

**Sustainable Public-Private Partnership Projects Performance:  
Moderated Moderation of Environmental Uncertainty,  
Joint Risk Management and Trust**



**Muhammad Waseem Ali Tipu**

**01-280182-005**

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## APPROVAL FOR EXAMINATION

Scholar's Name: Muhammad Waseem Ali Tipu

Registration Number: 01-280182-005

Program of Study: Ph.D. (MS)

Thesis Titled:

**Sustainable Public-Private Partnership Project Performance : Moderated Moderation of Environmental Uncertainty, Joint Risk Management and Trust**

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Principal Supervisor's Signature: \_\_\_\_\_

Name: Dr Ali Imtiaz

Date: \_\_\_\_Aug 2023

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(01-280182-005)

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Date: Aug 30, 2023

Supervisor: \_\_\_\_\_

Prof. Dr. Ali Imtiaz

Department of Management Studies

Bahria Business School

Bahria University Islamabad Campus

## DEDICATION

This dissertation is dedicated to my loving family members, who have meant and continue to mean so much to me, especially my (late) father *Mian Ghulam Ali* who had always loved me and strengthened my belief to endure difficulties for great success.

I take this opportunity to thank my beloved wife *Ayesha Tipu* who has always been a great help to undertake this uphill task. She is the source of true inspiration and love for life to me. Lastly, I would like to adore my lovely children *Amber, Menaal*, and *Mahad* for their grace.

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## ABSTRACT

Governments around the world are using Public-Private Partnership (PPP) projects to deliver different services and products in partnership with the Private sector. The sustainable performance of PPP projects is one of the primary challenges in the project management domain, especially for large infrastructure projects having multiple years duration that exposes them to Environmental Uncertainties affecting overall project success. This study presents a comprehensive framework to achieve Sustainable PPP Project Performance. Initially, Critical Success Factors (CSFs) are identified from extensive literature and then confirm their relevancy and their relationship with Sustainable PPP Project Performance. This study also evaluates the impact of Environmental Uncertainty (EU) as a moderator on the relationship between CSFs and Sustainable PPP Project Performance. Subsequently, Trust and Joint Risk Management (JRM) moderate the moderated impact of EU to achieve Sustainable PPP Project Performance. CSF theory and Agency Theory have been used considering all-encompassing variables including EU, Trust, and JRM as a way forward to deal with agency problems. This study makes an effort to achieve Sustainable PPP Project Performance from the direct relationship of CSFs and the three-way interaction of EU, Trust, and JRM in the paradigm of agency theory. A research methodology is a quantitative approach. An explanatory type of research is used to identify the variables and to determine the link between the proposed conceptual model. Cross-sectional data with a primary method for data collection is used. A questionnaire was used to get the response from the population comprising officials from the Pakistan Public Private Partnership Authority (PPPA), companies undertaking PPP projects, and consultants/experts involved in the infrastructure PPP projects. Snowball non-probability sampling techniques was used for data collection. A sample size of 394 has been used for data analysis. The analysis provides empirical evidence about the significant correlation between CSFs and Sustainable PPP Project Performance along with the significant moderating impact of the EU on this relationship. Furthermore, it provides evidence of moderated moderation impact of Trust and JRM on the moderated outcome of the EU for the achievement of sustainable PPP Project Performance. The study outcome provides a foundation to formulate a comprehensive framework for Sustainable PPP Project Performance in developing countries as well as the study is valuable to PPPA, companies undertaking PPP projects and consultants working on PPP projects.

**Keywords:** Public-Private Partnership; Sustainable Performance; Environmental Uncertainty; Joint Risk Management; Trust; Agency theory.

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## LIST OF ABBREVIATIONS/ ACRONYM

ADB	-	Asian Development Bank
AHCI	-	Art and Humanitarian Citation Index
APM	-	Association for Project Management
AVE	-	Average Variance Extracted
BLO	-	Build-Lease-Own
BLT	-	Build-Lease-Transfer
BOO	-	Build - Own - Operate
BOOM	-	Build-Own-Operate-Maintain
BOOT	-	Build - Own - Operate - Transfer
BOOTT	-	Build-Own-Operate-Train-Transfer
BOR	-	Build-Operate-Renewal
BOT	-	Build - Operate - Transfer
BTO	-	Build-Transfer-Operate
CR	-	Convergent Validity
CSFs	-	Critical Success Factors
CSR	-	Corporate Social Responsibility
DBFO	-	Design-Build-Finance-Operate
DBO	-	Design-Build-Operate
DBOM	-	Design-Build-Operate-Maintain
DBT	-	Design-Build-Transfer
DOT	-	Design-Operate-Transfer
DV	-	Dependant Variable
EF	-	Economic Factor
ESCI	-	Emerging Science Citation Index
ESG	-	Environmental, Social and Governance
EU	-	Environmental Uncertainty
FWO	-	Frontier Works Organization
GFC	-	Global Financial Crisis
IPDF	-	Infrastructure Project Development Facility
IV	-	Independent Variable
JRM	-	Joint Risk Management
KMT	-	Krejcic and Morgan Table

LF	-	Legal Factor
MM	-	Market Maturity
NESPAK	-	National engineering services Pakistan
NHA	-	National Highway Authority
NLC	-	National Logistics Cell
NPM	-	New Public Management
OECD	-	Organization for Economic Cooperation and Development
PEC	-	Pakistan Engineering Council
PES	-	Pakistan Engineering Services
PF	-	Political Factor
PFI	-	Private Finance Initiative
PLS	-	Partial Least Square
PMBOK	-	Project Management Body of Knowledge
PMI	-	Project Management Institute
PPP	-	Public Private Partnership
PPPA	-	Public Private Partnership Authority
PrF	-	Procurement Factor
PRISMA	-	Preferred Reporting Items for Systematic Review and Meta-Analysis
RDS	-	Response Driven Strategy
RF	-	Regulation Factor
ROO	-	Rehabilitate-Own-Operate
ROT	-	Refurbish-Operate-Transfer
SCIE	-	Science Citation Index Expanded
SPPPP	-	Sustainable Public Private Partnership Project
SPSS	-	Statistical Package for Social Sciences
SSCI	-	Social science Citation Index
SDGs	-	Sustainable development goals
TF	-	Technical Factor
WB	-	World Bank



# CHAPTER 1

## INTRODUCTION

### 1.1 StudyBackground

Sustainable development or sustainability in projects is very important consideration of the modern era (Hueskes, Verhoest& Block, 2017). Sustainability has got the attention not only in the Public Private Partnership (PPP) literature but the overall project management domain alike (Du, Wu & Zhao, 2018).Public-Private Partnership (PPP) is considered a tool to achieve sustainable development goal (SDGs) by United Nation. (Li et al., 2021). United Nations has formulated seventeen (17) sustainable development goals and has linked PPP with sustainability (Cheng et. al., 2021). Furthermore, United Nations Economic Commission for Europe has linked PPP projects with the sustainability of any country (Hancock, Ralph & Ali, 2018).

Public-Private Partnership (PPP) is used to improve economic development around the globe in developed as well as developing countries (Tian et al., 2021). The gamut of PPP is so vast that it appears difficult to formulate a complete and precise definition of PPP (Akintoye, Beck & Kumaraswamy, 2015). However, the increased popularity of PPP in the last decades has enhanced its importance many folds to understand its mechanics. We can deduce a clear description of the concept by common practices, rules, and procedures involved in PPP (Leitao, Sarmiento, & Aleluia, 2017).

PPP is an arrangement for coordination and cooperation of the private and public sectors around the world. PPP has enhanced the economic value of different projects and contributed to the growth of infrastructure projects in particular (Qiu et. al., 2023). The main idea of the PPP scheme is public and private sector collaboration (Ke et al., 2010) with different tiers of responsibilities and involvement as well as to provide public and infrastructure services more proficiently (Yun et al., 2015). The concept of PPP specifically focuses on the interrelationship between private and public partners. Moreover, this arrangement also stems from the concept of mutual sharing of

risk, cost, and profit (Steijn et al., 2016).

Conventional studies explain PPP as a source for managing projects and their finance (Wang et al., 2018). The PPP framework in the ambient of sustainability describes it as a governance tool to attain sustainable development goals in an overall globalization context (Cheng et al., 2021). Sustainable projects with modern and reliable characteristic are very important and are considered the objective of people in the world (Jomo et al., 2016).

Undoubtedly, PPP projects in developed countries like USA, Britain, Australia, and Canada have obtained great success and thus have attracted great private investment. The PPP market in developed countries is much more mature and therefore private investor has full confidence in their markets (Wojewnik-Filipkowska & Węgrzyn, 2019). However, this concept does not apply to developing countries where very few private markets have been successful to attract private investments in the past couple of decades like infrastructure, health, and transport industry (Osei-Kyei & Chan, 2019).

PPP projects are being used extensively around the globe to deliver public assets to meet budget deficits (Liu et al., 2018). When adopting PPP, the main concern of any government is to provide the best innovative services delivery and public service delivery more efficiently, effectively and with great quality at lower cost possibility (Liu et al., 2016). Many researchers have discussed various CSFs in their studies and highlighted their importance for successful PPP project implementation. (e.g. Jamali, 2004; Li et al., 2005; Chan et al., 2010; Babatunde et al., 2012; Cheung et al., 2012; Osei-Kyei et al., 2015; Liu and Wilkinson, 2016 and Opawole et al., 2019).

Critical Success Factors (CSFs) have a significant effect on the performance of PPP projects (Opawole et al., 2019) and there are plethora of studies by various researchers (e.g. Jamali, 2004; Li et al., 2005; Chan et al., 2010; Babatunde et al., 2012; Cheung et al., 2012; Osei-Kyei et al., 2015; Liu and Wilkinson, 2016 and Opawole et al., 2019) that deal with the influence of CSFs on the performance of PPP projects. As per studies, there are numerous factors, which contribute to satisfactory or unsatisfactory PPP projects performance (Liu et al., 2016). There remained a huge debate of blame game on partners for the unsatisfactory PPP projects performance as

the reasons for the unsatisfactory PPP project performance have never been explored in detail. (Tetteh et al., 2019).

According to Bititci et al., (2012), Performance measurement is an important concern to measure the business/ project success as the end state of the project will decide about the satisfactory or unsatisfactory performance. As Performance measurement is the only process to quantify and report the efficiency, success, and efficacy of the action performed toward the attainment of the set objectives by the organization (Liu et al., 2018).

Whitfield (2010) has highlighted the PPP failure reasons regarding miscalculation about the project. The uncertainty to implement the PPP projects is a point of great concern as it leads to the failure of a project in the end (Fu, Sun & Xu, 2023). Uncertainty is theorized based on elements present inside the organization i.e. organization-specific uncertainty and the uncertainty outside the organization can be termed as external or environmental uncertainty (Almeile et. al., 2022).

Uncertainty is presumed as the possibility of happening of an undesired event thus it provides the central understanding of risk (Cheng, Liu, & Xu, 2021). At the same very time uncertainty appears relevant only when it comes to the result which is unwanted and potentially takes a project to a state which requires a response as well (Zinn, 2016). Once we talk about the response to deal with the uncertainty then it describes the partnership intensity or the partner's coordination in different forms like their trust in each other or some mechanism to face the uncertainty i.e. management system for risk.

In developing countries, PPP is considered one of the best-suited measures for financing and procurement modality to address the existing infrastructure gap (Wang et al., 2018). PPP can also be used to bring down cost and time efficiencies as well as utilizing the private sector to deliver public goods by managing them efficiently (Cps-pak-2015-2019). Public-Private partnerships also fetch risks, which need to be managed and mitigated. To tackle these challenges/ risks, there remains a need to bring reforms to the PPP arrangement (Mensah & Casadevall, 2019).

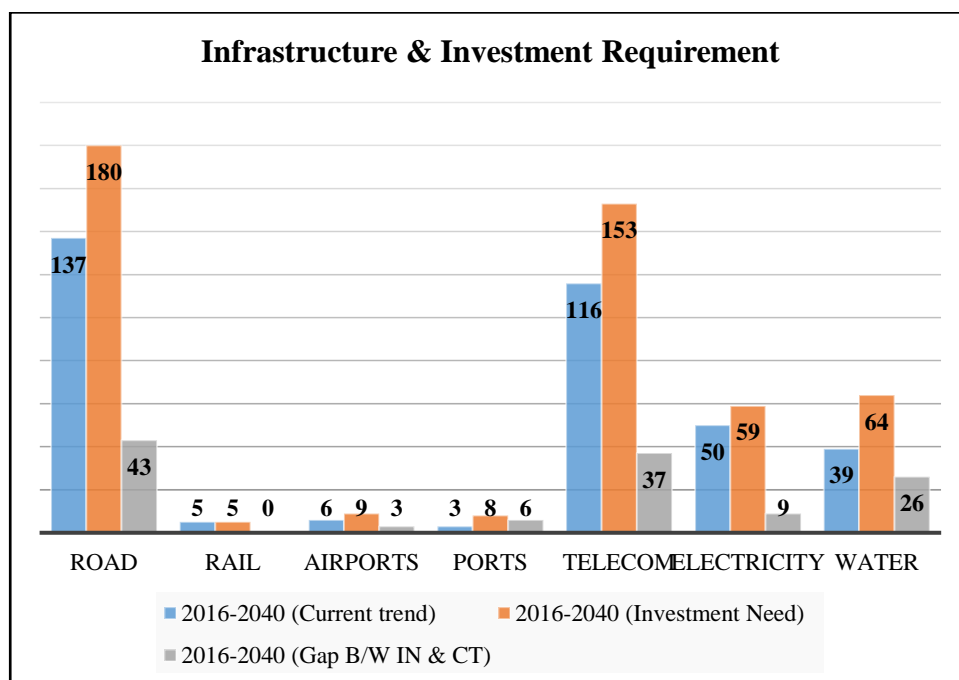
Mostly, past studies like Hopwood, Mellor, and Brien (2005) have highlighted the importance of PPP projects to obtain sustainability in any country. Modern views

about sustainability encompass three interconnected dimensions of sustainability namely: Economic, Social, and Ecological (Pinz, Roudyani & Thaler, 2018). These three forms can produce social parity, economic prosperity clean natural environment, and social justice. In short, we can achieve economic, ecological, and social sustainability through PPP projects and can use it as a capable tool in this regard (Ma et. al., 2020).

