustainability management.

In the fifth Research Objective (RO5), the study hypothesized the following three sub-hypotheses under the H_3.

H_{3a}: Project organizations' sustainability strategies positively moderate the relationship between project governance and project sustainability management in such a way that the relationship is stronger with the increased adoption level of project organization's sustainability strategies.

The result indicates that project organizations' strategies moderate the relationship between project governance and project sustainability management. The results validate the arguments presented by Aarseth et al (2017) that project organizations apply sustainability strategies by setting sustainability goals. It helps in the implementation of project sustainability management through project governance. Herazo et al. (2012) underscored the importance of such kinds of sustainability strategies and professed these strategies as a facilitator in the management and governance of projects. Robichaud and Anantatmula (2011) supported the strategies of projects organizations such as sustainable goals setting in the early phases of project helpful in instigating the project governance and sustainability management. The project organizations use sustainability strategies like sustainable supplier practices for project governance and project sustainability management as highlighted in the findings of earlier studies including Jaillon and Poon (2008) and Eriksson et al. (2014).

The researchers explored sustainability strategies applied by project organizations. Sustainable practices appeared to be visible strategies for project sustainability management and governance. Song, Xu, and Liu, 2017 emphasized the role of sustainable supplier practices and considered them as an essential part of project governance and sustainability management. As Silvius et al (2012) underscored that projects can be governed and managed successfully by adopting sustainable supplier practices. The project organizations also inculcate sustainability in project design as a sustainability strategy as confirmed in the findings of earlier studies including Heravi et al. (2015) and Abiding and Pasquire (2007). The authors claimed that inculcation of sustainability in project design can play its role as a sustainability strategy towards the improvement of project governance and sustainability management. A similar theme can be found in previous research, which emphasizes the importance of setting sustainability targets during the design phase to direct and manage the projects according to the stakeholders' satisfaction (Wang et al., 2014; Lapinski, Horman, &

Riley, 2006; Robichaud and Anantatmula, 2011). Hence, sustainability strategies deployed by project organizations moderate the relationship between project governance and project sustainability management.

H_{3b}: Project hosts' sustainability strategies positively moderate the relationship between project governance and project sustainability management in such a way that the relationship is stronger with the increased adoption level of project hosts' sustainability strategies.

The results indicate that project host organizations' sustainability strategies moderate the relationship between project governance and project sustainability management. The significant beta coefficient for the interaction term indicates moderating role of that PHOS on PG→PSM. The findings of the study validate the findings presented by Aarseth et al. (2017) that project host organizations set sustainability policies to promote project sustainability management through the establishment of laws, regulations, and governance. Practical sustainability strategies specified by Nassos & Avlonas (2020) also include the development of sustainability policies for governance and sustainability management. The employed strategies improve the governance and sustainability management of the infrastructure projects. Project host organizations strategically emphasize project organizations regarding the incorporation of sustainability in project practices.

The findings validate the statements of previous researchers as Bossink (2002) who stated that incorporation of sustainability into project practices results in project sustainability management through the development of technical systems, further leading to the better governance of projects. Jaillon and ChiSun (2010) and Jaillon and Poon (2008) identified construction tools, prefabrication, and waste management systems as sustainable project practices to be used as sustainability strategies for sustainable project management levied by the project host organizations. The consideration of sustainability strategies by the project host organizations only contributes at a high or medium level, as long as strategies adopted by the host organizations become low, the effect of policies introduced by the host organization or incorporated project practices becomes weak. For the effective role of the host organization's strategies, these should be loud and clear to get maximum results of project sustainability management.

H_{3c}: Mutual sustainability strategies positively moderate the relationship between project governance and project sustainability management in such a way that the relationship is stronger with the increased adoption level of mutual sustainability strategies.

The result indicates that mutual sustainability strategies of both project host and project organizations moderate the relationship between project governance and project sustainability management. The significant beta coefficient for interaction term indicates that MSS significantly moderates the relationship between project governance and project sustainability management. These results corroborate the findings of previous researchers including Mathur et al., (2008), R,oss et al. (2010) and Yunus and Yang (2014), where both project host and project organization include sustainability promoting actors by engaging the local public as stakeholders and NGOs in project-related decision making. This kind of mutual sustainability strategy has appeared as an instrumental strategy for project sustainability management and project governance. Kerzner (2017), particularly discussing public sector infrastructure projects supported mutual strategic efforts of project host and project organization through the inclusion of stakeholders. Stakeholders could be sustainability promoting actors rather than be a burden at times. Those stakeholders would feel happy to help the project manager to govern the projects successfully while managing their constraints favorably. Project organizations and project host organizations may utilize the strategies of developing project managers' competencies. The utilizations of such kinds of sustainability strategies are authenticated by the findings of Tabbasi et al. (2016), who endorsed using project manager's competencies development as a strategy for improving project sustainability management and governance of the projects of the infrastructure sector.

Liu et al (2010) supported the significance of sustainability strategy through developing sustainability management competencies of the project participants for project sustainability management. Robichaud and Anantatmula (2011) stressed the role of developing and utilizing sustainability-related competencies amongst the project managers to govern and manage the projects successfully. In addition, Aarseth et al (2017) underscored the development of sustainability competencies in the project hosts' and project organizations' participants, which would play a significant role as sustainability strategy towards project sustainability management and project governance. Sustainability certification programs have proved to be an effective framework and motivating strategy for

the success of most organizations (Hitchcock and Willard, 2012). The environmentally responsible organizations also support the strategies like providing training to the employees and stakeholders for incorporating sustainability in the projects, hence claiming it one of the important strategies of the roadmap towards project governance and project sustainability management (Nassos & Avlonas, 2020).

The result indicates that the mutual strategy of project host and project organizations also includes sustainable project portfolio management that can strengthen project governance to further lead towards improvement in sustainability management in projects. Sanchez (2015) formulated a framework for the governance of sustainable projects and highlighted that rational selection of portfolio is one of the four steps in governing sustainability issues in project management. These results support the findings of Aarseth et al (2017) that sustainable project portfolio management by the project host and project organization appears as a sustainability strategy for project sustainability management and project governance.

5.1.4 Moderated Mediation effect of SS between PG and PSM at values of SS

The Sixth Research Objective (RO6) of the study was "To assess the moderated mediation effect of sustainability strategies between project governance and project sustainability management at different values of sustainability strategies."

This objective covers Hypothesis 3(d) which is discussed as follows.

H_{3d}: Sustainability strategies will moderate the indirect relationship between project governance and project success through project sustainability management, such that this indirect relationship will be stronger when there is a higher adoption level of sustainability strategies.

The research question was formulated that whether there is a moderated mediation effect of SS between PG and PSM at various levels of SS in the projects of the infrastructure sector or not? The study postulated hypothesis H_{3d} that there is a moderated mediation effect of SS between PG and PSM at different values of SS. The results of the study revealed that

the moderated mediation effect of SS exists between the PG and PSM relationship at different levels of SS such that the low level of sustainability strategy's application cancels the mediating effect of SS between the PG and PSM more as compared to the strategies with the high level of sustainability strategies. Therefore, while managing PG and PSM, the SS should not be neglected. This result supports our hypothesis H_{3d}, which is in line with the work of Kok et al. (2019); De Lange et al. (2012); Linnenluecke & Griffiths (2010); McGee (1998); Hannon & Callaghan (2011); Aguinis & Glavas, (2012); Baumgartner (2014); Rodrigues and Franco (2019).

Ashrafi et al. (2018) have introduced an emerging "theory" of corporate sustainability theorizing that "to be considered sustainable, corporations need to embed sustainability strategies into their business model through adopting new governance structures that involve stakeholders conscientiously and contribute to the continuous improvement of social, environmental, and economic conditions on a regional and/or global scale" (Ashrafi et al., 2018, p.4). The theory of corporate sustainability explains that in the case of high utilization of sustainability strategies, the effectiveness of the governance would be very high because the application of sustainability strategies are techniques to manage sustainability in terms of stakeholders' preferences (economic, social, and environmental). However, when the projects are governed in terms of stakeholders' orientation and behavior control, it would result in positive effects of project sustainability management, i.e., projects would be managed considering sustainability in project management, green procurement, environmental technologies, design for the environment and social responsibility.

Furthermore, it is identified that the positive and significant effect of project governance on the infrastructure projects would be higher with the applicability of sustainability strategies at a high level as compared to the projects where these strategies are applied at a low level. Here in our case, the moderated mediation effect of sustainability strategies between the project governance and project sustainability management at different values of sustainability strategies is significant such that with the increase of applicability of these strategies, the mediating effect of PSM decreases, which means that the projects with weak applicability of strategies remain weak that affects weakly the PSM as compared to projects having high applicability. The study points out that the possible explanations could be that in a developing economy like Pakistan, the subject of sustainability is new and that is

why strategies and project sustainability management need more attention to ensure a higher rate of project success. It is also supported by Ullah et al (2021), who conducted research on project sustainability management in Pakistan and highlighted that the strategies are required to be adopted in developing economies like Pakistan where the concept of sustainability is in the emerging phase, specifically in a low level that needs to be investigated.

5.2 Implications of the study

Results of the study discovered that project governance plays important role in prompting and enhancing project success. The stakeholder-oriented governance contributed in attaining sustainability in the infrastructure public sector projects. This study has important implications for the choice of sustainable projects for financing, endorsement and implementation. It is important to mention that sustainability strategies like crafting sustainable project policies by developing laws, regulations and guiding principle play role in project governance and project sustainability management. The qualitative results of the study emerged with the sustainability strategies to promote awareness of project sustainability in project organizations and host organizations and mutually as well. Integrating sustainable practices into projects can be one of the strategies for achieving sustainability leading to the success of the projects. Including sustainability-promoting players in project-based organisations, as well as authorities and NGO legislatures, as acceptability performers. Project managers, as well as governmental and general public officials, should gain sustainability capabilities. Findings imply that developing sustainability competencies as sustainability strategy has significant effect for project sustainability management. These validated dimensions of sustainability strategies should be taken into account by project organizations and project hosts for completing projects successfully and to achieve sustainable development. This study contributes both to the theoretical implications and practical implications.