Sustained economic growth is linked with the country's macroeconomic stability (Le Fort, Gallardo & Bustamante, 2020). According to Pakistan's economic survey (2018-19), the growth momentum of Pakistan's economy remained unstable in the last couple of decades due to macroeconomic imbalances. These macroeconomic imbalances coupled with the growing population in developing countries like Pakistan are unable to meet the infrastructure requirements due to limited financial resources (Oxford Economics, 2017). The gap in current trends and investment is shown in the following figure.

Figure 0.1

#### Investment trends in Pakistan



Source: Oxford Economics, 2017

Pakistan like many other developing countries has also adopted Public-Private Partnerships (PPP) in different sectors since the 90s and this adoption has improved the infrastructure service delivery of the public. Owing to fiscal constraints, PPP has been opted as an innovative and supplementary approach to provide infrastructure away from the traditional approach linked with Government as the sole service provider rather it has taken the finance and expertise from the private sector. The significant share in the infrastructure sector required in Pakistan can be obtained through Public-Private Partnerships (PPP) and this policy approach framework will lay a solid foundation for the new approach i.e. PPP in Pakistan (Cps-pak-2015-2019).

According to World Bank Private Participation in Infrastructure (PPI) database, Pakistan achieved a financial close of 108 infrastructure projects from 1990 to 2019 and approximately made investments of approximate\$28.4billion (PRs4.40 trillion). Out

In Pakistan, the total number of infrastructure projects that attracted private investments and achieved financial closure from 1990 to 2019 were 108.

of the 108 PPP projects that achieved financial closure, the public and private entities of the United Kingdom and the People's Republic of China (PRC) have sponsored the most projects.

According to provincial public private partnership authorityopen source data, Punjab has 10 ongoing PPP projects, Khyber PakhtunKhwana PPPA has 1564 PPPschemes and Sindh has passed 36 PPP projects in their respective provinces. Besides these projects, 20 persons per month on international projects and 590 persons per month on national projects have been employed as consultants by the governments to provide consultancy on PPP projects.

PPP (Public-Private Partnership) has resolved the problem of resource deficit for many developing countries, likewise, it is equally applicable to the Pakistani scenario but somehow it has not been a prolific practice for Pakistan due to various reasons/ risk factors. Therefore, the suitability of PPP in the Pakistani context needs to be explored. Furthermore, different challenges which had been the cause of the ineffectiveness of PPP in Pakistan need to be identified for a better PPP approach in the country (Sadeghi et al., 2018).

In order to have more PPP projects, we need to be cleared about the impact of Critical Success Factors which play role in enabling the environment for PPP projects (Opawole et al., 2019) so we can have more successful and sustainable PPP projects performance. PPP projects are considered the testimony of a sustainable future for society and this sustainable future must be able to fulfill present needs without forfeiting the interest of upcoming generations (Hwang, Shan, & Lye, 2018). PPP projects are gaining popularity in the world, therefore, the quest to tackle the reasons for PPP failures is not rare as they provide a foundation to deal with the posed threat to the sustainable development of human society by Sustainable PPP Project Performance (Cui et al., 2018). Therefore, researchers have linked the PPP's success to the sustainable development of any country (Du, Wu, & Zhao, 2018).

## **1.2 Gap Analysis**

Cui et al., (2018) reviewed almost 754 studies from 56 countries on six continents around the globe. The study explained that out of the 754 studies, 165 articles originated from China, 108 were from the UK, 84 were from the USA, 80 were from Australia and India produced 40 articles. Although the remaining countries have also incorporated their share yet the above-mentioned countries have taken almost fifty percent share of PPP studies. It was the same percentage as compared to the findings of Ke et al. (2009). This findings explains that publications or literary contribution regarding PPP of any country has the linkage with the investment in PPP for that specific country.

### **1.2.1 Theoretical Gap**

Different researchers have investigated the theoretical perspective of PPP differently attributable to their specific discipline. Theories play a critical role in understanding the concerned discipline, similarly, classical theories like complex system theory, contract theory, and organizational theory have played a very important role in PPP research and practices. Previous researchers have widely used the principal-agent theory or agency theory, stakeholder theory, and game theory amongst the main theoretical foundations of PPP literature (Cui et al., 2018). The Critical Success Factor theory and Principal-Agent theory lens have been used to see the PPP project in this

study. According to Principal-Agent theory, the private sector plays as an agent, and the public sector act as a principal. In this way, the private sector takes maximum advantage of principal sector incentives (Cui et al., 2018).

Limited literature has explored the aspects of agency problems in PPP relationships. The available literature is mainly focused on the risk (Grimsey & Lewis, 2007; Tang, Shen, & Cheng, 2010) or the cost associated with the cooperation (Shaoul, Stafford, & Stapleton, 2012). When its focus is zoomed in, there is a lack of knowledge regarding conflicting interests, uncertainty, and risk behavior (Smith, Umans, & Thomasson, 2018). There is also a requirement to see the trust, project risk, and its management through the lens of the principal-agent model in the PPP arrangement (Niwabiine, 2019). Previously, no study has used the Environmental Uncertainty as a moderator in the PPP framework for sustainable PPP performance. Moreover, no framework of PPP has used Trust and JRM moderated moderation for the achievement of sustainable PPP performance.

There is requirement to see trust and risk management through the lens of principal-agent model in PPP projects.

### 1.2.2 Contextual Gap

Cui et al., (2018) have mentioned that the investment in Public-Private Partnerships was equal to the publishing articles in a particular field. According to Oxford Economics (2017), Pakistan just got about 25 Billion \$ investment in PPP projects which is the third last as per the global and regional perspective as shown in Figure 1.2. Keeping in view the investment, we can have an idea about the fewer PPP projects as well as publications/ literary work done in Pakistan. Thus, there is a dire need to conduct PPP-specific research in Pakistan (Hashmi, 2020).

Figure 0.2

Investment Committed in PPP since the 90s



*Source: Oxford Economics, 2017*

The lack of work done about PPP is the main motivation source to undertake this study as there is no significant work done in Pakistan about PPP and in the future, most of the projects are likely to be dependent on PPP because developing countries have to rely on PPP to fill the gap of financial need (Cps-pak-2015-2019). Currently, there are approximately 22 ongoing infrastructure projects in Pakistan but ironically there is no reliable estimation method or consideration for the incorporation of localized Critical Success Factors (CSFs) for PPP projects. Owing to the non-consideration of proper localized CSFs most PPP projects don't meet a successful end state (Hai, Toan & Van, 2022). Therefore, there is a great requirement to ascertain the localized CSFs for PPP projects in Pakistan (Ullah et. al., 2018).

Sustainability is one of the most critical agendas of the modern age, therefore modern industry has focused on this aspect and this concept is being applied in various fields. However, an extension of the sustainability concept to the Public-Private Partnership projects performance needs attention as it is not a much-researched linkage (Dolla & Laishram, 2020). However, there is a requirement for the formulation of a comprehensive management outline to measure sustainability performance management as this is an issue of extensive research (Maletič, 2018). Moreover, there is also a requirement to investigate the obstacles or hindrances which are affecting the PPP project performance in Pakistan (Maryam & Sohail, 2018). PPP is a policy with



strong practical needs therefore, future research needs to evaluate the PPP phenomena and provide an optimized solution to the application problem (Cheng et al., 2021). It is quite evident that launching and setting up PPP projects is not an easy task, especially with limited market size, characteristics, and inexperience with PPP (Kim & Kwa, 2020).

Public-private partnership projects in an unpredictable environment are confronted with uncertainty as they are dealing lot many issues emerging in their environment. A great number of international evidence point out that a favorable regulatory mechanism is very much important to deal with Environmental Uncertainty (EU). Literature has discussed the conflicts present in the PPP arrangement but the uncertainty has been discussed very little in this regard and needs to be explored more to have sustainable PPP projects (Smith, Umans, & Thomasson, 2018). A robust framework to deal with Environmental Uncertainty needs to be explored which can provide sustainable PPP project performance (Song, 2018).

Present-day uncertain and changing environment enhances the importance of risk management to have successful projects. In this regard, Joint Risk Management (JRM) can facilitate the project risk understanding and its consequences for different participants. However, in spite of the advantageous approach of collaborative strategy i.e. JRM, it is still rarely used in projects under Public-private partnerships (Friday et al., 2018) which can be examined further. Trust absorbs uncertainty and diffuses complexity by increasing reliance on partners in a public-private partnership. Partners who place trust in each other to deal with complexity can reduce the impact of uncertainty in projects.

Pakistan like many developing countries needs to explore PPP domain by extensive research, which can identify the contextual/localized CSFs for PPP, reasons of PPP project's failure to find out solution for achievement of sustainable PPP project performance.

Trust between partners in any PPP helps partners to face uncertain outcomes and PPP performance can be correctly visualized in the presence of trust (Warsen et al., 2018). Trust enhances the public value in PPP projects but its role to enhance the business value in PPP projects is unclear especially when PPP projects are working in an uncertain environment therefore it needs to be explored (Brogaard, 2019). The mixed

answer about the impact of Trust warrants further attention to investigate Trust in the partnership projects' performance (Abdullah & Khadaroo, 2020).

This study aims to satisfy the following gaps:

- Work on PPP project in Pakistan.
- Exploration of CSFs for PPP projects in Pakistan.
- Working on sustainable PPP projects performance in Pakistan.
- Explore the impact of hindrance/ agency problem i.e Environmental Uncertainty (EU) on PPP projects performance.
- Formulation of framework to deal with EU.
- Explore the role of Trust and Joint Risk Management to deal with the agency problem.

Under  
umbrella  
of agency  
theory

### 1.3 Problem Statement

The economic growth of any country stimulates by different factors including the number of underway PPP projects and the types of PPP in use. Public-Private Partnership (PPP) has encouraged the private sector to join hands with the public sector for different infrastructure projects by combining the strengths of both sectors. Keeping in view the gap analysis supplemented by the challenges for successful completion of the PPP project highlighted in the literature researcher can comprehend that attainment of sustainable PPP project performance is not so well explored idea so far. Therefore, there is a dire need to formulate a comprehensive framework for the sustainable public-private partnership project. Literature highlights that there is a linkage between the research work on PPP projects and investment made in

There is a dire need to explore the localized / contextualized CSFs for PPP to achieve sustainable PPP project performance. Environmental uncertainty is likely to have moderated impact on this relationship which can be moderated with the impact of Trust and JRM.

PPP projects. It has also appeared in the literature that developing countries are not mature markets for PPP due to less research work on PPP. Exploration of localized CSFs for PPP are very important for PPP project performance but has not been addressed properly. Although the literature has evidence regarding the relationship between CSF and PPP project success yet the relationship between CSF and Sustainable PPP Project Performance has not been investigated whereas Sustainable PPP Project Performance is the need of the modern era. PPP projects develop agency problems due to the longevity of the projects and the involvement of partners. The impact of agency problems (i.e. environmental uncertainty) has not been investigated thoroughly.

This perceived threat to sustainable PPP project performance needs to be tackled by appropriate measures so we can obtain Sustainable PPP Project Performance. Therefore, the researcher can use the factors like Trust and Joint Risk Management which are not much explored in the context of PPP but researchers have mentioned their concern that these factors may play some role to enhance partnership coordination in PPP arrangements leading to Sustainable PPP Project Performance. Once the challenge to Sustainable PPP Project Performance is addressed properly then we will be able to get Sustainable PPP Project Performance in the end.

#### **1.4 Research Questions**

Keeping in view the problem statement based on research gaps and study needs, this research aims to answer the following research questions:

**RQ 1:** What are Critical Success Factors (CSFs) for PPP in Pakistan?

**RQ2:** What is the relationship between CSFs for PPP and Sustainable PPP Projects' Performance?

**RQ 3:** How does Environmental Uncertainty moderate the relationship between CSFs and Sustainable PPP Projects' Performance?

**RQ 4:** How does Joint Risk Management moderate the moderated outcome of Environmental Uncertainty on the relationship between CSFs and Sustainable PPP Projects' Performance?

**RQ 5:** How does Trust moderate the moderated outcome of Environmental Uncertainty on the relationship between CSFs and Sustainable PPP Projects' Performance?

## **1.5 Research Objectives**

Keeping in view the research questions in mind, this study aims to extend the current knowledge of PPP projects by setting the following objectives:

**RO 1:** To explore the appropriate CSFs for PPP.

**RO2:** To evaluate the relationship between CSFs and Sustainable PPP Project Performance.

**RO 3:** To evaluate the moderated impact of Environmental Uncertainty on the relationship between the CSFs and sustainable PPP project performance.

**RO4:** To evaluate the moderated moderation impact of Joint Risk Management on the moderated outcome of Environmental Uncertainty on the relationship between CSFs with Sustainable PPP Project Performance.

**RO 5:** To evaluate the moderated moderation impact of Trust on the moderated outcome of Environmental Uncertainty on the relationship between CSFs with Sustainable PPP Project Performance.

## **1.6 Significance of Study**

This study has significance from theoretical, contextual and methodological perspective as it has addressed the existing gaps in respective fields.

### **1.6.1 Theoretical Significance**

This study provides a great insight into agency theory by tackling the agency problems of Environmental Uncertainty by Joint Risk Management and Trust between the partners/ agents. This study provides a deeper perspective of PPP projects managements by taking on board all the partners to deal with envisaged challenges for the successful application of PPP projects. This study provides a comprehensive framework for sustainable PPP projects in developing countries and thus sets a stage for

policymakers to formulate policy recommendations in PPP. This study also tests the agency theory by discussing and empirically testing the agency problems of uncertainty, risk, and joint risk management to bring sustainability in principal and agent relationships for better and sustainable performance.