5.2.1 Theoretical Implications

The current study contributes to the existing body of knowledge as of its comprehensive and extensive nature. The major input of the study is an investigation of project governance's effect on project success while addressing the research gaps identified in the problem statement as suggested by various authors (Aarseth et al, 2017; Joslin & Muller, 2016) for future research through the moderating role of sustainability strategies on PG and PSM relationship. This research complements the literature of stakeholder theory (Freeman, 1984) from the perspective of governance and sustainability management of projects. Unlike the literature available about stakeholder management in projects, this research explores the impact of governing projects and managing sustainability of projects while considering the "management for stakeholder" approach (Harrison and Freeman, 1999). In this way, this research addresses the assertion of Maddaloni and Derakhshan (2019) who consider management for stakeholders is extremely needed to increase sustainable development. This study contributes to stakeholder theory by emphasizing the importance of stakeholder-oriented governance. Alike the operationalization by prior scholars (Eskerod & Huemann, 2013; Martens & Carvalho, 2016), who noticed stakeholder engagement as a probable factor of project sustainability management, this research finds a significant impact of stakeholder-oriented governance over the project success.

Most recent studies tried to find the impact of project governance on project success (Joslin and Muller, 2016) but left the important emerging factor of sustainability management. Similarly, Carvalho and Rabehnini (2017) investigated the intersection of sustainability management with project success and left an important antecedent of project governance. This study contributes to the PM literature by examining the impact of project governance while considering project sustainability management and sustainability strategies on project success. This research took a further step to reveal antecedents of project success and their effects on the successful completion of projects utilizing newly emerging constructs. A better understanding of the adoption of sustainability management in projects may help scholars to understand the management of challenges about sustainable development and establish a more success-driven model for infrastructure projects. By demonstrating the underlying configuration between emerging constructs of PM, this research contributes to orchestrating

the governance structures, incorporating “a new school of thought” i.e., sustainability in strategies and management of the project for their successful completion.

This study highlighted the importance of project governance, sustainability strategies, and project sustainability management for the success of infrastructure public sector projects. The outcome of this study contributes to the new emerging theories of governance and project management. The development and validation of sustainability strategies construct and its measurement instrument as well as considering sustainability strategies as a moderator on the relationship between project governance and project sustainability management, contributes to the stakeholder’s theory as the project sustainability management is dependent upon project governance. The results of the study contribute to the improvement of emerging theories of project governance by examining the effect of project governance on project sustainability management and project success as suggested by various authors.

The study also contributes to the body of knowledge by examining the moderating effect of sustainability strategies in the developed framework while addressing the future directions suggested by Aarseth et al., (2017). In addition to validation of sustainability strategies construct, this study developed and validated the Sustainability Strategies Questionnaire (SSQ), for measurement of sustainability strategies deployed in the projects of the infrastructure sector. The reliable instrument for sustainability strategies is developed and validated for the measurement of multidimensional construct of sustainability strategies with 3x dimensions i.e. project organizations’ strategies, project host organizations strategies, and mutual sustainability strategies. This construct has not been tested in previous quantitative research. That makes a visible contribution to the body of knowledge.

The five-dimensional construct of project sustainability management PSM was first developed and operationalized by Carvalho and Rabechini (2017). The current study, in response to the future directions of various researchers, tested PSM as a mediator between project governance and project success. In this study, project sustainability management appeared as an outcome of project governance and antecedent of project success. Sustainability strategies also moderated the relationship between project governance and project sustainability management through its three dimensions. The tested framework demonstrated that deployment of three distinct sustainability strategies can improve the

project governance that ultimately effects project sustainability management of public sector infrastructure projects in Punjab, Pakistan.

5.2.2 Practical Implications

The results of this study could be generalized to develop a ground for researchers, academics, project managers and policy makers. The results can be used in the formulation of comprehensive policy for project governance in context of project sustainability management for successful projects in the infrastructure sector of Punjab, Pakistan. This study is new in Pakistan that empirically examined the moderating role of sustainability strategies in the relationship between project governance and project sustainability management and project success.

The results of this study have practical implications for managers at national level. As the country is facing rapid economic expansion along-with the challenges of poor governance and resource depletion. The project sustainability management augmented with project governance and sustainability strategies would enable the organizations to cope with the releasing negative impact of projects on the environment, society and economy. That would ultimately help organizations to benefit from a stable economy and complete the projects successfully.

The framework of this study would enable the project practitioners to embrace the growing need for expertise, criteria and concepts to practically implement the project sustainability management in the projects. The results of the study could be generalized to provide an opportunity for the practitioners and policy makers for policy formulation about sustainable and successful project management in Pakistan. The first ever study conducted in Pakistani context offers comprehensive solution to the issues prevailed in projects of public sector of Pakistan in developing, governing and implementing sustainable projects. This extends the knowledge of top management of projects working in different sectors of Pakistan about applicability of project governance, sustainability management and strategies as influential antecedents for successful completion of infrastructure projects.

Project organizations, for successful management project through PSM and for raising chances of project success, may consider stakeholders' interests. This study provides empirical evidence for project-based organizations with meaningful insight to improve project success through adoption of particular sustainability strategies. Organizations may contribute in national level cause of addressing UN-Sustainable Development Goals by prioritizing sustainability in public sector projects.

The practical implications of this study at organizational level targets both project managers and top management. Project managers may benefit from utilizing the framework of project sustainability management in an organization for successful achievement of public sector development projects. Commonly, organizations focus on increasing the wealth of shareholders at the cost of the interests of stakeholders and society. Contrary to this view, this study supports the stakeholder theory that prefers stakeholders' interests over the shareholders' interests. Hence, control of decision-making and benefits are recommended to be given to stakeholders. Findings further suggest that project managers and practitioners should consider the sustainability aspect of projects from the early stages of the project till completion.

Project managers who are involved in construction projects will get a more detailed knowledge of relevant sustainability strategies as techniques that could contribute to project success through stakeholder-oriented project governance and through project governance leading to project sustainability management. Additionally, the context of sustainability provides projects and academics with a base for more in-depth study and research on the overall efficacy of a sustainable project design framework. The results of the research will help project managers formulate new sustainability solutions in line with this framework, particularly in infrastructure projects, incorporating the framework developed by this study.

Other than what has already been stated, this research additionally serves as a real contribution in the consideration of the two major objectives of the UN SDGs which are mentioned in chapter 1 of this study. One of the most relevant goals is "Innovation in industry and infrastructure". The practical outcomes of this study are supporting the government in achieving this goal by incorporating the developed framework through building robust infrastructure, promoting inclusive and sustainable industrialization, and encouraging

innovation. The second relevant goal of the SDGs is “sustainable cities and communities”. The practical implications of this study suggest a framework in achieving this goal by governing the infrastructure projects in the context of sustainable development leading towards sustainable cities and communities.

Practical implications are further elaborated by adding precise recommendations in terms of study hypothesis. For instance, stakeholder oriented governance positively influences project success, therefore, project managers influencing the design of project governance must be aware of the importance of a stakeholder orientation for the successful completion of projects, which should be included in training programs for infrastructure development projects at managerial, industrial, and sectoral levels. In terms of sustainability strategies and its dimensions, the relationship of project governance and project sustainability management is strengthened, therefore, project organizations should address the sustainability issues in the early phases of projects, and should support suppliers by providing guidelines for sustainable supplies like ecological material and prefabrication, etc. in infrastructure projects.

In order to appraise the implementation, project organizations should develop sustainability-related key performance indicators (KPIs) and use them throughout the project life cycle and further review them during project lifecycle assessment procedures. Similarly, to support sustainability at the project level, project host organizations should clearly define sustainable policies, laws, and regulations for project organizations to foster implementation of sustainability management and successful completion of projects. Furthermore, mutually project organization and project host organization can develop the competencies and skill set of government regulatory actors and project managers by investing in formal training programs in order to impart sustainability management in projects. Both kinds of organizations are recommended to mutually update the policy framework (i.e. PC1) for appropriate selection projects through including triple bottom line concept of sustainability as a mandatory parameter in early phase appraisals for approval and funding.

A suitable set of guidelines on sustainability management can be offered based on the outcomes of this study for local stakeholders like NGO representatives in order to engage them in the project’s planning for the benefit of society.

5.3 Limitations and future research directions

This study is not away from the limitation, under the specific circumstances, like others. Based on those limitations of the study, the researcher openly offered a way forward for the future researchers to undertake them in their research projects to get improved outcomes.

In this study, only cross-sectional data was used for investigation whereas longitudinal data was not employed. A survey with a longitudinal design may be needed to gain deeper insights into the nature and moderating role of the relationships. This study selected a highly invested sector that is the infrastructure sector that includes the construction industry as well. Hence, data from the completed projects of the infrastructure sector of Punjab, Pakistan were collected.

In the future, researchers may consider another sector than infrastructure public sector projects of Pakistan, such as the social and production sector. It could be beneficial for the industry of project management to apply this model to the various projects of the production and social sector. Data were collected from project directors and project managers only. The respondents of the study may also be included from the various cadre of jobs including technical side and top management of project host and project organizations as well.

One of the limitations include that only 252 respondents participated as a sample from the completed project of Punjab province, future studies with large size of the sample can also add value to the results and recommendations of the study. Hence, data from all over the country as a large size sample could help in producing more generalizable results.

Finally, this study has only considered public sector projects, whereas private sector projects could also be considered. This study considered overall three kinds of strategies, whereas, future research could therefore examine whether different project phases require different types of sustainability strategies, specifically. Future research can also utilize the currently developed instrument of SSQ for the assessment of sustainability strategies being employed in the projects of various sectors.