### **1.6.2 Contextual Significance**

Initially, this study explores the contextual critical success factors for PPP and then figures out the relationship between critical success factors (CSFs) and sustainable PPP performance in developing countries. Subsequently, it investigated the moderated impact of Environmental Uncertainty (EU) on the relationship to establish it as a hindrance/ impediment to PPP project performance. Then this study explained the impact of Trust and Joint Risk Management on the moderated outcome of Environmental Uncertainty on the relationship between CSFs and sustainable PPP performance. This study highlighted the importance of PPP projects to bring sustainability to any country.

This study unfolds the relationship of CSFs with sustainable PPP performance. This relationship guides us to maintain a favorable environment to have successful PPP projects in our country. The researcher can formulate a policy and framework to take measures to have more investment in projects of its kind as the requirement was highlighted.

This study would not only be significant for academicians but also gives valuable insight to PPP project practitioners. The theoretical model helps practitioners to formulate the strategy for sustainable PPP performance under the realm of Environmental Uncertainty as persists in most developing countries. The results of this study are valuable regarding the formulation of policies and strategies to manage PPP projects to have better and sustainable PPP performance. Subsequently, the outcome can be used by the Public-Private Partnership Authority (PPPA) to have a policy/strategy point in PPP projects for sustainable PPP performance.

The study findings can be adopted by the future researcher through the development of further areas of own interest. It can provide the basis for upcoming studies on PPP performance and an empirical basis for sustainable PPP performance.

The idea of Trust and Joint Risk Management to moderate the impact of Environmental Uncertainty helped the researcher to explore more factors for sustainable PPP performance. The researchers can also benefit from the contribution of an extensive body of knowledge in PPP studies. The findings of this study tell us the way forward to create a favorable environment for PPP projects as well as to maximize the outcome of these projects to bring sustainability to our homeland, as future projects will be dependent on the successful PPP.

### **1.6.3 Methodological Significance**

This study has used moderated moderation analysis techniques in PPP study which is a unique and very less applied technique in management science literature. Most management science studies have used different statistical analyses attributable to their research aims and objective. This study has used moderated moderation analysis technique.

## **1.7 Research Scope**

This study empirically tests a model for sustainable PPP project performance. This model incorporates the CSFs, Environmental Uncertainty, Trust, and Joint Risk Management leading toward Sustainable PPP Project Performance. This study is carried out in the PPP sector of Pakistan by incorporating the top and middle managers, consultants of the companies undertaking PPP projects, and the officer cadre members of the PPP authority of Pakistan. This study specifically looks into the three dimensions of PPP projects i.e. the relationship between CSFs and sustainable PPP performance, the moderated impact of Environmental Uncertainty, and moderated moderation impact of Trust and Joint Risk Management. This study has explored localized CSFs for PPP before going to further research dimensions. The research is an endeavor to discourse the huge gap present in the research of PPP sustainable performance by incorporating Environmental Uncertainty, Trust, and Joint Risk Management.

## **1.8 Research Limitations**

The scope of the study was limited to formulating a framework for sustainable PPP project performance by dealing the Environmental Uncertainty and to tackle this

aspect by Joint Risk Management, and Trust have been incorporated into the research model. Although there are numerous impediments to the success of any project this study could only explore the impact of one factor i.e. Environmental Uncertainty. Addressing one agency problem is a limitation. Joint Risk Management and Trust have been integrated to moderate the impact of Environmental Uncertainty. The incorporation of just two factors to mitigate the impact of Environmental Uncertainty is another limitation of this study as there can be more factors that can diminish the adverse effect of Environmental Uncertainty.

The research focuses on an important national issue i.e. PPP project practices in Pakistan. Although PPP practices remain country-specific and therefore the framework produced in this research is Pakistan-specific with the PPP units working in Pakistan. In order to implement the framework in other countries, the presented framework may need some refinement while an application to other countries but it can be assumed that the framework will remain helpful in other developing countries alike. As the research is highly context-specific and the generalizability of the finding is not an aim, thus the countries with similar contexts may implement whatever seems best to them.

## 1.9 Organization of Thesis

Organization of the thesis has been explained with the help of following diagram for better comprehension.

Table 1.1

### Organization of Thesis

S/ No	Research Phases (Uma Sekran 2010)	Research structure
1.	Observation, Broad area of research	<b>Chapter:1 Introduction</b>  Problem domain, Problem statement, Research question, objectives, significance & research gap
2.	Problem Identification, Research problem delineated	

3.	Preliminary data gathering, Literature Review	<b>Chapter:2 Literature Review</b>  Literature review, Theoretical Framework, and Hypothesis
4.	Theoretical Framework, Variables clearly identified and labeled	
5.	Generation of Hypothesis	
6.	Research design	<b>Chapter: 3 Methodology</b>  Research design, Sampling population, Unit of analysis, Research approach, and data collection technique
7.	Data collection, analysis & interpretation	<b>Chapter: 4 Results</b>  Data analysis, Reliability, Validity, Correlation analysis, Moderation analysis, Moderated moderation analysis
8.	Deduction  Hypothesis Sustiated, Research questions answered	<b>Chapter:5 Discussion&amp; conclusion</b>  Summary of findings & Future Recommendations

The thesis comprised of five chapters including a list of references and appendices. Chapter 1 includes a background study regarding PPP, CSFs leading to Sustainable PPP Project Performance, Environmental Uncertainty, Trust, and Joint Risk Management along with the factors associated with PPP sustainable performance. It also includes the problem statement that provides the issues prevailing that need to be minimized by providing empirical evidence. Keeping in view the statement of problem, objectives, and questions for research were set. This chapter also contains the study significance entailing the detail of study contributions and for whom this study will be helpful. Scope and research limitations are mentioned in this chapter.



Chapter 2 contains a literature review of study variables i.e CSFs, EU, JRM, and Trust along with the history of PPP. The theoretical underpinning for the study and conceptual framework along with the hypothesis details which have been tested in subsequent chapters are mentioned in this chapter.

Chapter 3 encompasses the research methodology regarding the research nature, data collection method, sampling design, and statistical tools used in the study. The chapter consists of the research approach, research design, time dimension, method of data collection, unit of analysis, sampling design, sample size, and research instrument for data treatment. It also describes the methods and step-by-step process involved in approaching the respondents for data collection.

Chapter 4 describes the findings and interpretation of the analyzed data concerning the research questions. Therefore, the results of the study have been presented in an aggregate way through a detailed explanation of analyzed data regarding each variable.

Chapter 5 covers the findings of the study with critical debate related to sustainable PPP performance. Compares the findings of the study against other studies and existing literature. It will also specify the contributions of the present thesis to the research areas. This chapter also explains the conclusion of the study, limitations related to the study which can be lessened by future researchers.

## **1.10 Demarcation of Thesis**

Public private partnership is a complex phenomenon and has linkages with many fields and sectors. An endeavour has been made in this study to channelize the focus towards PPP infrastructure projects for more clarity with the help of following table.

Table 1.2

Thesis Demarcation

Field of Application	Domain-Independent					Domain Specific				
Scope of Investigation	Govt.			PPP			Private			
Focus of Impact	Infrastructure Projects									
Sectors	Infrastructure-Economic					Infrastructure-Social				
Sub-Sector	Rail	Road	Urban Mobility	Port & airport	Water & Waste	Energy	ICT	Tourism	Agribus	
Scientific Perspective	Positivism					Interpretivism				
Research approach	Inductive					Deductive				
Research Method	Mixed Method		Quantitative				Qualitative			
Sampling Procedure	Probability Sampling					Non-Probability Sampling				
Sampling Technique	Convenient		Purposive		Snowball			Quota		
Legend	Out of Scope					In Scope				

## Chapter 2:

### LITERATURE REVIEW

This chapter provides a detailed review of Public-Private Partnership by highlighting its definition, different dimensional contours, and Critical Success Factors for successful PPP have been mentioned. CSFs for PPP have been deliberated and shortlisted according to country dimensions i.e. developing country. Sustainability is a great challenge and every project tries to obtain sustainable performance as the ultimate objective. Therefore, Sustainable PPP Project Performance has been discussed along with its measurement methods. Environmental Uncertainty always influences the performance of any project, uncertainty and its type along with Environmental Uncertainty has been explored through literature. Trust and Joint Risk Management are two agency problems and therefore this chapter presents a detailed overview of these two factors. Then, in order to provide theoretical foundation to study variable review of the agency theory and relationship of principal and agent with special emphasis on agency problems i.e. Uncertainty, Trust, and Joint Risk Management has been presented. In the end, the chapter provides the conceptual framework supported by theoretical foundation i.e. agency theory. This framework was subsequently tried empirically to obtain a comprehensive framework for Sustainable PPP Project Performance from Critical Success Factors and three-way interaction of Environmental Uncertainty, Trust, and Joint Risk Management.

#### 2.1 Public-Private Partnership (PPP)

PPP i.e. Public-Private Partnership is an arrangement of coordination and cooperation between private and public sectors to undertake some specific project which is considered a part of the public sector domain (Wang et al., 2018). Governments around the world are taking benefit from this cooperation attributable to the provision requirements of different services and products. The last two decades have seen the enormous popularity of PPP arrangements (Osei-Kyei, Chan, & Dansoh, 2019). The actual outcome of the PPP arrangement is PPP project performance

concerning the proposed achievements e.g the objectives established at the partnership time. The PPP project's efficacy is recognized by the comparison of objectives or goals with the outcome (Hodge, Greve, & Boardman, 2010).

### **2.1.1 PPP: A Brief History**

PPP is not a new phenomenon because it exists in our society in different shapes e.g. concession is the type of PPP which was present thousands of years ago. Romans used to practice the concession PPP for road construction, managing markets, and constructing public baths. French nobleman Luis de Bernam in the fourteenth century was also involved in the concession PPP project as the transportation of goods on the Rhine was contracted on concession (Cassis, Luca & Florio, 2016). Similarly, the joint venture has also been in practice as a form of PPP for a long time since the popularity of the PPP concept in 1970. During that time people started questioning the poor performance and the inefficiency of governments in different projects, thus leading to the concept of New Public Management (NPM) (Fábián, 2010). Against this backdrop, Public-Private partnership is taken as a substitute for bureaucratic public service methods and to some extent as an alternative to state-owned inefficient enterprises. Thus we can consider PPP as the main source to decrease the state's role, and enhance the public administration's efficiency and provision of public services (Jomo et al., 2016).

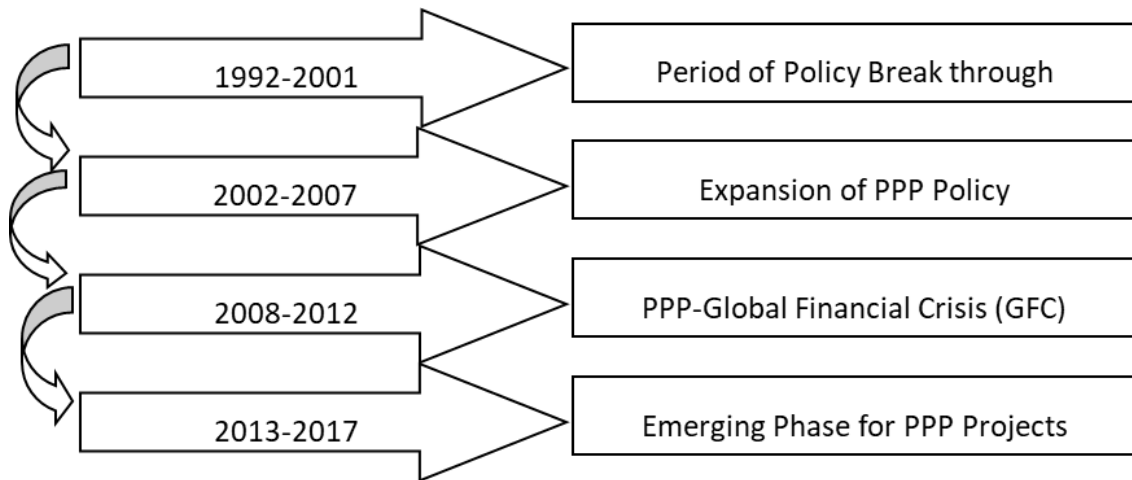
Hodge, Greve, and Biygautane (2018) have highlighted the evolution in the development of the concept and policy of Public-Private partnership since 1992. Their explanation is described in ensuing paragraphs along with Figure 2.1.

- **1992-2001.** The time between 1992-2001 is considered a policy breakthrough because policy and projects occurred first time in Australia and UK. The UK adopted the Private Finance Initiative (PFI). The PFI extended the role of the private sector for the provision of public services like health, education, transport, infrastructure, etc. by signing a contract with private sector partners (Froud, 2003).