The construct of sustainability also connects with the dimensions of national and organizational culture. In future studies, the construct of culture may also be incorporated for getting a better understanding of the region being studied.

5.4 Conclusion

The theoretical lens of the stakeholder theory enables us to conclude that the organizations should deliberate the apprehensions of stakeholders over the shareholders. The study answers the research questions revealing the significant impact of project governance, sustainability management, and strategies on the success of infrastructure development projects. The findings validate the connections between project governance and project sustainability management and strategies, and their impacts on project success.

This study developed and validated an instrument for the measurement of multi-dimensional sustainability strategies. The developed instrument of sustainability strategies is the first-ever tool to assess level of sustainability management in the public sector infrastructure projects. It is found that the sustainability strategies enhanced the relationship of project governance to attain project sustainability management for the successful completion of projects. This study enables the implementation of different sustainability strategies while concentrating on the context of sustainability strategies advocated by host organisations and project organisations in the interests of stakeholders rather than shareholder concerns. The sustainability strategies are made up of a series of linked activities that will be implemented throughout the project's lifespan. Though such strategies have been partially recognised in other studies, they are not depicted as a potentially comprehensible and clarified set of interconnected activities that can be identified and followed through an execution progression. It is found that project organizations individually and mutually with project hosts can utilize these sustainability strategies to advance their sustainability agendas and complete their projects successfully. The results of the study indicate that all three kinds of sustainability strategies are valid and significant to enhance the relationship of project governance and project sustainability management to achieve success in infrastructure public sector infrastructure projects.

The results of the study bridge the gap in the literature and practice to cope with the challenges of infrastructure projects through project governance, sustainability management, and strategies, to enhance the likelihood of project success. The findings of the study positively contribute to the body of knowledge and present important insight into the field of

sustainable development of society through project governance and project sustainability management. The study concludes the direct effect of project governance and through mediating variable of project sustainability management that contributes towards improving project success, particularly in the infrastructure sector projects. The study also concludes that outcome and stakeholders-oriented project governance enhances the performance of the projects through project sustainability management. The relationship becomes more effective by the deployment of sustainability strategies by project host and project organizations separately and mutually as well. The study shows that weak project governance especially behavior-controlled project governance has partial impact on the projects to complete them successfully.

This study will benefit the project host and project organizations to reap various benefits from a contribution to sustainability in their business model. In the competitive world, businesses and societies will search for new ways to distinguish themselves from contenders. When companies or organizations are aware of the existing and potential problems in the community, they may support themselves by creating innovative goods or methods that may assist in a solution. Project Sustainability Management will place organizations to be ahead of a movement that has the potential to deliver both benefit and a socially beneficial impact through completing projects successfully. The tested framework will favor the project organizations, which are frequently criticized by NGOs, and it would boost the goodwill these large corporations have with the public. Sustainability aims to foster decision-making processes and governance that would help infrastructure projects to end successfully while improving the living standard of the society and upcoming generations.

Since project success through sustainability management is more relevant now than ever, and conventional models with an emphasis on shareholder capital tend to be going out of date, it can be said that projects are transitioning to prioritizing stakeholder value. Owing to the transition to long-term strategic planning, project organizations must move away from the short-term plans to those that last a long time, the cornerstone of which would be governing projects with sustainability management to get the targets of completion successfully. The implementation of project governance and sustainability management, as well as the implementation of sustainability strategies frameworks, will play a major role in the project management world and, even more significantly, in the global climate for the next

several decades. Although it will become the current normal, the meaning of this paradigm will undermine until we are told that there is no such thing as a “sustainability and success of the projects is at the stake”.

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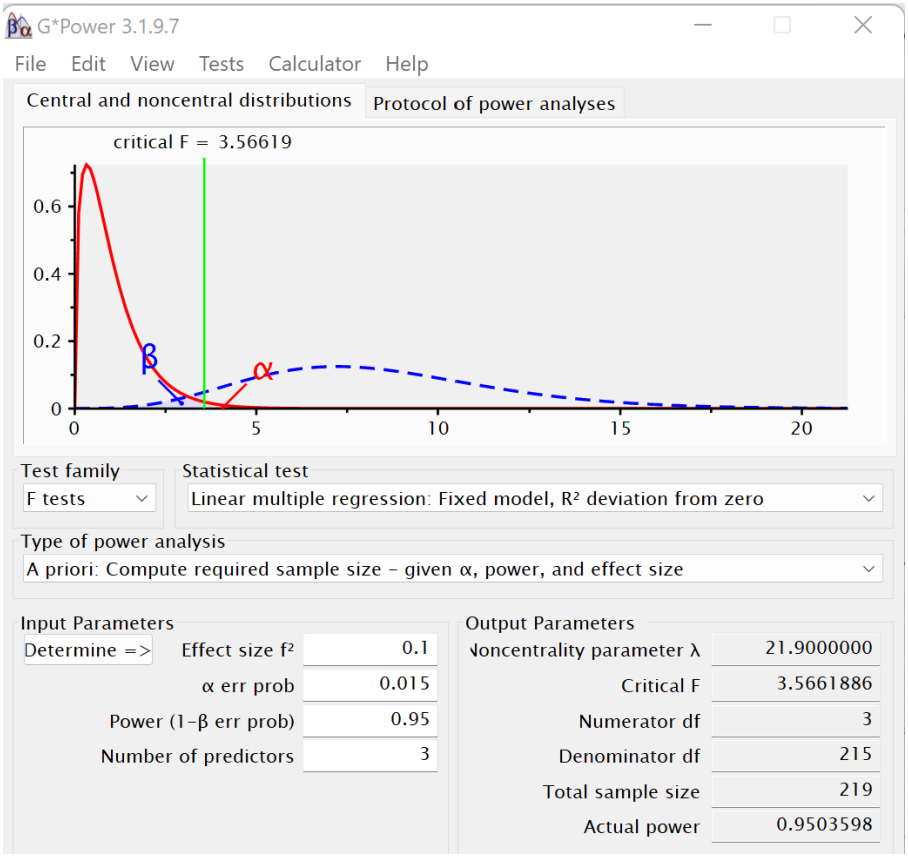
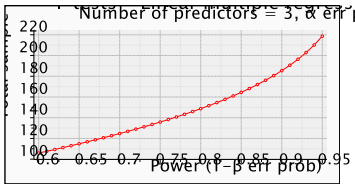
Zwikael, O., & Smyrk, J. (2015). Project governance: Balancing control and trust in dealing with risk. *International Journal of Project Management*, *33*(4), 852-862.

APPENDICES A – I

APPENDIX – A

Screenshots of Sample estimation through G*Power 3.1.9.7

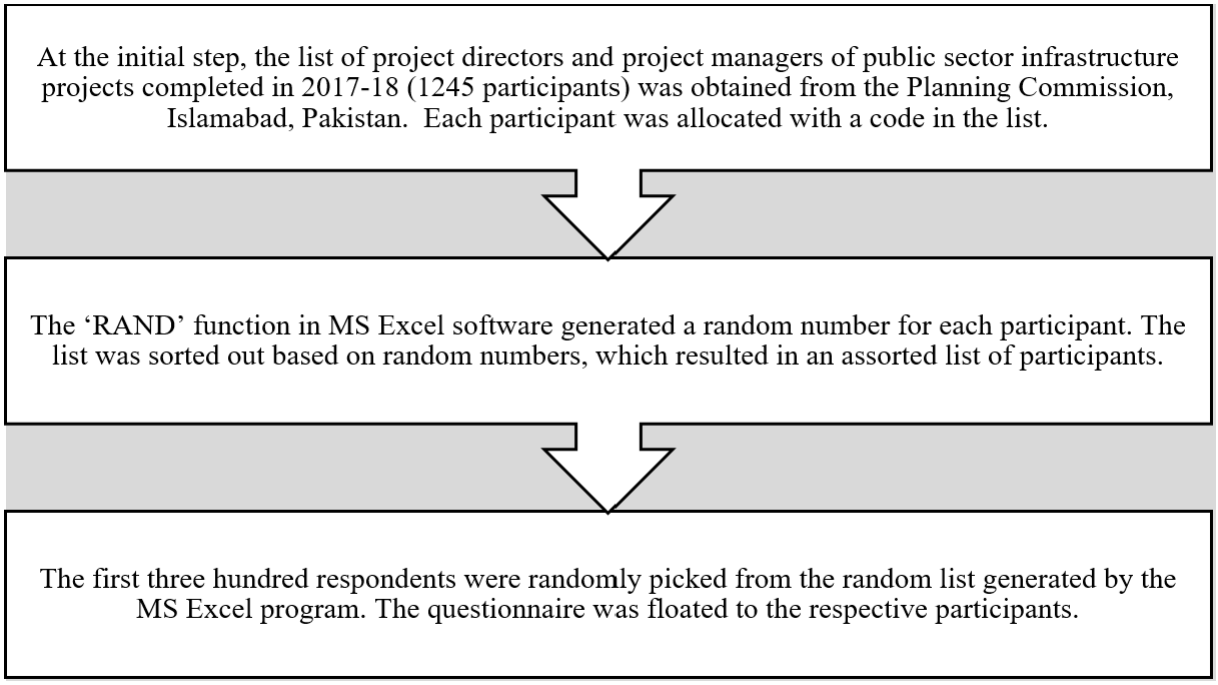




APPENDIX – B

Using 'RAND' function for selecting sample

The methodology followed in the selection of sample under simple random sampling strategy is as follows:



APPENDIX – C

Questionnaire

Dear Respondent,

You are requested to please fill this questionnaire for my research titled " Project Governance and Project Success: A moderated mediation model of Project Sustainability Management and Strategies". Your precious response will add great value to this research.