- **2002-2007.** During this period infrastructure projects remained part of the economic boom and PPP policy expanded to other countries in Europe (Flinders, 2010).
- **2008-2012.** Global Financial Crisis (GFC) paused the progress of PPP projects during this period. Banks stopped financing the projects during this time, therefore governments had to intervene to salvage the PPP projects. This period brought bankruptcy to many businesses and governments suffered the financial loss (Willems & Van Dooren, 2016).
- **2013-2017.** An emerging phase of PPP projects during this period developing as well as developed countries became involved in PPP projects especially many countries from Africa, Asia, America, Europe, and China (Boardman, Greve & Hodge, 2015). World Bank and many other international organizations established a PPP knowledge lab in 2016. Resultantly, PPP started emerging as a global public policy agenda (Biygautane, Gerber & Hodge, 2017). In the post-GFC era, many countries used infrastructure projects because the economies of countries started improving. PPP working framework including infrastructure governance started evolving for maximum benefits from PPP arrangements (Hodge,

Figure 2.1

Self Developed after content analysis (History and Phases of PPP)



### 2.1.2 Conceptualization of PPPs

The concept is the main idea in human communication because, without any concept, it is very difficult to relate any phenomena to each other keeping other thoughts aside (Dingwerth&Pattberg, 2006). In a classic context, PPP is a formal arrangement between the public and private sectors to obtain any specific purpose. Owing to various features and diversified activities involved in PPP, it can have various explanations. Therefore, people around the globe do not accept a unified concept regarding PPP which also provokes a great debate about the PPP concept. (Khanom, 2010). An evaluation of the literature on the subject explains that PPP is a vague terminology, which has several meanings and is used as per the context of its application (McQuaid, 2010). Therefore, we can consider PPP as a tool and later as a responsibility/ collaboration form for better comprehension of its concept

### 2.1.3 Conceptual Dimensions Considering PPP as a Tool

According to Olatunji, Olawumi, and Ogunsemi (2016), the public sector defines the task to the private sector regarding any public service as it falls under the responsibility of the public sector but due to resource deficiency private sector has been involved in the project. Thus the conceptual arrangement of PPP can be considered an arrangement for the attainment of benefits from PPP arrangements and their utilization. Different conceptual arrangements and their utilization can be as follows:-

### **2.1.3.1 PPP – A Tool of Governance or Management**

One of the popular ways to define PPP is as a tool of management or governance. The main idea is to formulate a proper management system to provide an arrangement to deliver goods and services to people in a systematic arrangement. In this concept of PPP, most authors have discussed the organizational aspects of the relationship, risk sharing, type of cooperation, and duration of cooperation between the public and private sectors (Hodge&Greve, 2007). Few authors like Van Ham and Koppenjan (2001) have stressed PPP as an arrangement for sharing of risk, cost, and resources related to the product thus arranging governance and management.

### **2.1.3.2 PPP – A Tool of Financial Arrangement**

PPP is considered a tool of the financial arrangement between the public and private sectors to reduce the pressure and shoulder the need of the government in infrastructure. This financial arrangement focuses on sharing of utilities, sharing of profit, and risk-sharing amongst the partners (Collin, 1998). In the financial arrangement consideration, the emphasis remains on the financial aspects of the arrangement, which revolves around the sharing of risk and profit keeping in view the overall arrangement of the PPP as in the BOT (Build-Operate-Transfer), BOO (Build-Own-Operate) BOOT, and (Build-Own-Operate-Transfer). In such an arrangement, both partners formulate a proper contractual arrangement specifying the details of risk and profit sharing (Khanom, 2010).

### **2.1.3.3 PPP – A Tool of the Development Process**

PPP has emerged as a tool for development around the globe as the PPP arrangement maximizes the benefit through cooperation and increases efficiency but this progress depends upon the defined objectives of the partners (Mendel &Brudney, 2012). PPP is used as a development process by incorporating ideas and resources from both partners. Both partners develop a mechanism to complete a project mostly for public service and this mechanism development leads towards the completion of the PPP project. In this cooperation, the public and private sector incorporate their

resources like human, technical, finances, and other intangibles like decision-making (Khanom, 2010).

#### **2.1.3.4 PPP – A Language Game**

PPP has termed a language game due to its different connotations attributable to partnership, cooperation, coordination, and arrangement (Jomo et al., 2016). Privatization or contracting out has also been used as a synonym of PPP as in privatization, private sector is encouraged to perform public services (Savas&Savas, 2000). Owing to the Public-Private partnership terminology, the language game is considered the PPP concept. Therefore, Bovaird (2004) has labeled it as a fashionable word that any government can use in any type of agreement which includes the delivery of public services through the cooperation of the private sector.

#### **2.1.3.5 Summary of Conceptual Dimension of PPP as a Tool**

The salients of the conceptual dimension of PPP are discussed as follows:-

- There exist a relationship between the public and private sector to undertake a task most likely a public service.
- There is collaboration and cooperation between the partners.
- There is a commitment to a long-term partnership between the partners.
- Partners agree to share every risk associated with the project under consideration.

#### **2.1.4 Conceptual Dimensions Considering Responsibility and Collaboration of PPP**

Conceptual dimensions encompassing PPP as a tool for governance, development process, financial arrangement, and a word game appear insufficient to elaborate the PPP concept due to delineation and diverging practices of PPP. Therefore, we need to focus on a different dimension for the attainment of conceptual clarity.



#### 2.1.4.1 Co-Responsibility Dimension of PPP

The co-responsibility dimension of PPP describes responsibility-sharing between public and private partners as a major theme. The shared responsibility may be ownership of the project, risks, task involvement, or financial revenue. PPP talks about more responsibility to the private sector and can be termed as an “extension of contracting out” (De Bettignies & Ross, 2004). or “long-term contracts” (Hodge & Greve, 2017). In case of a greater responsibility shift towards the private sector then financial, and operational risk, as well as more ownership, however, the public sector will remain accountable (Stelling, 2014).

Normally the PPP tasks are labeled as “traditional”, in which government has to take on a certain task but due to the limitation of government resources, the private sector has to step forward to share the responsibilities based on the created market for efficient solutions. Normally, publications talking about this “**marketization approach**” to fulfill the tasks assume the traditional PPP as this arrangement is embedded in the scope of “New Public Management” (McLaughlin et. al., 2002). Contrary to this arrangement, few authors stated that in some scenarios private sector can not meet the PPP project requirement. This “**interventionist approach**” will take place with the help of the government in countries with weak states (Dunn-Cavelty & Suter, 2009). Both the interventionist approach and marketization approach talk about the lead role of the public or private sector in PPP arrangement, there is no opposition to effective work collaboration as in the case of the New Public Management paradigm (Stelling, 2014).

#### 2.1.4.2 The Relational Governance Dimension of PPP

PPP literature has an abundance of studies about the rules and norms to formulate the relationship between the partners and it explains that there is a specific form of governance and management that exists in PPP, which is concerned about the divergence regarding collaboration. In this collaborative methodology, the “**structural approach**” emphasizes that institutional structure, such as the establishment of a joint organization, will be more helpful to obtain partnership behavior as compared to separate offices (Buse & Walt, 2000; Greve & Hodge, 2005). On the other hand, the

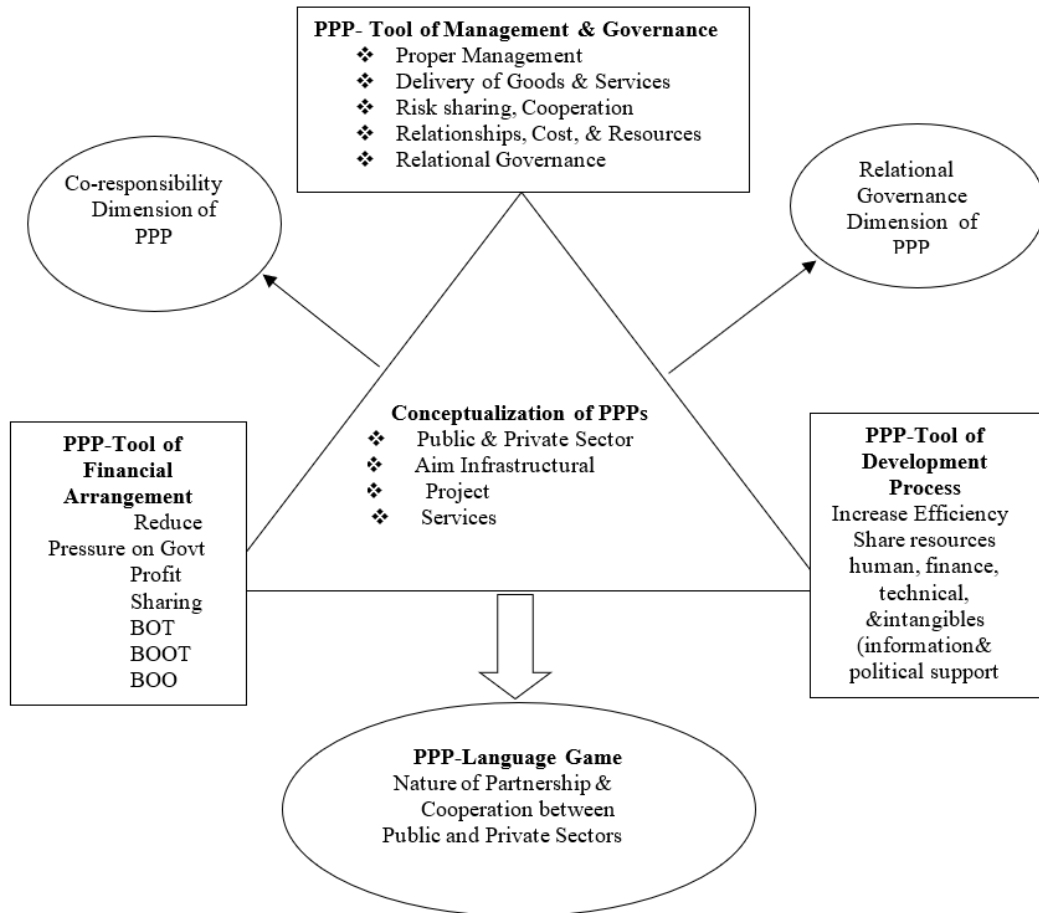
“**managerial approach**” emphasizes joint management strategies for better PPP results (Osborne, 2010; Skelcher, 2010; Weihe, 2010).

#### **2.1.4.3 Summary of Conceptual Dimension of PPP based on Co-Responsibility and Collaboration**

- In the PPP arrangement, two partners i-e public and private have agreed to deliver public service.
- The co-responsibility dimension focuses on the mechanics of shared/ distributed responsibilities across the partners. Whereas the relational governance dimension focuses on the joint and mutual decision-making process of the partnership.
- The co-responsibility dimension explains the division of responsibility amongst the partners to fulfill a task and the governance approach describes how partners can face different emerging eventualities with the help of a comprehensive decision-making process based on joint risk management, cooperation, and trust.
- We know that PPP requires autonomous as well as responsible partners. Therefore, both dimensions are separate but equally important for PPP arrangement, as there are no partners without the partnership and no partnership without partners.

Figure 2.2

Self-Developed after content analysis (Conceptual Dimension of PPP as a Tool)



### 2.1.5 Definition of Public-Private Partnership

Public Private Partnership is a complex phenomenon due to in-built complexities, multidimensionality, and the concept of changeability. There is no unified definition of PPP around the world as the arrangement depends upon the cooperation and coordination between the partners. However, definitions that are being practiced embracing a form of cooperation, financial arrangement, transparency arrangement, and risk allocations between private and public sectors are as mentioned below:

#### 2.1.5.1 Definition by International Organizations

PPP has been defined by the United Nation as a “*Collaborative and monetary arrangement between partners (i.e. state or no state) in which partners agree to work together for the attainment of a common purpose for some specific task by sharing the risk and responsibilities, benefits and resources*” (Bull, 2010).

PPP has been defined by the World Bank as a “ *joint venture of the public and private sector for-profit and not-for-profit. In this arrangement, both partners provide resources including human, technical, finance, and intangibles like political or information support. In this arrangement, all partners participate in decision making*” (Khanom, 2010).

PPP has been defined by the Asian Development Bank as a “ *possible relationship arrangement between private and public sectors to meet the infrastructure and services requirements. This relationship distributes the obligations, risks, and tasks amongst the partners. The private sector can be some international or local organization with technical and financial expertise related to a specific project. The public sector can be government entities like ministries, departments, etc. World Bank incorporates the contractual agreement between the parties, sensible risk-sharing among the partners, and financial reward to private partners*” (Felsing, 2008).

The fundamental features of the above-mentioned definitions are as follows:-

- PPP is an arrangement between the public and private sectors to share the risk and resources to provide public service.
- The main focus of the private sector is on the provision of expertise and resources, whereas the public sector is focused on the provision of services.
- The private sector can be some local or international organization.
- Service delivery is the main emphasis of the partners instead of asset creation.
- Although all international organizations talk about the cooperation/ agreement between the private and public sectors yet no one has clarified the nature of the agreement.

#### **2.1.5.2 Definition by Developed Countries**

Developed countries have defined the PPP as per their perspective attributable to their context and objectives. Different countries have their connotations to define

PPP as per their perspective to use the arrangement as per respective context and objective.

United States of America has defined PPP as “ *a contractual arrangement between private and public sector in which private sector is encouraged more to contribute than traditional. The arrangement revolves around the concern to construct, renovate, operate as well as maintain the system or facility. Ownership remains with the public sector but the private sector is given the extra decision-making right till the project completion. The nature of the contract can vary from simple to development projects.*”(Sabol & Puentes, 2014).

In the United Kingdom, *PPP is characterized by joint working between the public and private sectors, collaboration across all types of interfaces between partners to deliver policies, services, and infrastructure.* In the UK, the most common form of PPP is the Private Finance Initiative (PFI) (Eadie, Millar & Toner, 2013).

In Australia PPP is defined as “*a method of procurement which is a broader spectrum of the contractual relationship between public and private sectors to deliver public service or produce an asset*”. This form of agreement is different from early contractor involvement, traditional procurement, alliances, and other forms of procurements (Australia, 2008).

Ireland's government defines PPP as “*an arrangement of public and private sector to work jointly for some shared objectives for delivery of infrastructure or public service with the private resources which otherwise could have been provided by the public sector*” (Reeves, 2003).

### **2.1.5.3 PPP Definitions along with its Dimensional Contours**

Researchers and authors have also comprehended the PPP concept from a different perspective. A few definitions along with conceptual dimensions (Jomo et al., 2016) are explained in table 2.1 below.

Table 2.1

PPP Definitions and Dimension

Definition	Dimensions
<p>A cooperative arrangement between two or more bodies that can work share compatible objectives to have shared responsibility and authority, mutual benefits, shared risk-taking, and joint investment of resources. (HM Treasury 1998)</p>	<ul style="list-style-type: none"> <li>▪ Inter-organizational relationship</li> <li>▪ Cooperation</li> <li>▪ Shared objectives</li> <li>▪ Joint investments</li> <li>▪ Risk sharing</li> </ul>
<p>An agreement between the government and the private sector in which the private sector forms part of the production and decision-making of goods and services falls under the domain of the public sector but the private sector shares the risk of the production (Forrer et al., 2010).</p>	<ul style="list-style-type: none"> <li>▪ Participation of the private sector in decision making</li> <li>▪ Risk sharing</li> <li>▪ Inter-organizational relationship</li> </ul>
<p>A contract with legally binding between the government and private sector for asset provision and services delivery to allocate the risk and responsibility amongst partners. (Partnerships British Columbia, 2003)</p>	<ul style="list-style-type: none"> <li>▪ Contractual governance</li> <li>▪ Risk allocation</li> </ul>
<p>As compared to the traditional approach for infrastructure provision, PPP is characterized by service provision in long-term contracts and bundle investment. The concessionaire will manage and control the asset by the user fee exchange during the contract duration (Engel et al., 2008)</p>	<ul style="list-style-type: none"> <li>▪ Bundling</li> <li>▪ Service provision</li> <li>▪ Long-term contract</li> </ul>
<p>The partnership includes the contractual, cooperative, and collaborative arrangement, for policy development for programs and services. (Osborne, 2000)</p>	<ul style="list-style-type: none"> <li>▪ Contractual governance</li> <li>▪ Inter-organizational relationship</li> </ul>

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<p>An arrangement/ relationship that comprises shared objectives with specific distribution of responsibilities and roles amongst the partners, can be formal or informal as well as voluntary or contractual. Resultantly, it can lead to sharing of authority, joint risk sharing, and benefits sharing (Lewis, 2002).</p>	<ul style="list-style-type: none"> <li>▪ Inter-organizational relationship</li> <li>▪ Shared objectives;</li> <li>▪ Mutual investments</li> <li>▪ Risk sharing</li> <li>▪ Benefit-sharing</li> </ul>
<p>An association that involves sharing of work, power, support for the achievement of goals and mutual benefits (Kernaghan, 1993)</p>	<ul style="list-style-type: none"> <li>▪ Inter-organizational relationship;</li> <li>▪ Cooperation;</li> <li>▪ Power and information sharing</li> <li>▪ Shared objectives</li> </ul>

---

The dimensions explained in the table 2.1 clearly describe that PPP is an inter-organizational association amongst private and public partners. This arrangement is dependent on mechanisms encompassing cooperation, risk sharing, benefit sharing, power and information sharing, contractual governance and mutual investment, etc. These dimensions of PPP are summarized in Table 2.2.

Table 2.2

PPP Dimension along with Citation

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<b>PPP Dimensions</b>	<b>Citation</b>
Inter-organizational relationship	HM Treasury 1998; Forrer et al., 2010; Osborne,2000

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Cooperation	HM Treasury 1998; Kernaghan, 1993
Shared objectives	HM Treasury 1998
Joint investments	HM Treasury 1998
Risk sharing	HM Treasury 1998; Forrer et al., 2010; Lewis & Greenwood, 2002
Participation of the private sector in decision making	Forrer et al., 2010
Contractual governance	Partnerships British Columbia, 2003; Osborne, 2000
Risk allocation	Partnerships British Columbia, 2003
Bundling	Engel et al., 2008
Service provision	Engel et al., 2008
Long-term contract	Engel et al., 2008
Shared objectives	Lewis, 2002
Mutual investments	Lewis, 2002
Benefit-sharing	Lewis, 2002
Cooperation	Kernaghan, 1993
Power and information sharing	Kernaghan, 1993
Shared objectives	Kernaghan, 1993

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#### 2.1.5.4 PPP Definition in Pakistani Context

PPP has been defined in Pakistan's federal PPP act as, “ the commercial transaction between a private party and a public party in which the private party: performs public agency's function; assumes the responsible use of the public property for the project; assumes considerable financial, the operational and technical risk connected with the use of public property or public function; and/or benefits for executing the public agency's function or from the use of public property or both in certain enumerated ways (Munir, 2022).



Pakistan initiated Infrastructure Project Development Facility (IPDF) in 2006 under the finance division to start a public-private partnership program. The main objective of IPDF was to facilitate development structure and procure projects under the PPP modality as well as to provide advisory on PPP projects in Pakistan. Later, in 2017, PPPA (Public Private Partnership Authority) was established to formulate a regulatory framework to attract foreign and domestic investment in PPP projects in Pakistan. The objective of the PPPA also included promoting domestic and foreign investment, increasing the availability of public infrastructure projects, reducing transaction costs, ensuring appropriate regulatory control, and providing legal and economic mechanisms. (PPPA Newsletter, 2018).

### **2.1.6 PPP: Future requirement of Pakistan**

According to the Pakistan Economic Survey report 2021/22, the real GDP growth of Pakistan remained at 5.97 percent. Pakistan's economy has recovered from the pandemic and achieved higher value than in the last years. Undoubtedly, Pakistan achieved a strong recovery after being low due to the pandemic catastrophe. This growth trajectory is also supplemented by external and internal factors. The GDP growth of the world has witnessed a downward trend, for Pakistan, it is quite low on a comparative basis.

On the current trajectory, Pakistan is going to be the 4<sup>th</sup> largest country in population by 2050. The already low infrastructure is unable to meet the requirement of the existing population. Now the per capita road km is 0.0014, which is the lowest in the region. There is no railway-based intra-city facility available in Pakistan. Karachi is the largest city (population 23.5 Million) with no proper mass transit system available.

The infrastructure needs of a developing economy like Pakistan exceed the fiscal resources available to fulfill them due to the growing population (Outlook, 2016). According to the outlook survey, the average annual investment until 2015 and expected investment until 2040 are mentioned in Table 2.3 below.

Table 2.3

Expected Annual Investment of Pakistan in 2040

	2015	2040	Avg Annual Growth
GDP (Bn \$US)	268	950	5.2%
GDP per Head (\$US)	1416	3404	3.6%
Population	188,925	278,987	1.6%
Urban Population (% of total)	38.8 %	49.3%	1.0%
Population Density (Per per Km)	245	362	1.6%

*Source: Outlook, 2016*

Once we see the need for infrastructure concerning the finances available to any country then we see that a huge gap exists to meet the requirement. Cumulative infrastructure investment is mentioned in Table 2.4 below.

Table 2.4

#### Pakistan's Infrastructure Need in 2040

Bn (\$US)	Road	Rail	Airports	Ports	Telecoms	Electricity	Water	Total
2016-2040 (current trends)	137	5	6	3	116	50	39	356
2016-2040 (Investment need)	180	5	9	8	153	599	64	1013

*Source: Oxford Economics, 2017*

When we compare the existence and need of the infrastructure for the people of Pakistan then we can find the gap between these two aspects. It shows the current trend, investment need, the gap between the current trend and investment, and the requirement of the investment. Keeping in view the economic condition of Pakistan, it is very much evident that this gap can not be met by the government. This gap can only be filled with PPP in Pakistan as highlighted by senior officials at many forums. So correct implementation of PPP and its success will be beneficial for the country.

According to the Public Private Partnership monitor by the Asian Development Bank, the Federal government of Pakistan has undertaken 108 PPP projects, Punjab PPPA has 10 ongoing PPP projects, Khyber Pakhtun Khan PPPA has 1564 PPP schemes and Sindh PPPA has passed 36 PPP projects. Besides these projects, 20 persons per month on international projects and 590 persons per month on national projects have been employed as consultants by the governments to provide consultancy on PPP projects.

### 2.1.7 Models of PPP

The models of PPP formulate the shape according to the set goals and objectives of the partnership. These objectives and goals have surfaced in different definitions of PPP (De Matteis, Notaristefano & Bianchi, 2021). Different models exist in the world that deals with PPP functioning around the world attributable to the project type, risk transfer level, investment level, and the required outcome. These models are very much linked with the sustainability of PPP projects (Anwar, Xiao, Akter & Rehman, 2017). Different PPP models are listed below.

Table 2.5

#### Models of PPP

Synonym	Full Name	Public Agencies	
		Op	Ow
DBT	Design-build-transfer	✓	✓
BLT	Build-lease-transfer	✓	✓
DOT	Design-operate-transfer	✓	✓
BOT	Build-operate-transfer	✓	✓
BOR	Build-operate-renewal	✓	✓
ROT	Refurbish-operate-transfer	✓	✓
DBOM	Design-build-operate-maintain	✓	✓
DBFO	Design-build-finance-operate	✓	✓
DBO	Design-build-operate	✓	✓
BTO	Build-transfer-operate	✓	✓

BOOTT	Built-own-operate-train-transfer	✓	✓
BOOT	Built-own-operate-transfer	✓	✓
BLO	Built-lease-own	✓	
BOOM	Build-own-operate-maintain		
ROO	Rehabilitate-own-operate		
BOO	Build-own-operate		

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Note: B–Built; D–Design; Ec–Economic; En–Environment; F–Finance; L–Lease; M–Maintain; Op–Operate; Ow–own; Pr–Private; Pu–Public; S–Social; T–Train

*Source: Anwar, Xiao, Akter & Rehman, 2017*

### **2.1.8 Public-Private Partnership Project's performance**

PPP projects support the economy of any country and many shreds of evidence support that PPP projects have a linkage with the GDP growth of a country i.e. more PPP projects lead to a higher GDP growth rate. So, PPP projects can be utilized to improve the GDP growth of any country. PPP projects are a source of large capital markets and long-term employment in the country. The employment opportunities will generate more wealth and thus will strengthen the economy of a country. Subsequently, private investment in successful PPP will also attract other private investors leading to a sustainable model for economic growth (Link & Scott, 2019).

Brinkerhoff (2011) explained different aspects of the PPP as an organizational solution to the problems appearing in our society. PPP has many contributing factors to its popularity including service expansion can be fostered through PPPs, PPP projects can operate with greater efficiency, PPP projects mostly deliver in less time as compared to traditional projects and there are more choices and modern services in PPP.

PPP projects provide support to the economy of the project but to make this support credible and reliable it is more important that the formulated PPP projects meet the successful end state. Therefore, PPP project performance is very important to obtain dividends from PPP projects. According to Rouboutsos et. al. (2013), PPP project performance is critical to business success. The ineffective PPP performance evaluation system is the main cause of this failure (Bult-Spiering & Dewulf, 2008).

Previous studies on PPP performance discuss the performance measurement mechanism to evaluate the PPP project (Ismail, 2011). Froud and Shaoul (2001) conducted a study to evaluate the affordability of the PPP options. Coulson (2008) has also discussed the quantitative elements of PPP including risk transfer, transaction cost, and imputed life cycle. The English (2007) discussed the PPP performance audit mechanism and procedure in Australia. Furthermore, Garvin and Bosso (2008) proposed a framework to assess PPP effectiveness considering the interest of society, state, industry, and market. To improve the mechanism for PPP, several researchers have identified different factors for performance measurement. Yuan et. al. (2008) investigated the characteristics of PPP and identified different factors to identify project performance. Factors have been identified by using different conceptual models for performance indicator systems in PPP projects (Mohamad, Ismail & Said, 2018).

### **2.1.9 Critical Success Factors**

Critical Success Factors are the limited identified factors in any business, which ensure the success of that particular business and the performance in these identified areas must go right/perfectly to flourish the business. The business will not be able to obtain a defined objective if the identified factors will not perform satisfactorily (Hai, Toan & Van, 2022). According to Muhammad and Johar (2019), CSFs are the key areas that will assure the success of the projects and the absence of these key areas will lead to the failure of a project. Thus, CSFs identification is the prime step towards the proficient and practical development of the PPP framework, moreover, these factors play an important role in achieving a successful PPP projects (Tabish & Jha, 2011). Despite PPP's growing popularity, there are limited empirical studies around the CSFs of PPPs implementation (Chileshe et. al., 2022).

#### **2.1.9.1 Critical Success Factor and Success Criteria**

Critical Success Factors (CSFs) and Success Criteria have been extensively used in management literature interchangeably though they are not exchangeable but related (Lim & Mohamed, 1999). CSFs are the combination of the facts and circumstances, which enable the success of the project (Tipu & Khan, 2021). CSFs are the main reason to have a successful project (Rockart, Ball & Bullen, 1982) whereas the success criteria describe the success measuring parameter and are the successful

outcome (Chan, Scott, & Lam, 2002). Therefore we can deduce that success criteria and critical success factors are very important to achieve success and both collectively operate under the overall project success framework (Lim & Mohamed, 1999).

### **2.1.9.2 Critical Success Factors for PPP**

Researchers like other fields remained very inquisitive to identify the CSFs for PPP projects as well. Various studies have discussed and explained CSFs through research surveys and case studies (Osei-Kyei & Chan, 2015). CSFs vary according to the type of project, industry, phases of the lifecycle, individuals, organization, and nationality.

## **2.2 Exploration of CSFs for PPP**

Critical success factors are undoubtedly the main enabler to undertake any project. Therefore, CSFs identification is an important consideration to appreciate the success/ failure of a specific PPP project. The popularity of PPP projects around the world has also boosted the investigation of CSFs (Al-Saadi & Abdou, 2016). Literature has plenty of studies that highlight the CSFs related to project success or successful project outcome (Zhang, 2005; Robinson and Scott, 2009; Yuan et al., 2009; Raisbeck et al., 2010; Liu et al., 2015 & Babatunde et al., 2016). Exploration and identification of localized/contextualized CSFs is a very important consideration for PPP project success. The identification of localized CSFs in the Pakistani scenario has not been addressed properly therefore it needs attention and there is a requirement to explore CSFs for PPP in Pakistan (Ullah et. al., 2018).