Section I

Please mark the correct option

1. **Gender**
   - a. ☐ Male
   - b. ☐ Female
2. **Age**
   - a. ☐ upto 35 years
   - c. ☐ 36-45
   - d. ☐ 45+
3. **Education**
   - a. ☐ Bachelors
   - b. ☐ Masters
   - c. ☐ PMP
   - d. ☐ Above Masters
4. **Job Designation**
   - a. ☐ Project Director
   - b. ☐ Project Manager
5. **Experience**
   - a. ☐ upto 10 Years
   - b. ☐ 11-20 Years
   - c. ☐ Above 20 Years
6. **Project Type**
   - a. ☐ New Built
   - b. ☐ Renovation
7. **Project Budget**
   - a. ☐ Small (≤ 60M)
   - b. ☐ Medium (>60 M and ≤ 1000M)
   - c. ☐ Large (> 1000M)

Section II

S#	Statements	SDA	DA	N	A	SA
	Project Governance					
	Shareholders versus Stakeholders orientation					
	In my organization					
1	decisions are made in the best interest of the shareholders and owners of the organization and their return on investment (RoI)					
2	the remuneration system includes stock-options for employees and similar incentives that foster shareholder RoI thinking					
3	prevails an image that profitability determines the legitimacy of actions (including projects)					
4	I am sometimes asked to sacrifice stakeholder satisfaction for the achievement of financial objectives					
5	the long term objective is to maximize value for the owners of the organization					
6	decisions are made in the best interest of the wider stakeholder community (including shareholder, employees, local communities etc.)					
7	the remuneration system provides incentives for community, environmental, humanitarian or other non-profit activities outside and/or inside the organization					
8	prevails an image that wider social and ethical interests determine the legitimacy of actions (including projects)					
9	I am sometimes asked to sacrifice the achievement of financial objectives for improvement of stakeholder satisfaction					
10	the long term objective is to maximize value for society					
	Behavior versus outcome control orientation					
	The management philosophy in my organization favors…					
11	a strong emphasis on always getting personnel to follow the formally laid down procedures					
12	tight formal control of most operations by means of sophisticated control and information systems					
13	a strong emphasis on getting personnel to adhere closely to formal job descriptions					
14	support institutions (like a PMO) should ensure compliance with the organization's project management methodology					
15	prioritization of methodology compliance over people's own experiences in doing their work					
16	a strong emphasis on getting things done even if it means disregarding formal Procedures					
17	loose, informal control; heavy dependence on informal relationships and the norm of cooperation for getting things done					
18	a strong emphasis to let the requirements of the situation and the individual's personality define proper on-job behavior					
19	support institutions (like a PMO) should collect performance data in order to identify skills and knowledge gaps					
20	prioritization of people's own experiences in doing their work over methodology compliance					

S#	Statements	SDA	DA	N	A	SA
Project Sustainability Management						
Project management focus on sustainability						
1	Follow up meeting concerning sustainability issues conducted					
2	Sponsor commitment with sustainability was seen					
3	In the initialization and planning phases, it was clear the alignment between corporate sustainability strategy and project sustainability management					
4	There are stakeholders' requirements related to sustainability					
5	The project product/services foreseen review and acceptance have targets for sustainability to be achieved.					
6	Stakeholders participated in project meeting related to sustainability in the project-planning phase.					
7	The scope definition considered corporate sustainability guidelines					
8	The project deliverables were designed to be sustainable.					
9	Project communication with stakeholders and project reports explicit present sustainability performance, compared with the target planned.					
10	The project WBS has deliverables and work packages related to sustainability.					
11	The project closure process considered aspects of sustainability involving all PM areas of knowledge.					
12	The project product/service development took into account the sustainability requirement.					
Green procurement and partnership						
13	Project procurement took into consideration sustainability aspect to select products.					
14	The project supply chain took into consideration sustainability aspect to select suppliers.					
15	The material supply system was aligned to project strategies for sustainability.					
Environmental technologies						
16	Clean technologies were prioritized and applied along the project product development.					
17	Clean technologies were prioritized and applied during the project execution phase.					
18	The project final product/service control considered aspects of clean technology performance.					
19	Systems and technologies involved in the project have a high degree of adherence to aspects of sustainability impact prevention more than control.					
Design for environment						
20	The team applied life cycle management (LCM), life cycle assessment (LCA), life cycle engineering (LCE) and life cycle cost (LCC) during project development.					
21	The team applied Design for Environment (DFE), Design for Disassembly (DFD) and Design for Energy Saving (DFES) or other DFXs methods related to sustainability along the development of the project.					
22	The ISO 14000 principles were applied in the project.					
23	The project performance evaluation system considers aspects of environment sustainability.					
Social Responsibility						
24	Project manager is committed to social responsibility in project context					
25	ISO 26000 principles observed in project context					
26	OHSAS 18000 principles observed in project context					
27	Stakeholders commitment with social responsibility seen in project context					

S#	Statements	SDA	DA	N	A	SA
Sustainability Strategies						
Project Organizations' Strategies						
	Project organization…					
1	focused explicitly on sustainability issues when developing project strategies					
2	paid special attention to instance where sustainability issues aligned with other concerns					
3	supported suppliers in implementing sustainable practices					
4	provided sustainability guidelines highlighting sustainable practices for suppliers					
5	supported use of ecological materials and prefabrication					
6	incorporated sustainability issues in early phases of projects					
7	developed sustainability related KPIs and used throughout the project life cycle					
8	appraised sustainability matters through lifecycle assessment					
Project Host Organizations' Strategies						
	Project host organization					
9	defined sustainable policies, laws and regulations, norms, plans and guidelines to support sustainability on the project level					
10	executed provincial / local governmental to emphasize and promote sustainability in host region projects					
11	supported the incorporation of sustainability into project practices					
12	supported the incorporation of sustainability into technical system					
13	supported the incorporation of sustainability through construction tools and waste management					
14	supported the incorporation of sustainability through prefabrication					
Mutual Sustainability Strategies						
15	Project organization selected and included actors that bring sustainability promoting skills and capabilities					
16	Project host included different authorities NGO reps to support multidisciplinarity in project organization					
17	Project host organization engaged local stakeholders in project's decision making through providing guidelines					
18	Project host organization provided incentives to local stakeholders in return of engaging themselves in project's decision making					
19	Project organization expanded competencies and skill sets of project managers by investing in formal training programs					
20	Project hosts developed sustainability related competencies of governmental regulatory actors and general public					
21	Project organization used framework for project selection by including sustainability as a dimension in early phase appraisals					
22	Project hosts emphasized sustainability issues when deciding which project to fund and approve					

S#	Statements	SDA	DA	N	A	SA
Project Success						
Project Efficiency						
1	The project was completed on time or earlier					
2	The project was completed within or below budget					
3	The project had only minor changes in scope					
4	The project achieved overall expected efficiency measures					
5	The project met predefined quality parameters					
Impact on customer						
6	The product improved the customer's performance					
7	The customer was satisfied with deliverables					
8	The product met the customer's functional and technical requirements					
9	The product improved the customer image and value					
10	The product improved the customer loyalty and trust					
Impact on team						
11	The project team was highly satisfied and motivated					
12	The team was highly loyal to the project					
13	The project team had high morale and energy					
14	The team felt that working on this project was fun					
15	The team members experienced personal growth					
Business success						
16	The project was an economic business success					
17	The project increased the organization's productivity					
18	The project enhanced the organization's market value					
19	The project directly contributed to the organization's performance					
20	The project improved the efficiency of organization					
Preparing for future						
21	The project outcome will contribute to future projects					
22	The project will help to create new markets					
23	The project created new technologies for future use					
24	The project contributed towards new business processes					
25	The project supported in developing better managerial capabilities					

APPENDIX-D

Confirmation email from Aarseth et al (2017) on non-development of instrument on Sustainability Strategies

Gmail **Muhammad Iftikhar Ali <iftikhar.kfp@gmail.com>**

Request for Guidance & Questions on Project Sustainability Strategies

3 messages

Muhammad Iftikhar Ali <iftikhar.kfp@gmail.com> Mon, Mar 18, 2019 at 6:23 PM
To: kirsi.aaltonen@oulu.fi

Dear Professor K Aaltonen,
I hope this email will find you in good health.
I take this privilege to write you and introduce myself that I (Mr. M. Iftikhar Ali) am a PhD Scholar at Bahria University Islamabad, Pakistan. My research work focus on examining the effect of project sustainability management and project governance on project success. I read your research articles relating to project sustainability and impressed by all of your research work but especially the below article which is providing new directions and dimensions of Strategies for project sustainability. I found your domain approach —Project Sustainability Strategies Framework— is a latest concept with absolute dimensions for measurement of sustainability strategies, through your this remarkable research article:
"Aarseth, W., Ahola, T., Aaltonen, K., Økland, A., & Andersen, B. (2017). Project sustainability strategies: A systematic literature review. *International Journal of Project Management*, *35*(6), 1071-1083."

I hereby request you to kindly share the questionnaire of Project sustainability Strategies with dimensions (if you have) and more detail about measurement of this construct with permission to use this tool in my research work. If you don't have the Questionnaire of PSS based on this framework, may I design a questionnaire based on your framework and send it to you to seek your guidance and expert opinion before operationalizing it in the research. I'll definitely acknowledge your guidance and support appropriately.
I shall be highly obliged for your kind help and look forward for your guidance & collaboration in future.
With best regards,
Sincerely

M. Iftikhar Ali (BCS, MS Management)

PhD Scholar, Faculty of Management Science
Bahria University, Shangrilla Road, Sector E-8, Islamabad, Pakistan
Mob: +92 3335389200
iftikhar.kfp@gmail.com; qao@bahria.edu.pk

Kirsi Aaltonen <Kirsi.Aaltonen@oulu.fi> Sat, Mar 30, 2019 at 6:41 PM
To: Muhammad Iftikhar Ali <iftikhar.kfp@gmail.com>

Dear Muhammad,

thank you for your contact and apologies for a very delayed response. As I am not the first author of the paper, I would suggest that you contact Prof Wenche Aarseth for asking about the permissions. However, as the article was based on a systematic literature review, based on which the dimensions were actually constructed we do not have a measurement instrument ready. However, I think you would be able to build this kind of instrument based on the results of our article. I wish you the best of luck in your research. With kind regards,

Kirsi

[Quoted text hidden]

Muhammad Iftikhar Ali <iftikhar.kfp@gmail.com> Tue, Jun 11, 2019 at 5:46 PM
To: Kirsi Aaltonen <Kirsi.Aaltonen@oulu.fi>

Dear Kirsi, Thank you for your kind feedback, and sorry for the late reply as i was in field for data collection and did not make it possible to stay in touch. Thanks again for guidance.

Iftikhar
[Quoted text hidden]

APPENDIX-E

Summary of Instrument Development process

Steps	Process
Step-1: Item Creation	Items were recognized and shifted to the items pool relevant to the dimensions of the construct Language and content of the most of items were adapted from the selected framework Finally, pools of items for three dimensions of SS were created Items were added to adjust the context of the current study The items seemed as confusing or redundant were eliminated
Step-2: Item Sorting	Domain coverage was assessed with the help of a panel of two judges They sorted each item under the SS dimensions by applying the Q-sort procedure Q Set were developed 02 panels of judges constituted (1 user, 1 professor, 1 professional, in each panel) Conducting Q Sorting (2 rounds) (Inter-Rater Reliability)
Step-3: Q-Sort Procedure	Using the Q-sort technique, it discovered significant differences in the degree of "correct" placement of items across different categories of construct, which allowed to confirm construct validity by identifying convergence and divergence of items Selection process generated a total number of 30 items
Step-4: Pre and Pilot Testing	pretesting of questionnaire was conducted by using 12 convenient samples (experts from education and project sector) It ensured validity of the content, the diction, the arrangement and design, the order, the directions, difficulty level in the questions, and the range and appropriateness of scale (5-point Likert) The final version of the questionnaire was refined based upon suggestions/ comments on pre-test responses including context-specific adjustments resulting 22 items. A total of 63 responses were collected for pilot study. The results of pilot study confirm the least condition of Cronbach alpha (0.70)

APPENDIX – F

Initial list of items generated – Sustainability Strategies Questionnaire (SSQ)

S#	Statements
Project organization	
1	focused on sustainability issues when developing project strategies
2	paid attention to instance where sustainability issues aligned with other concerns
3	supported suppliers in implementing sustainable practices
4	provided sustainability guidelines highlighting sustainable practices for suppliers
5	supported use of ecological materials and prefabrication
6	procured green supplies from the suppliers focusing sustainability
7	incorporated sustainability issues in early phases of projects
8	methods were based on development of performance indicators
9	developed sustainability related KPIs and used throughout the project life cycle
10	appraised sustainability matters through lifecycle assessment
11	applied appraisal techniques such as value management.
Project host organization	
12	defined sustainable policies, laws and regulations, norms, plans and guidelines to support sustainability on the project level
13	executed provincial / local governmental to emphasize and promote sustainability in host region projects
14	executed regulatory tasks in a manner that emphasizes and promotes sustainability
15	supported the incorporation of sustainability into project practices
16	supported the incorporation of sustainability into technical system
17	supported the incorporation of sustainability through construction tools and waste management
18	supported the incorporation of sustainability through prefabrication
19	Influence sustainability of overall project practices
Mutually	
20	Project organization selected and included actors that bring sustainability promoting skills and capabilities
21	Project host included different authorities NGO reps to support multidisciplinarity in project organization
22	Project host organization engaged local stakeholders in project's decision making through providing guidelines
23	Project host organization provided incentives to local stakeholders in return of engaging themselves in project's decision making
24	Project organization expanded competencies and skill sets of project managers by investing in formal training programs
25	Project hosts developed sustainability related competencies of governmental regulatory actors
26	developed sustainability related competencies of general public
27	developed framework for project selection and included sustainability in appraisals
28	Project organization used framework for project selection by including sustainability as a dimension in early phase appraisals
29	Project host constituted a committee for project selection giving priority to the sustainability parameters
30	Project hosts emphasized sustainability issues when deciding which project to fund and approve

APPENDIX – G

Table: 1 Item-wise Skewness and Kurtosis of each variable

Project Governance

Items	Mean	Std. Dev	Skewness	Kurt
SSO1	3.48	1.102	-.750	.017
SSO2	3.48	1.155	-.849	-.029
SSO3	3.48	1.216	-.441	-.708
SSO4	3.40	1.127	-.544	-.319
SSO5	3.35	1.107	-.592	-.222
SSO6	3.45	1.178	-.585	-.375
SSO7	3.42	1.066	-.367	-.456
SSO8	3.46	1.202	-.623	-.401
SSO9	3.66	1.179	-.900	.089
SSO10	3.65	1.131	-.845	.131
BOC1	3.47	1.116	-.597	-.282
BOC2	3.40	1.172	-.562	-.394
BOC3	3.59	1.209	-.741	-.253
BOC4	3.56	1.136	-.403	-.680
BOC5	3.58	1.169	-.738	-.129
BOC6	3.62	1.220	-.738	-.308
BOC7	3.60	1.178	-.844	-.015
BOC8	3.53	1.069	-.715	.120
BOC9	3.51	1.209	-.696	-.337
BOC10	3.63	1.189	-.749	-.162

Project Success

Items	Mean	Std. Dev	Skewness	Kurtosis
PE1	3.20	1.189	-.527	-.658
PE2	3.12	1.180	-.430	-.719
PE3	3.27	1.227	-.314	-.814
PE4	3.17	1.172	-.403	-.639
PE5	3.23	1.206	-.528	-.665
IOC1	3.23	1.175	-.531	-.515
IOC2	3.19	1.200	-.366	-.740
ICO3	3.25	1.158	-.259	-.689
ICO4	3.27	1.129	-.505	-.397
IOC5	3.25	1.177	-.549	-.513
IOT1	3.04	1.209	-.451	-.817
IOT2	3.12	1.094	-.386	-.432
IOT3	3.03	1.138	-.120	-.715
IOT4	2.95	1.173	-.176	-.779
IOT5	3.08	1.217	-.359	-.845
DBOS1	3.44	1.230	-.674	-.469
DBOS2	3.34	1.168	-.547	-.547
DBOS3	3.30	1.102	-.548	-.462
DBOS4	3.40	1.144	-.575	-.337
DBOS5	3.35	1.217	-.544	-.561
PFF1	3.52	1.179	-.825	-.030
PFF2	3.38	1.173	-.658	-.297
PFF3	3.35	1.193	-.310	-.742
PFF4	3.31	1.147	-.461	-.426
PFF5	3.44	1.227	-.608	-.522

Project Sustainability Management

Items	Mean	Std. Dev	Skewness	K
PMFS1	3.28	1.270	-.496	-.
PMFS2	3.40	1.266	-.508	-.
PMFS3	3.34	1.282	-.477	-.
PMFS4	3.34	1.244	-.437	-.
PMFS5	2.92	1.406	-.127	-1
PMFS6	3.23	1.129	-.304	-.
PMFS7	3.38	1.290	-.523	-.
PMFS8	3.44	1.201	-.577	-.
PMFS9	3.35	1.289	-.562	-.
PMFS10	3.42	1.203	-.607	-.
PMFS11	3.41	1.186	-.619	-.
PMFS12	2.66	1.279	.134	-1
PMFS13	3.52	1.298	-.639	-.
GPP1	3.48	1.254	-.672	-.
GPP2	3.37	1.169	-.475	-.
GPP3	3.39	1.243	-.530	-.
GPP4	3.35	1.203	-.561	-.
GPP5	3.34	1.168	-.487	-.
GPP6	3.45	1.228	-.631	-.
GPP7	3.42	1.219	-.642	-.
GPP8	3.41	1.196	-.587	-.
GPP9	3.48	1.222	-.719	-.
GPP10	3.42	1.176	-.718	-.
ET1	3.47	1.039	-.484	-.
ET2	3.44	1.049	-.259	-.
ET3	3.45	1.098	-.497	-.
ET4	3.43	1.025	-.387	-.
ET5	3.49	.959	-.523	-.
ET6	3.51	1.027	-.677	-.
ET7	3.49	1.066	-.467	-.
ET8	3.47	1.035	-.513	-.
ET9	3.49	1.069	-.531	-.
ET10	3.40	1.042	-.340	-.