### **2.2.1 PRISMA for Critical Success Factor's Exploration**

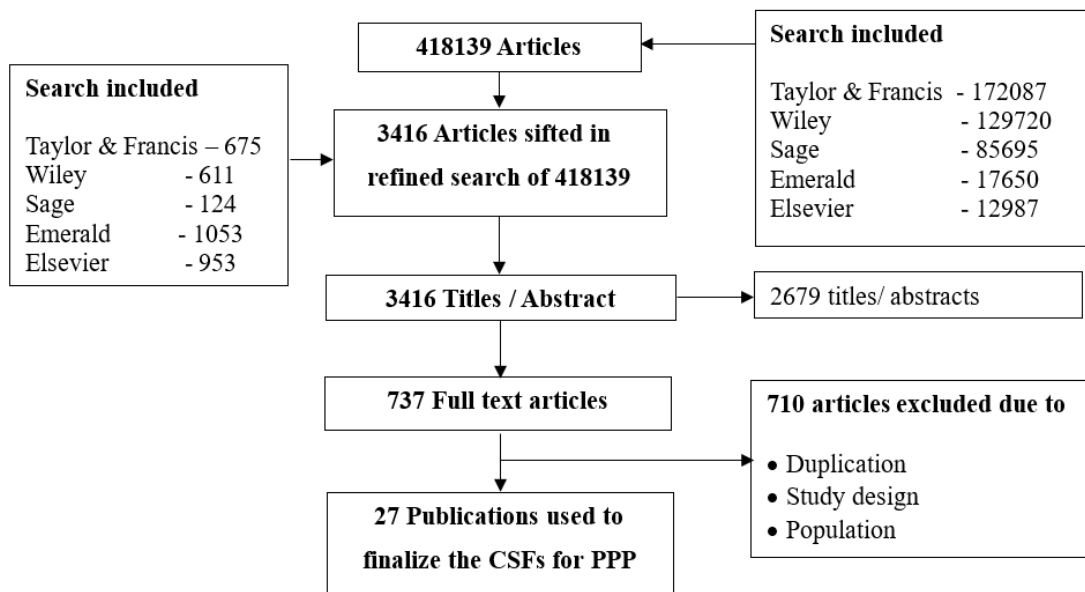
Moher et al. (2009) presented the PRISMA (i.e. preferred reporting items for systematic review and meta-analysis) which aims to deliver a clear picture of past studies in a specific area. Moreover, this systematic evaluation also provides a comprehensive overview of the study in that specific field till the current time. According to Phillips and Newton (2002), the results of the Meta-analysis are expressed mathematically by using different statistical methods to conclude already

published articles. PRISMA provides a great advantage to scholars and researchers by providing a comprehensive and systematic literature review.

Several studies used PRISMA for systematic literature (Luhnen et. al., 2018 & Peters et. al., 2015). PRISMA is mostly used in mixed-method research methodology and its explanation is dealt with as a qualitative method (Page et al. 2021). The present study used PRISMA in three phases including a literature search, selecting the published articles, extracting information, and summarization. This is explained in figure 2.3 below.

Figure 2.3

PRISMA picture of literature review for CSF



Two databases i.e. Scopus and web of science (WOS) with an online index like Social science citation index (SSCI), Science Citation Index Expanded (SCIE), Emerging Science Citation Index (ESCI), and Arts and Humanities Citation Index (AHCI) have been used in this study. Several keywords including public-private partnership, critical success factors, sustainability, uncertainty, risk management, and trust have been used to extract the related articles. Different publishing databases were also used during the search.

The PPP literature has an abundance of factors labeled as critical success factors used in various studies. Therefore, a detailed and systematic literature review has been conducted to select CSFs for this study. Primarily, the academic databases available on the internet have been searched for this purpose. Online library access/ websites of famous publishers like SAGE, Taylor & Francis, Elsevier, Wiley, and Emerald were searched in detail. The keywords for the search were PPP projects and CSFs. At the first stage, the only keyword “public-private partnership” was searched which resulted in 85695 articles by Sage, 17650 by Emerald, 172087 by Taylor & Francis, 12987 by Wiley, and 12987 by Elsevier. Later the search was refined with a Boolean search by “public-private partnership” and “critical success factors”. This resulted in 124 articles making it 0.14 %, 1053 i.e. 5.96 %, 675 i.e. 0.39 %, 611 i.e. 0.47 %, and 954 i.e. 7.3 % against the SAGE, Emerald, Taylor & Francis, Wiley, Elsevier respectively.

### **2.2.2 Finalization of CSFs**

The articles were studied with specific consideration on CSFs for PPP in developing countries, which appeared in more than hundreds. For example, Tiong (1996) identified six CSFs for winning PPP (Zhang, 2005), and Marcus Jefferies identifies five Ps as CSFs (Jefferies, Gameson&Rowlinson, 2002). Dima Jamali identifies four Cs as CSF for PPP (Jamali, 2004). Zhang (2005) identified 5 CSFs comprising 46 sub-success factors. Saqib, Farooqui & Lodi,(2008) identified 7 x CSFs comprising 77 x sub-success factors. (Saqib, Farooqui & Lodi, 2008). Abdul Aziz (2010) identified 15 CSFs (Aziz, 2010). 15 key CSFs were identified by Zhang et al. (2012). Khan (2013) identified 77 CSFs for PPP (Khan, Turner & Maqsood, 2013). Gupta (2013) identified 45 CSFs (Gupta, Gupta & Agrawal, 2013). Wai (2013) identified 41 CSFs (Wai, Yusof, Ismail & Ng, 2013). Al-Saadi (2016) identified 13 CSFs (Al-Saadi& Abdou, 2016). Osei-Kyei (2017) identified 5 CSFs for PPP projects (Osei-Kyei& Chan, 2017). Sanni (2016) identified 13 x CSFs for the PPP project's success (Sanni, 2016). Almarri et al. (2017) identified 18 x CSFs (Almarri&Boussabaine, 2017). Ullah identifies 38 x CSFs (Ullah &Thaheem, 2018). Cui et al. (2018) identified 5 x CSFs (Cui, Liu, Hope & Wang, 2018). Kavishe et al. (2019) identified 17 x CSFs for PPP success (Kavishe&Chileshe, 2019). Muhammad et al. (2019) identified 18 x CSFs (Muhammad &Johar, 2019). Osei-Kyei et al (2019) identified 32 x CSFs (Osei-Kyei& Chan, 2019). Opawole et al (2019) identified 8 x



CSFs comprising 28 sub-factors for PPP success (Opawole et al., 2019). Ahenkan(2019) gathered 40 x CSFs from the previous authors as per country-specific areas (Ahenkan, 2019). Debela(2019) gathered 26 x CSFs from different studies and then evaluated their validity in different countries as per the importance specific to countries including China, Ethiopia, Nigeria, Uganda, Indonesia, and Ghana (Debela, 2019). Sehgal et al. (2019) identified 17 x CSFs for PPP project success (Sehgal & Dubey, 2019). This detail is mentioned in Table2.6 below.

Table 2.6

CSFs along with Authors

<b>Authors &amp; Years</b>	<b># Factors</b>
Tiong (1996);Zhang (2005)	6
Jefferies, Gameson, &Rowlinson(2002);	5
Jamali, D. (2004)	4
Saqib et al. (2008); Cheung, et al (2012). Khan (2013); Khan, Turner&Maqsod(2013)	7 (77) sub-factors.
Saqib, Farooqui, & Lodi, (2008). Abdul Aziz (2010)	15
Gupta, Gupta, & Agrawal, (2013)	45
Wai, Yusof, Ismail& Ng, (2013)	41
Al-Saadi, &Abdou, (2016)	13
Osei-Kyei (2016); Osei-Kyei& Chan, (2017)	5
Sanni (2016)	13
Almarri&Boussabaine (2017)	18
Ullah &Thaheem (2018).	38
Cui, Liu, Hope, & Wang (2018)	5
Kavishe et al. (2019)	17

Muhammad & Johar (2019)	18
Osei-Kyei et al. (2019)	32
Opawole et al. (2019)	8 (28) subfactors
Ahenkan (2019)	40
Debela (2019)	26
Sehgal et al., (2019)	17

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CSFs have been identified after a detailed literature review keeping in view the country's dynamics i.e. developing or developed. Later, based on PRISMA and the most cited CSFs in developing countries have been finalized for this study.

### 2.2.3 Validation of CSFs by other Tiers

The shortlisted CSFs were extracted and then a list was prepared in the Pakistani scenario. In this regard, it has been discussed with the officials at PPPA, and the ranking of CSFs by the officials validated that these are the factors that are likely to have more relationship with the implementation of PPP projects in Pakistan. These CSFs were also been discussed with the academicians with the perspective of their validation in developing countries in general and particularly in the Pakistani scenario. Their ranking by them also validated the CSFs list. CSFs were also discussed with PPP projects consultants and they validated the findings regarding CSFs. The words of officials of PPPA, academicians, and consultants have encouraged us to proceed further with our research objectives.

The results of PRISMA and input by the officials, academicians, and consultants provided us almost with the same CSFs and therefore I used them in my further study. The identified CSFs include Technical Factor, Legal Factor, Political Factor, Finance Factor, Market Maturity, Economic Factor, Procurement Factor, and Regulation Factor. The factors along with their components are in Table 2.7 below.

Table 2.7

## Component of CSFs

Construct	Component
Technical Factor	<ul style="list-style-type: none"> <li>• Effectiveness of arbitration process</li> <li>• Existence of a well-organized economic regulatory authority</li> <li>• Availability of labor</li> <li>• Availability and efficiency of supporting infrastructure level of transparency and corruption.</li> <li>• Availability of indigenous technology.</li> </ul>
Legal Factor	<ul style="list-style-type: none"> <li>• The extent of compliance to international conventions and enforcement status of domestication and implementation of international laws/codes</li> <li>• Predictability in legal regime and enforcement</li> </ul>
Political factor	<ul style="list-style-type: none"> <li>• Consistency in government policies</li> <li>• Political stability and support</li> <li>• Provisions for reversion of policies</li> <li>• A clear contract stating responsibilities and liabilities</li> </ul>
Finance factor	<ul style="list-style-type: none"> <li>• Availability of risk-sharing framework</li> <li>• Availability and stability of the financial market</li> <li>• Availability and stability of consumer market</li> </ul>

	<ul style="list-style-type: none"> <li>• Access to foreign finance</li> </ul>
Market maturity	<ul style="list-style-type: none"> <li>• Stability of exchange inflation rate</li> <li>• PPP human capacity index</li> <li>• Tariff control policy and availability of tariff framework</li> </ul>
Economic factor	<ul style="list-style-type: none"> <li>• Stability of exchange rate</li> <li>• Stability of interest rate</li> </ul>
Procurement factor	<ul style="list-style-type: none"> <li>• Level of understanding of public-private alliance transaction</li> <li>• Competitiveness of bidding process</li> <li>• Performance Guarantee</li> <li>• Political will by the public sector</li> <li>• Availability of guarantee and stand by financing</li> </ul>
Regulation factor	<ul style="list-style-type: none"> <li>• Existence of clear investment laws</li> <li>• Delay in land acquisition</li> <li>• Existence and adequacy of the legal framework for concession.</li> </ul>

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Table 2.8

Identified Critical Success Factors

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
<b>Technical factor</b>																											
1. Effectiveness of arbitration process				✓																							
2. Existence of well-organized economic regulatory authority			✓																								✓
3. Availability of labor			✓																								
4. Availability and efficiency of supporting infrastructure			✓																								
5. Level of transparency and corruption											✓		✓					✓									
6. Availability of indigenous technology (Tech feasibility)	✓		✓	✓			✓	✓	✓	✓			✓	✓					✓		✓		✓	✓			
<b>Legal factor</b>																											
1. Extent of compliance to international conventions and enforcement						✓	✓																				
2. Status of domestication and implementation of international laws/codes																											
3. Predictability in legal regime and enforcement			✓	✓				✓															✓	✓		✓	
<b>Political factor</b>																											
1. Consistency in government policies										✓												✓					
2. Political stability and support	✓	✓		✓			✓	✓	✓	✓			✓	✓	✓						✓			✓	✓	✓	
3. Provisions for reversion of policies												✓	✓														
4. Clear contract stating responsibilities and liabilities												✓	✓														
<b>Finance factor</b>																											
1. Availability of risk sharing framework	✓	✓	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓			✓	✓		✓		✓	✓		✓	✓
2. Availability and stability of financial market		✓						✓	✓	✓		✓		✓				✓		✓				✓	✓		✓
3. Availability and stability of consumer market								✓	✓	✓				✓										✓	✓		✓
4. Access to foreign finance & Aval of F Mkt						✓	✓								✓			✓			✓	✓			✓		✓
<b>Market maturity</b>																											
1. Stability of inflation rate				✓																							
2. PPP human capacity index																							✓	✓			
3. Tariff control policy and availability of tariff framework													✓														
<b>Economic factor</b>																											
<b>Economic Policy</b>																											
2. Stability of interest rate			✓	✓			✓			✓	✓		✓	✓	✓				✓	✓	✓				✓	✓	✓
<b>Procurement factor (Transparent procurement process)</b>																											
1. Level of understanding of public-private alliance transactions			✓	✓				✓	✓	✓				✓							✓				✓	✓	
2. Competitiveness of bidding process									✓	✓								✓	✓								
<b>Performance Guarantee</b>																											
1. Political will by the public sector								✓							✓			✓		✓							
2. Availability of guarantee and stand-by financing							✓	✓	✓	✓		✓				✓	✓	✓		✓		✓		✓			
<b>Regulation factor</b>																											
1. Existence of clear investment laws																											
2. Delay in land acquisition																											
3. Existence and adequacy of legal framework for concession				✓	✓				✓	✓				✓				✓		✓							
<b>Good Governance</b>																											
Stable & Transparent Pol/Social Sit										✓				✓	✓			✓	✓	✓	✓						
<b>Macroeconomic Indicator</b>																											
Strong Private Consortium																						✓					