Items	Mean	Std. Dev	Skewness	Kurtosis
ET12	3.40	1.061	-.484	-.439
ET12	3.40	1.061	-.484	-.439
ET13	3.50	1.091	-.362	-.599
DFE1	3.72	1.176	-.638	-.386
DFE2	3.77	1.162	-.695	-.279
DFE3	3.50	1.289	-.579	-.676
DFE4	3.77	1.071	-.792	.285
SR1	3.70	1.084	-.825	.420
SR2	3.65	1.117	-.591	-.227
SR3	3.47	1.215	-.436	-.630
SR4	3.70	1.182	-.820	.048

Sustainability Strategies

Items	Mean	Std. Dev	Skewness	Kurtosis
POS1	3.06	1.211	-.156	-.977
POS2	3.34	1.254	-.558	-.694
POS3	3.21	1.138	-.510	-.704
POS4	3.12	1.335	-.202	-1.186
POS5	3.35	1.124	-.678	-.294
POS6	3.23	1.168	-.518	-.663
POS7	3.33	1.032	-.379	-.388
POS8	2.76	1.161	-.041	-1.036
POS9	2.79	1.194	-.040	-.974
POS10	2.80	1.175	-.001	-.993
POS11	3.37	1.076	-.517	-.411
PHOS1	3.22	1.290	-.365	-.932
PHOS2	3.29	1.309	-.385	-1.003
PHOS3	3.34	1.325	-.495	-.937
PHOS4	3.26	1.116	-.445	-.603
PHOS5	3.34	1.134	-.304	-.701
PHOS6	3.37	1.090	-.542	-.517
PHOS7	3.16	1.318	-.156	-1.060
MSS1	2.44	1.097	.408	-.419
MSS2	3.37	1.099	-.327	-.578
MSS3	3.60	1.158	-.813	-.041
MSS4	3.42	1.128	-.507	-.330
MSS5	3.27	1.252	-.375	-.878
MSS6	3.25	1.292	-.375	-.915
MSS7	3.28	1.316	-.408	-.955
MSS8	3.29	1.226	-.391	-.747
MSS9	3.44	1.129	-.569	-.382
MSS10	3.39	1.153	-.504	-.512
MSS11	2.90	1.182	-.186	-.948
MSS12	3.34	1.061	-.466	-.360

APPENDIX – H

Table 2: Multi-collinearity statistics

Variables	Measure	Collinearity Statistics	
		Tolerance	VIF
	Range	>.10	<10.0
Project Governance			
Shareholder vs stakeholder orientation		0.841	1.189
Behavior vs outcome control		0.841	1.189
Project Success			
Project Efficiency		0.605	1.653
Impact on user / customer		0.810	1.235
Impact on team		0.730	1.369
Organizational Success		0.800	1.250
Preparing for the future		0.939	1.065
Project Sustainability Management			
Design for Environment		0.736	1.359
Environmental technologies		0.979	1.022
PM process & knowledge areas focusing on sustainability		0.994	1.007
the green procurement and partnership		0.956	1.046
social responsibility in the project		0.775	1.291
Sustainability Strategies			
Project organization strategies		0.653	1.530
Project host organization strategies		0.615	1.627
Mutual strategies		0.645	1.551

APPENDIX – I

Measurement Models

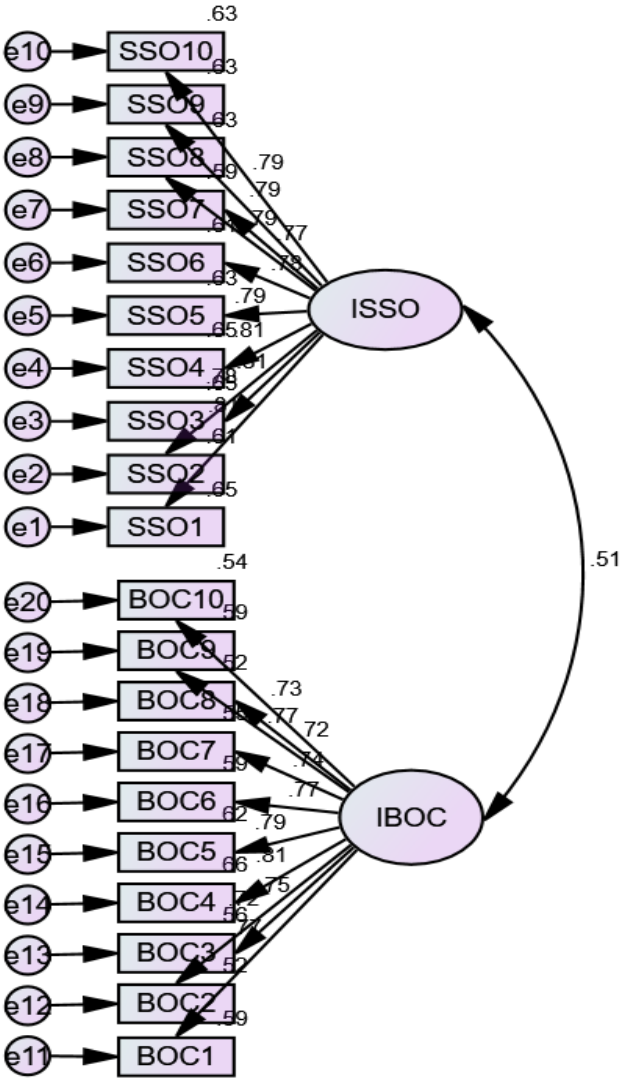


Figure: First order CFA of PG Dimensions

APPENDIX – I (Contd…)

Measurement Models

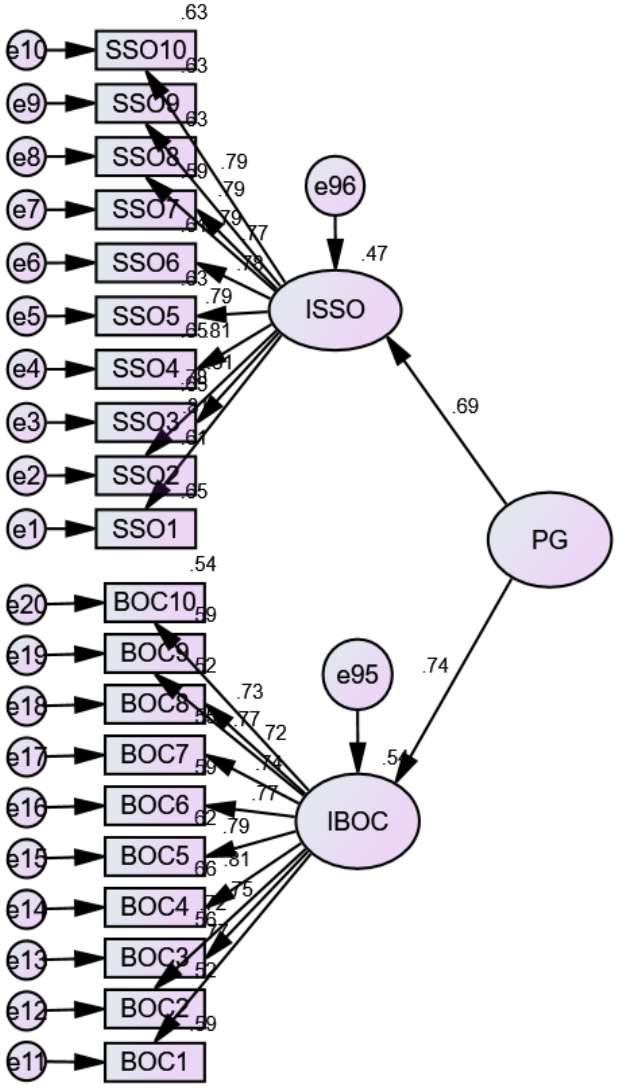


Figure: Second order measurement Model of PG

APPENDIX – I (Contd…)

Measurement Models

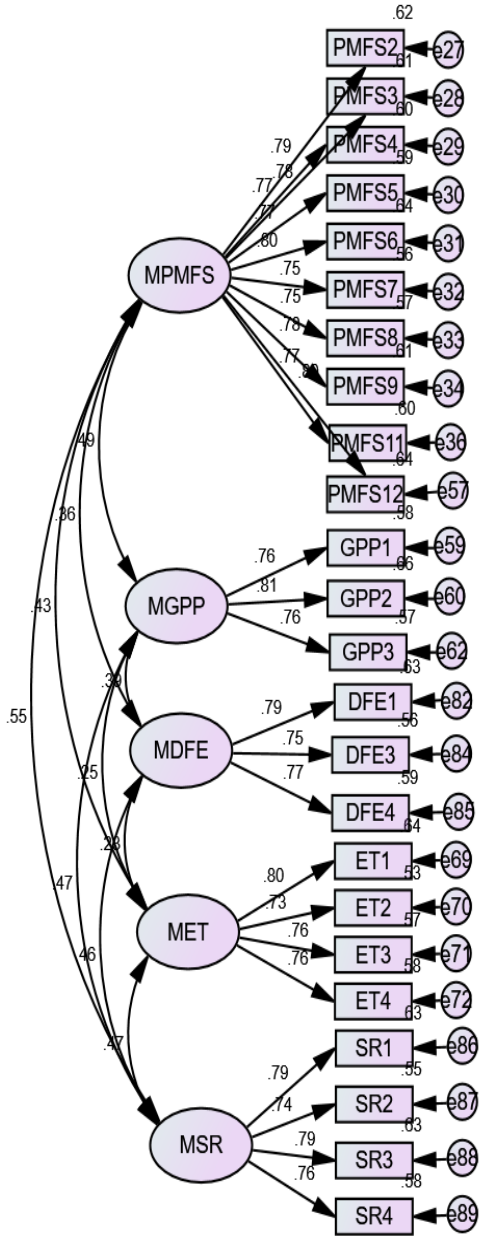


Figure: First order measurement Model of PSM

APPENDIX – I (Contd…)

Measurement Models

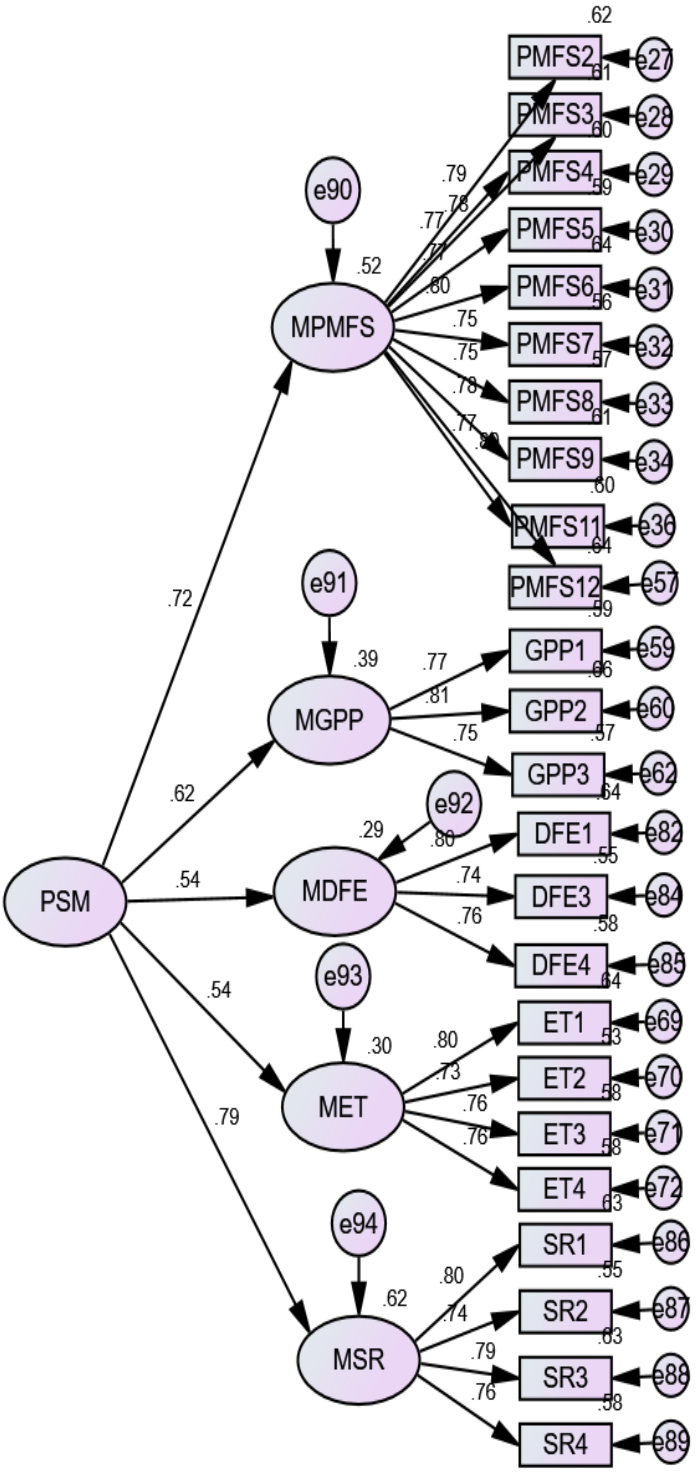


Figure: Second order measurement Model of PSM

APPENDIX – I (Contd…)

Measurement Models

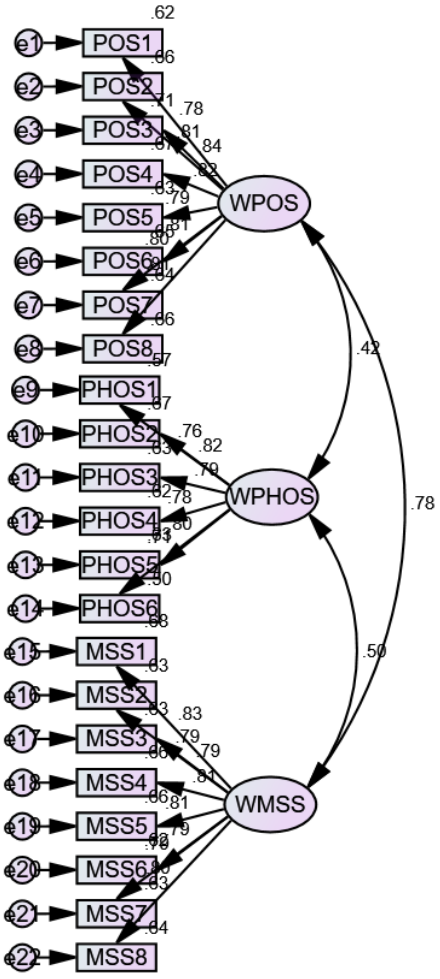


Figure: First order measurement Model of SS

APPENDIX – I (Contd…)

Measurement Models

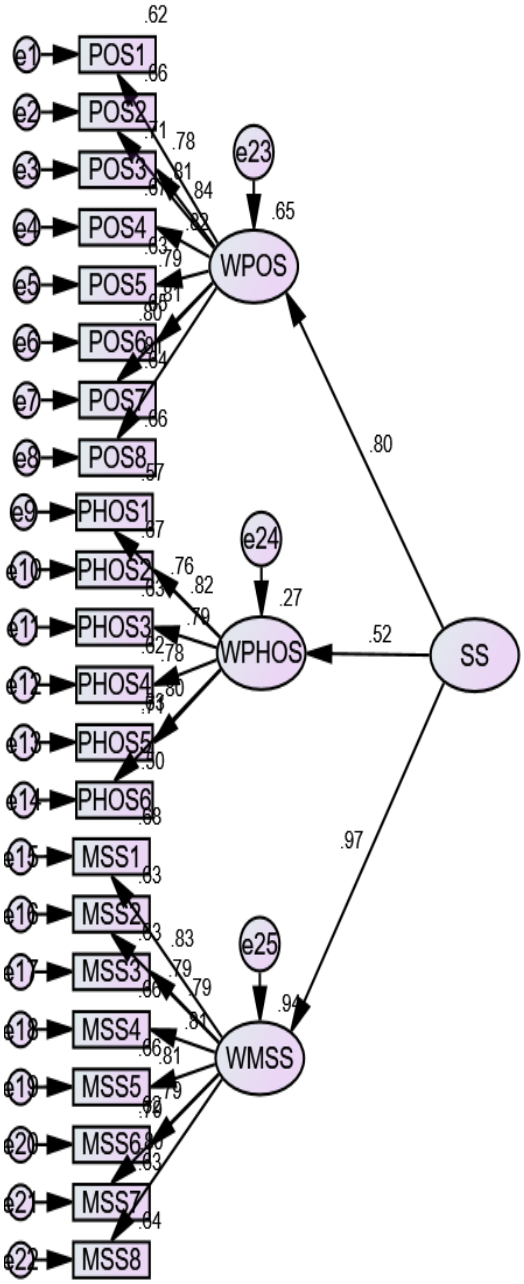


Figure: Second order measurement Model of SS

APPENDIX – I (Contd…)

Measurement Models

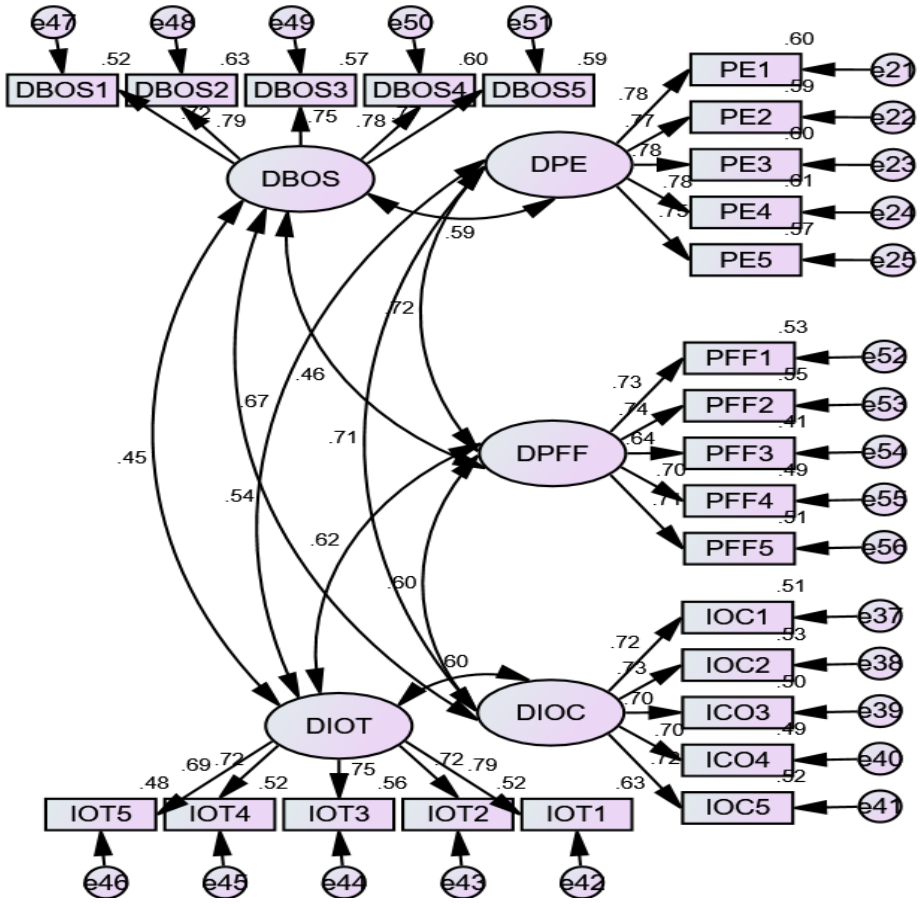


Figure: First order measurement Model of PS

APPENDIX – I (Contd…)