(1) Osei-Kyei, R., Chan, A. P., & Dansoh, A. (2019) (2)Ahenkan, A. (2019) (3) Sehgal, R., & Dubey, A. M. (2019) (4) Debela, G. Y. (2019). (5) Wang, L., Zhang, P., Zhang, P., Li, R., Zhang, Y., & Wu, Y. (2018). (6) Kavish, N., & Chileshe, N. (2019) (7) Osei-Kyei, R., & Chan, A. P. (2019) (8) Muhammad, Z., & Johar, F. (2019) (9) Opawole, A., Jagboro, G. O., Kajimo-Shakantu, K., & Olojede, B. O. (2019) (10) Mohamad, R., Ismail, S., & Said, J. M. (2018) (11) Osei-Kyei, R., & Chan, A. P. (2017) (12) Almarri, K., & Boussabaine, H. (2017) (13) Osei-Kyei, R., Chan, A. P., & Ameyaw, E. E. (2017) (14) Wang, H., Xiong, W., Wu, G., & Zhu, D. (2018). (15) Osei-Kyei, R., Chan, A. P., Javed, A. A., & Ameyaw, E. E. (2017) (16) Osei-Kyei, R., & Chan, A. P. (2017) (17) Osei-Kyei, R., & Chan, A. P. (2017) (18) Almarri, K., & Boussabaine, H. (2017) (19) Al-Saadi, R., & Abdou, A. (2016) (20) Osei-Kyei, R., & Chan, A. P. (2017) (21) Ameyaw, E. E., & Chan, A. P. (2016) (22) Sanni, A. O. (2016) (23) Ismail, S. (2013) (24) Wai, S. H., Yusof, A. M., Ismail, S., & Ng, C. A. (2013) (25) Zhang, X., Cheung, E., Chan, A. P., Lam, P. T., Chan, D. W., & Ke, Y. (2012) (26) Jefferies, M. (2006) (27) Zhang, X. (2005)

### 2.3 Sustainability or Sustainable Development

Sustainability is a topic of great concern in today's project management domain. Sustainability refers to the ability to sustain or maintain any project over time. Therefore, sustainability is considered an important aspect of international, national, and local administration of today's business world. (Traverso et al., 2012). Brundtland Commission has defined that sustainability aligns itself with the prevailing requirement to fulfill at that particular time without compromising the future generations' capacity. Moreover, the commission represented sustainability through sustainable development. (WCED 1987, Chapter 2, from A742/427). Thus, organizations need to understand the main essence involved in the sustainability process for the sustainability development implementation to achieve sustainability in any project. (Miralles-Quiros et al., 2017).

The concept of sustainability has been discussed in the literature with different definitions describing their different aspects and even it has been discussed with the convergence of definitions. According to Dover and Handmer (1992), sustainable development is a means to reach sustainability whereas sustainability is a goal. So we can describe sustainable development as a process towards the achievement of sustainability that is the main objective and goal (Lazaretti et al., 2019).

Sustainable development has grabbed the researcher's attention over the last two decades for the formulation of principles and practices to undertake sustainable business (Linnenluecke & Griffiths, 2013), this aspect will have a positive effect on the performance of any company (Yusuf et al., 2013). Therefore, companies are under a lot of pressure for the transition of industries to obtain sustainable development (Garza-Reyes, 2015)

The organization for economic co-operation and development (OECD) has defined sustainable development as "*the requirement of the present generation to be met without compromising the capacity of future generation*". This definition is very comprehensive and describes the milestones for sustainability practices evolution for any organization but at the same time, this definition has a limitation for describing the sustainable practices according to the business sector requirement. Therefore, different authors have worked to fill this gap by merging definitions and approaches to sustainability as a subject (Lüdeke-Freund & Dembek, 2017; Ritala et al., 2018).

Although the sustainability definition is not much clear yet few indicators explain sustainability concerns to obtain footing along with the organization's performance (Wetering, 2018).

### **2.3.1 Importance of Sustainability**

Sustainability is an important aspect of any business but we can not achieve sustainability without a comprehensive framework, because it is necessary for constant improvement in any business or organization. There is a requirement that the adopted framework must have a broader perspective and must consider the relationship between stakeholders and society (Radziwill, 2009). If an organization is considering a wide array of influence encompassing all organization's spheres of influence then it must go for an all-inclusive sustainability framework (Benn, Dunphy & Griffiths, 2006).

Sustainable development is a complex opinion and impact the capacity of any organization (Raza, Alshameri & Jamil, 2021). Sustainability achievement has forced people to think about the "Big Picture" and overall comprehensive longer period. It is a challenging task for organizations to translate sustainability into tangible day-to-day actions. Sometimes it focuses on evading adverse social, environmental, and economic impacts. Erstwhile, emphasis is given to improving operational performance to achieve favorable impacts. Therefore, to tackle this dilemma organizations can harness the talent of their people to crop favorable sustainable results. Therefore we can say that operational processes are the enabler that produces results (Pojasek, 2009).

Sustainability has also been considered as undertaking business activities ethically by incorporating stakeholders' concerns (Rezaee et al., 2019). Sustainability, corporate sustainability, business sustainability, or triple bottom line aiming at environmental, social, and governance (ESG) has been used interchangeably in the authoritative reports and literature. Sustainability is a wider-ranging concept than CSR or ESG but mostly it is regarded as risk moderation drills (Rezaee et al., 2019). Sustainability focuses on long-term goals achievement and performance enhancement for longer terms instead of short-term or periodic financial objectives. Thus, a business can maintain survivability by focusing on performance (Benn, Edwards & Williams, 2014).

### **2.3.2 Sustainability Performance Measurement System**

Sustainability success can be ascertained by the measurement of an organization's performance against the identified objectives (Edwards, 2009). Presently the performance measurement framework does not guide organizational performance improvement rather it only deals with financial performance instead of other issues to address the organization's pluralistic goals as well as it does not explain the complexity of the working environment including external or internal (Roca & Searcy 2012).

A comprehensive management outline is required for a sustainability performance management system and this management system must be able to align with social and environmental factors on one side. Subsequently, this framework must be able to integrate economic business information with environmental and social aspects. Therefore, managing and measuring sustainability is an issue of great research nowadays (Maletič, 2018).

### **2.3.3 Sustainability Measurement System and PPP Projects**

Sustainability is the ability to exist continuously or constantly and it is quite challenging to maintain sustainability as it requires a comprehensive management framework for sustainability management (Sebhatu, 2008). Public-private partnership projects are complex and of longer duration therefore sustainable performance measurement for PPP needs to be effective for a longer duration (Ahmad et. a., 2022). Therefore, a sustainable performance measurement system for PPP must be evolved considering the time as such projects are liable to develop uncertainties and risks in projects and amongst the partner's agreement (Liang & Wang, 2019).

According to Naoum (2003), public-private partnership projects get successful when both partners cooperate because of mutual trust rather than their hierarchical relationship. Owing to the popularity of PPP in the last couple of decades scholars are discussing PPP (Mazher et al., 2018). The PPP approach in different projects has been discussed differently including concession determinants (Shen & Wu, 2005), risk allocation (Jin, 2010), critical success factors (Osei-Kyei& Chan, 2015), and sustainable performance. In all the spheres of PPP, most scholars have focused on the sustainable performance of PPP projects (Prado et al., 2020).



The maintenance of sustainable performance is a very serious challenge for future generations (Wu et al., 2017). Several scholars have discussed different facets of PPP concerning private sectors but the sustainable behavior of PPP projects and the influence of sustainability performance have very limited literature (Hueskes et al., 2017). This aspect also motivated the researcher to study the sustainable performance of PPP projects.

#### **2.3.4 Stakeholders and their interest**

A PPP project is an arrangement between partners where each partner has different goals according to their interests. In such projects, the private sector will be more concerned with profit maximization and business proficiencies (Atmo& Duffield, 2014). Whereas the public sector will be concerned about the social outcome and benefits of that specific project (Zhang et al., 2016). We can say in relative terms that the private sector has shortsighted objectives while the public sector is concerned about long-sighted goals. The objective and goal differences must be coordinated throughout the projects with the help of a sophisticated system (Liang & Wang, 2019).

#### **2.3.5 Dimensions of Sustainable Performance Measurement System**

Sustainability performance evaluation in infrastructure projects exists in literature but very less work is visible to explore the sustainability performance of PPP projects (Shen & Wu, 2005). There are lot many factors that can be incorporated to form sustainable performance indicators comprising performance related to economic, environmental, and social aspects (Shen et al., 2016).

Liang & Wang (2019) has proposed five dimensions of the sustainable performance measurement system to measure the sustainable performance of PPP projects. The dimension of the measurement system are (1) Meeting design goals (2) Benefits to the end-user (3) Benefits to the private sector (4) Benefits to the public sector (5) Preparing for the future. These dimensions cover the sustainable performance of PPP projects in a comprehensive way.

### 2.3.5.1 Meeting Design Goals

Meeting design goals deals with the basic aspects of construction projects. Shenhar, Dvir, Levy & Maltz, (2001), Chan, Scott & Lam, (2002), Li, Akintoye, Edwards & Hardcastle, (2005), and Yuan, Skibniewski, Li & Zheng, (2010) have discussed these factors in project performance relations. Liang et. al., (2019) used the following four items as a sustainable performance measurement for PPP partnership projects with the scope of meeting design goals. These items are linked below:-

- The project shall be delivered on schedule
- The project shall be delivered within budget
- The project shall be delivered with functional requirement
- The project shall be delivered with technical specification

### 2.3.5.2 Benefits to the end User

The factor “benefits to the end-user” is designed from the end-user perspective. Project results must be attributable to the requirement of the endusers. Shenhar et al. (2001); Chan et al. (2002); Dvir, Raz & Shenhar (2003); Zhang (2006); Yuan et. al. (2010), and Ozorhon, Arditi, Dikmen & Birgonul (2011) discussed the items leading to the benefits to end-users in their studies. Liang et. al., (2019) used the following items as a sustainable performance measurement for PPP partnership projects of “benefits to end-user” of PPP projects. These are as follows:-

- The project outcome shall meet the needs of end-users in terms of reasonable service charges.
- The project outcome shall meet the needs of end-users in terms of timely supply.
- The project outcome shall meet the needs of end-users in terms of quantity.
- The project outcomes shall meet the needs of end-users in terms of quality.

- The project outcome shall meet the needs of end-users in terms of overall satisfaction.

### **2.3.5.3 Benefits to Private Sector**

Benefits to the private sector are the third dimension to measure the sustainable performance measurement for Public-Private Partnership projects. Dvir et al. (2003), Li et al. (2005), Zhang (2006), and Yuan et al., (2010) deliberated on the items in their studies, which led to the benefits to the private sector. Liang et al., (2019) have used the items in the context of sustainable performance measurement for PPP partnership projects concerning the “benefits to the private sector”. These items are as follows:-

- Cost Management
- Marginal Profit
- Investment return
- Market opportunities
- Technical advance
- Experience and knowledge gains
- Reputation Improvement
- Competitiveness enhancement

Among the eight items mentioned above, the former four are about direct profit-making and the latter four are to measure the long-term probability.

### **2.3.5.4 Benefits to Public Sector**

The fourth dimension is labeled as “benefits to the public sector” and it contains four items for its measurement. Li et al. (2005), Zhang (2006), Ogunlana (2010), and Osei-Kyei & Chan (2015) elaborated on the items in their studies which are used by Liang et al. (2019) in the setting of sustainable performance measurement for PPP

partnership projects concerning the “benefits to the public sector”. These items are as follows:-

- Economic benefits
- Government reputation
- Service quality
- Timely supply of public works

#### **2.3.5.5 Preparing for the future**

The fifth dimension is preparing for the future, which is stimulated by the work of Li et al. (2005), Ogunlana (2010), Atmo& Duffield (2014), and Osei-Kyei& Chan (2015). Liang et al. (2019) extracted the items to use in sustainable performance measurement for PPP partnership projects concerning “preparing for the future”. The items are as follows:-

- Long-term contribution to economic development.
- Long-term contribution to technical innovation.
- Long-term contribution to lifestyle shifting.
- Long-term contribution to industrial upgrades.

## **2.4 Uncertainty**

Uncertainty denotes a state in which actors are unable to assess future conditions because of the lack of information, change in environment, or any other happening (McIver, Shimizu & Kim, 2009). Uncertainty emanates in the human and social aspects of any enterprise. It appears in every aspect of life, its synonyms or antonyms: ambiguity, haziness, certainty, stability, risk, chance, standardization, and order (Weitz & Shenhaav, 2000).

All projects have a greater or lesser intensity of uncertainty (Perminova, Gustafsson & Wikström, 2008). The uncertainty or risk arises from the decisions of

investment, competition, performance variability, and other factors of technologies (Linsmeier & Pearson, 1996). It is important to understand the construct of risk and uncertainty for better comprehension. The literature explains the definition of risk and uncertainty as the “ability to numerically measure the probability of event occurrences” (Zheng & Carvalho, 2016).

Uncertainty and risk are very close in meaning and can be related to each other as they have been used interchangeably. Risk is an effect of a single and distinguishable event that may or may not occur but will have negative consequences. Risk mostly involves stakes and consequences (mostly applicable to finance), whereas uncertainty is linked with the source and is less contingent on the studied environment. Scientifically, uncertainty evolved with the mechanical engineering profession in the late 19<sup>th</sup> century and was formally recognized in the 20<sup>th</sup> century (Zachmann, 2014). It is considered an important factor as the ability to reduce uncertainty regulates and impacts the overall performance of any project or organization (Weitz & Shenhaav, 2000).

The literature distinguishes risk and uncertainty as per the explanation by Knight (1921). He explains that if something happens with probabilities of outcome in mind then it will be referred to as risk and if there are no probabilities of outcome then it will be termed as uncertainty (LeRoy & Singell, 1987). Although there is no clear differentiation between risk and uncertainty in classical literature on project management and both terminologies have overlapped in most places (Böhle, Heidling & Schoper, 2016).

Uncertainty can be defined as a circumstance in which there is not a single and complete understanding of the system to be managed (Zheng et al., 2016). Uncertainty is a negative outcome of project complexity rooted in the unpredictability of the project system in ambiguity with the absence of complete knowledge about the event. So two factors appear in the definition of uncertainty i.e complexity and ambiguity (Raadgever et al., 2011). The absence of complete knowledge also stresses the lack of information for managing the given task. However, it is not possible to simply resolve the issues emerging in the project by merely getting some more information (Sicotte & Bourgault, 2008).