Measurement Models

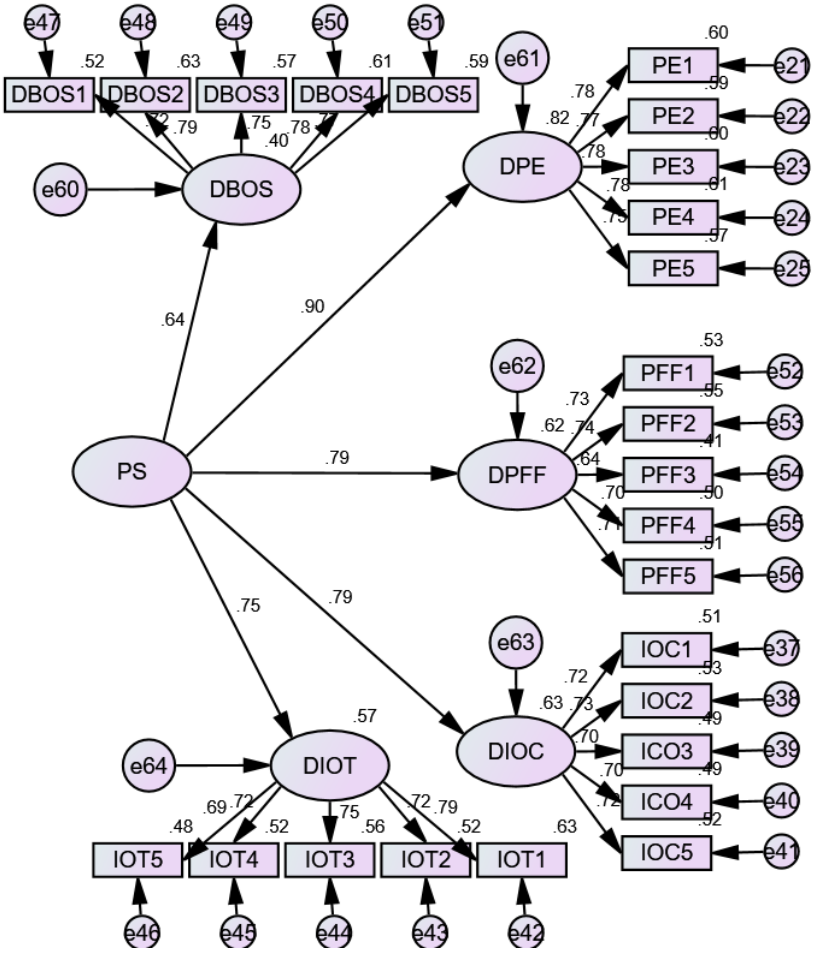


Figure: Second order measurement Model of PS

APPENDIX – I (Contd…)

Measurement Models

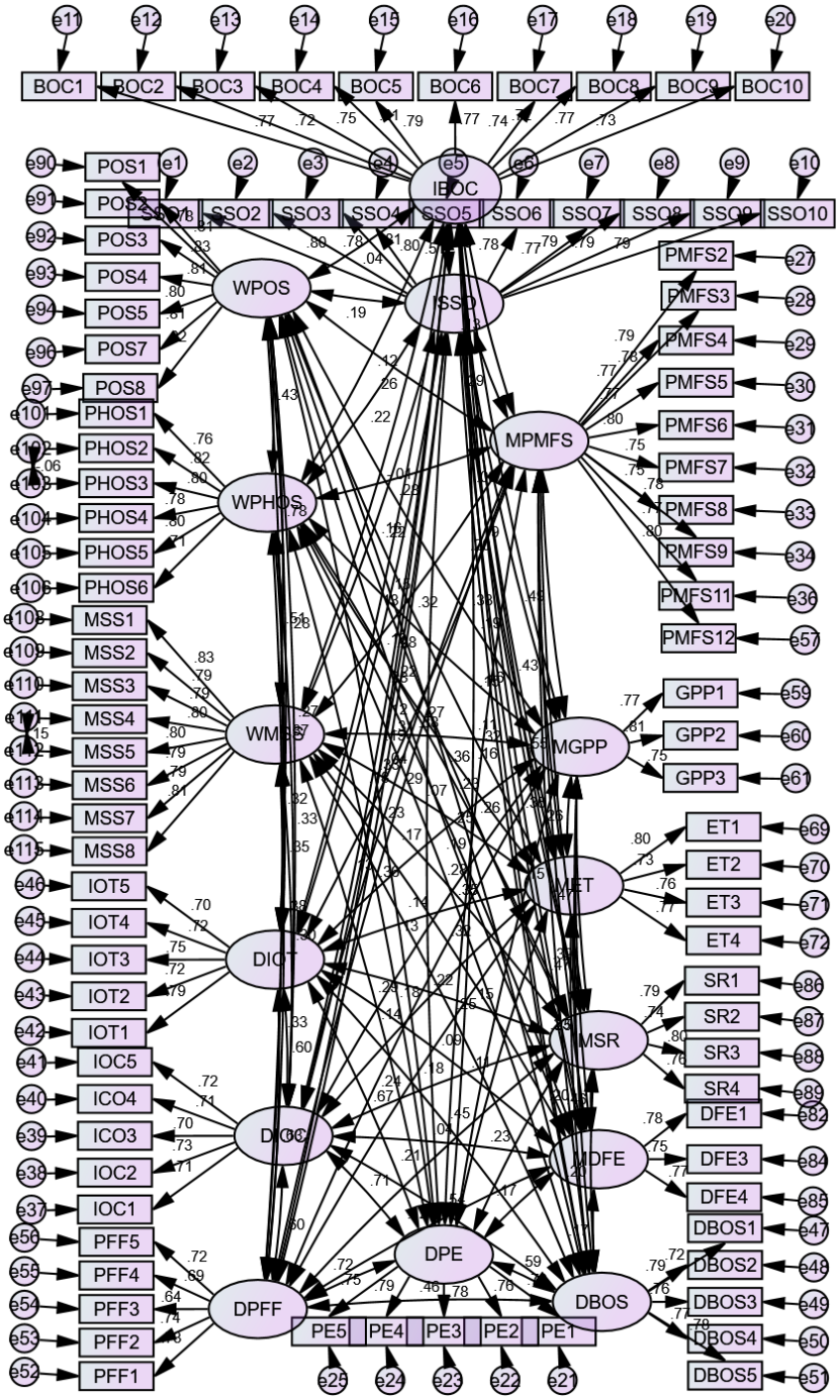


Figure: Complete Measurement Model of all dimensions

APPENDIX – I (Contd…)

Measurement Models

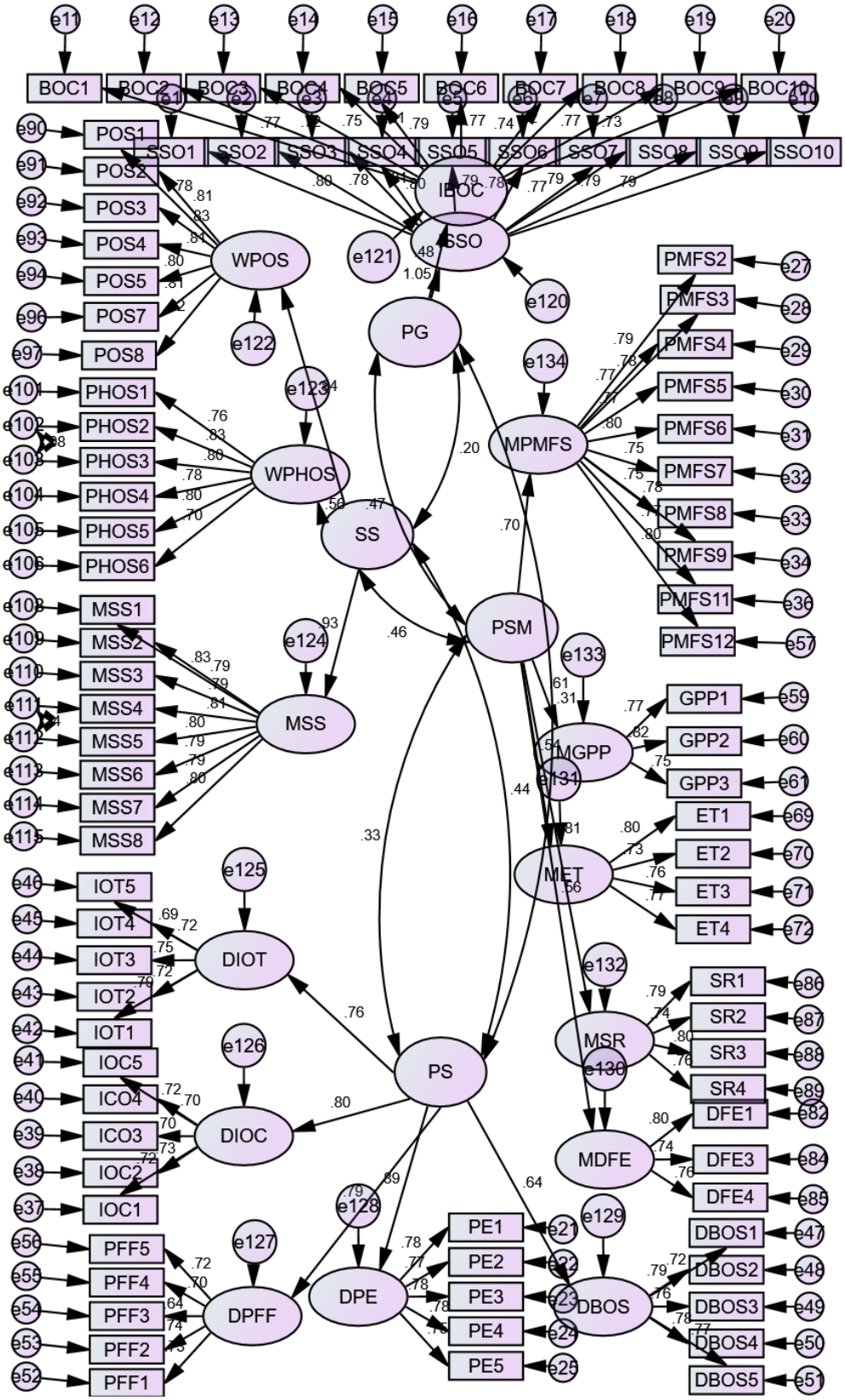


Figure: Second Order Measurement Model

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by Muhammad Iftikhar Ali

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PROJECT GOVERNANCE AND PROJECT SUCCESS: A MODERATED MEDIATION MODEL OF PROJECT SUSTAINABILITY MANAGEMENT AND STRATEGIES

Muhammad Iftikhar Ali
01-280171-002

A thesis submitted in fulfillment of the requirements for the award of the degree of Doctor of Philosophy (Management Science)

Department of Management Studies

BAHRIA UNIVERSITY, ISLAMABAD

June 2022

Thesis: Project Governance: A moderated mediation model of PSM and PS

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