### 2.4.1 Various forms of Uncertainty

In literature, various forms of uncertainties have been discussed and numerous definitions of uncertainty are used. As a broad definition, “uncertainty is any deviance from the unattainable ideal of totally deterministic information on the applicable framework” (Walker et al., 2003). Other definitions may include, “Not having the necessary information to decisively portray an occasion and its qualities” (Cardenas & Halman, 2016); “an absence of certainty about information identifying with the precise inquiry” (Sigel, Klauer & Pahl-Wostl, 2010).

Uncertainty at this point incorporates the absence of understanding amongst the partners. The definition of uncertainty varies in partnership arrangements as it is viewed from the analyst's as well as the decision maker's point of view (Thissen et al., 2017). However, the division in nature, level and location of uncertainty remain relatively stable (Zandvoort et al., 2018). Different forms of uncertainty have been mentioned at **Appendix 'A'**.

The most discussed form of uncertainty is internal and external uncertainty. Although, it is very difficult to distinguish internal from external uncertainty. As internal is organizational specific and external uncertainty is environmental specific (Beckman, Haunschild, & Phillips, 2004).

### 2.4.2 Environmental Uncertainty

Environmental uncertainty is linked with the changes in conditions outside the organization which are beyond control and difficult to anticipate (Krishnan, Martin & Noorderhaven, 2006). However, to sustain the performance of a project, partners require accurate information to tackle the emerging situation and adjust their strategy to respond accordingly (Fink & Harms, 2012). As the environmental uncertainty is a result of factors out of the control of the partners and difficult to anticipate. The more volatile external conditions in the countries will lead to higher environmental uncertainty. Thus, dynamic environments create more environmental uncertainty (Saeed et. al., 2022).

Environmental uncertainty arises from the combination of variability and complexity of external factors (Boyd & Fulk, 1996). Variability is linked with change in the factors like suppliers, competitors, and firms working conditions as this affect the

quality and accuracy of the information available to the decision-making body (Angriawan& Abebe, 2011). Complexity is a scenario in which understanding of cause and effect relationship according to the emerging environment becomes difficult thus any decision in that time frame may impact the performance of the project/ organization (Mitchell, Shepherd &Sharfman, 2011)

Environmental uncertainty is considered one of the important factors in the implementation and formulation of strategy. In regular market positions, firms articulate their strategy for creating fixed positions and strive to uphold this position. In this regard, they follow the strategy of difference and try to renew the unstable environment. Undoubtedly, the implementation of these strategies depends on organizational features attributable to the confronted environmental conditions (Eker&Eker, 2019).

Environmental uncertainty has been defined differently by different researchers based on its concept complexity. According to Fong (2012), it is an inability to forecast variation in economic conditions whereas mukhtar and Rosali (2017) have termed the unexpected directionality due to increased complexity as environmental uncertainty. Owing to its multidimensionality, environmental uncertainty has been used in literature as an independent variable and many have been evaluated as moderators (Saeed et al., 2021).

#### **2.4.3 Environmental Uncertainty in Public-Private Partnership Project**

The public-private partnership has public and private sectors as stakeholders and both sectors in our modern society confront increasing controversies on methodology to tackle different challenging issues in their environmental domain. In PPP arrangement problem solving appears as a complex and multifaceted game in which stakeholders behave strategically and are guided by diversified rules and perceptions. Thus, decision-making and problem-solving in a such volatile situation are dominated by environmental uncertainties. Scientific research, command and control mechanisms and project management provide a much more suitable response to emerging environmental uncertainties yet they require very sophisticated network analysis and network management to behave comprehensively. Conclusively, the

environment is becoming more and more important for PPP projects (Koppenjan, Koppenjan&Klijn, 2004).

Public-private partnership projects are working in an unpredictable environment and are dealing lot many issues emerging in their environment. They are part of a network in which they are dependent on other actors, they are unable to control their behavior, and they do not understand their complexity and therefore cannot predict the situation. Such an uncertain situation affects the project's performance. Therefore a favorable regulatory mechanism is very much important to deal with environmental uncertainty. A robust institutional framework along with the framework to deal with environmental uncertainty can provide sustainable and efficient PPP infrastructure projects (Song, 2018).

#### **2.4.4 Environmental Uncertainty as Moderator**

Scholars of management sciences have emphasized variability and unpredictability in the outcome of the project, market demand, and development as the main factor underlying environmental uncertainty (Fynes et al., 2004; Ragatz et al., 2002; Sun et al., 2009; Lee et al., 2009; Land et al., 2012). Therefore, environmental uncertainty is a complicated phenomenon, which can emerge from a different source and can impact the relationship between input and output in different ways (Wu, 2013).

The effect of environmental uncertainty on the project, process activities, and product success has been measured by Bstieler and Gross (2003). They measured and found the moderating effect of environmental uncertainty (Bstieler& Gross, 2003). The moderating effect of Environmental Uncertainty has been investigated by Wang and Fang (2012). Similarly, Chin et al. (2014) have determined the adverse moderating effect of Environmental Uncertainty on the relationship between performance and external integration. Rahim and Zainuddin (2016) have also proposed and established the moderating effect of Environmental Uncertainty on business performance. According to Saeed et al. (2021), uncertainty has a moderating effect on the relationship between project performance and an organization's innovation capability (Saeed et al., 2021).

#### **2.4.5 Measurement of Environmental Uncertainty**



Environmental uncertainty present in the project's environment may affect the success of a project. Previous researchers have explained Environmental Uncertainty as moderating factor, which has been captured by eight, items (Bstieler& Gross, 2003). These measures include:

- Market development volatility
- Technological development changeability
- Market development variability
- Instability of technological development
- Degree of market competition
- R&D efforts in the industry
- Marketplace complexity in terms of individual demands versus standard
- Technological development complexity to which the new product project was exposed.

## **2.5 Tackling Uncertainty in Public-private Partnership**

The main problem of economic organizations especially public-private partnership projects is to face and deal with uncertainties (Bose et al., 2003). Infrastructure projects face more uncertainty as compared to other industries and their flexibility distinguishes them from others (Jin, 2011). PPP projects are mostly prolonged projects, their prolonged lifecycle expanding over decades causes difficulty in foreseeing the uncertainties in the future (Ali, Turi, & Iqbal, 2023). Every stage of a PPP project is prone to different uncertainty, especially in later stages. At a time of high uncertainty, it will be difficult for firms to choose the technology to sustain or mitigate the uncertainty in the future. To tackle uncertainty firms or organizations have to work on mitigation by use of different options (Tao, Jiang & Santoro, 2015).

According to Shah and Swaminathan (2008), academics and practitioners have identified a great amount of failure and instability in projects of strategic alliance (Dyer, Kale & Sing, 2001; Hamel, Doz& Prahalad, 1989; Inkpen& Beamish, 1997;

Lambe&Spekman, 1997). Therefore, uncertainty management must be an essential part of PPP management. Changes in the environment have a strong impact on PPP projects.

In most of the PPP studies, the interaction between public and private partners over the project's life cycle (where uncertainty in the environment is inevitable) has not been discussed. Consistent with agency theory, contemporary projects require a more project-specific approach (Shenhar, 2001) and PPP research has mentioned that project context matters (Shah & Swaminathan, 2008). Nguyen et al. (2018) have mentioned approaches to address risk in various projects and markets as per the environment because of its influence. It has also been mentioned that context matters in case of uncertainty in PPP projects (Arabi et al., 2018).

## **2.6 Joint Risk Management**

### **2.6.1 What is Risk?**

Risk is a part of our life since the beginning of time. Although it was termed as such (i.e. risk) but have always, felt the presence of risk in their life. Risk is associated with uncertainty. Uncertainty has a long documented history from the time of the ancient Greek Socrates who defined eikos as "likeness to truth" (Singh, 1997). As a concept, risk and uncertainty have been discussed a lot since the last century as before that risk and uncertainty were hardly considered a concept.

The conceptual evolution became interesting after World War I. Frank Knight (1885-1972) is considered a pioneer in the field of risk and uncertainty. He mentioned decision-making under the influence of uncertainty in his book in 1921. The doctoral thesis is considered a foundation of modern work on risk and uncertainty (LeRoy & Singell, 1987). John Maynard Keynes (1971) another researcher appeared with the same conclusions in his book. Nobel Laureate Kenneth Arrow has conducted impressive research on the phenomenon of 'uncertainty we face' and 'risk we take' (Singh, 1997). Bernstein (1996) has named Arrow as a father of the concept of risk management in practical art. In the present day, risk management is wide and dispersed. Sitkin and Pablo (1992) captured the risk in three dimensions including outcome uncertainty, outcome expectation, and outcome potential. Jaafari (2001) has taken a risk as exposure to loss/ gain. PMBOK (2000, 2004) has mentioned risk as the

happening of an event that can have a positive or negative effect on the outcome of the project's objective. Hertz and Thomas (1984) have described the risk in both ways i-e 'uncertainty' and the 'result of uncertainty.

Yeo (1995) argued that risk and uncertainty have been used interchangeably in the literature for some time but then the researcher has come to decide the place where they have discussed the difference between risk and uncertainty. Mullins et al. (1999) defined risk as a degree of uncertainty and potential loss from a specific behavior or risk is the uncertain likelihood of something. Such arguments are a source of confusion and diffusion in the minds of researchers and practitioners in the following phase. Therefore, it is suggested to take risks and opportunities as derivatives of uncertainty. Uncertainty is a business opportunity that can express as "it is likely" it is probable" or "possibly" (Doctor, Newton & Pearson, 2001). Risk and opportunity are neither considered as negative nor positive but only happening, the only thing one can conclude is that risk and opportunity are uncertain until they are put into context.

It is very important to understand and distinguish between risks, issues, and problems because the risk is connected to uncertainty whereas issues and problems are not linked with it. Consequently, risk can be proactively managed but issues and problems cannot be managed in advance (Hillson, 2012).

Project Management Institute (PMI) has defined risk in Project Management Body of Knowledge (PMBOK) as, "any uncertain condition or event that can have a negative or positive effect on one or more objectives like its cost, schedule, scope or quality" (PMBOK 6th Edition (2017)). Most researchers and organizations linked with the field of project management have almost similar definitions. According to the Association for Project Management (APM) "*A risk is an event if occurs will affect the achievement of one or more objectives*" (Payne, Roden&Simister, 2019).

## **2.6.2 Risk Management**

"Risk Management" is a strategic interface aimed at organizing threat exposure or explaining the presence of harm. Risk management is a system to beneficially manage risk and opportunities by using processes and resources to reduce threats and maximize opportunities (Hillson, 2012). It is pertinent to remember that risk

management is not only to reduce losses but also a criterion to convert threats into opportunities to earn a better profit (Flanagan, Jewell & Johansson, 2007). Therefore, a risk management system needs to be designed efficiently to manage both types of risk. However, not all risks can be predicted and there will remain an unknown risk in projects (Hillson, 2012).

All projects face risks that can be known and unknown. The known risks can be recognized, evaluated, and managed whereas unknown risks are difficult to tackle as they can not be foreseen. An important part of risk management is to act proactively to reduce the amount of unknown risk. Therefore, a risk management system needs to be designed efficiently to manage both types of risk. However, not all risks can be predicted and there will remain an unknown risk in projects (Hillson, 2012)

The risk management system is used by organizations to manage uncertainty to increase the probability to achieve objectives as well as the allocation and utilization of resources attributable to opportunities and threats identified in projects to treat specific risks (Denney, 2018). The viewpoint of risk management is to treat uncertainties to obtain project success. The dynamic concept of “Joint Risk Management” in some emerging research has advanced the risk management theories in different projects specifically construction projects (Osipova, 2015).

### **2.6.3 Risk Management in Public-Private Partnership**

A public-private partnership is a complex arrangement that can have a life span spreading over years. In PPP, public and private partners are involved in the cooperative arrangement and have interdependencies with each other (Boussabaine, 2013). Duration of projects, scope, and PPP project intricacy present various additional risks including political, technical, regulatory, financial, market maturity, legal, and economics (Taruvunga, 2017). The important aspect of such a complex arrangement is that risk emerges through numerous pathways and spreads rapidly. If these risks are left unnoticed and unmanaged they will lead to the complete failure of the project (Loosemore& Cheung, 2015).

Researchers like Akintoye et al. (2000), Loosemore et al. (2005), and Jefferies and McGeorge (2008) have argued that failure in PPP can be put down and risk can be

managed to obtain successful projects. According to Lehtiranta (2013), traditional risk management is limited to one organization whereas, in PPP projects, risk management is dependent on partner interactions and therefore not manageable by one organization (Loosemore & Cheung, 2015).

Increased PPP projects in development have shown that risk mitigation is difficult to process as there are many opportunities for profit increase the same way there are many risks involved. These risks are due to environmental uncertainty in developing countries (Bakhtawar et al., 2021).

Risk management is used to tackle uncertainty in projects when formally confronted with such happenings. Undoubtedly, risk management depends upon sound planning to implement in each project phase. In construction projects, partners are involved according to the principal-agent relationship as the agency theory advocates the partners' behavior on maximizing their interest rather than the project as a whole because they enjoy adversarial relationships (Ravenswood, 2011).

#### **2.6.4 Joint Risk Management (JRM)**

Joint risk management (JRM) is an effective cooperative strategy to deal with risk allocation and deal with unforeseen events. JRM facilitates the project risk understanding and its consequences for different participants (Marinelli & Salopek, 2019). It is a very important aspect of managing risk in project management in the present-day uncertain and changing environment. However, in spite of the advantages approach of collaborative strategy i.e JRM, it is still rarely used in the construction industry (Friday, Ryan, Sridharan & Collins, 2018). JRM aims at the identification, assessment, and response to uncertain events, which may negatively or positively affect the project's success. Therefore, the main task of JRM is to facilitate stakeholders in decision-making by minimizing consequences and maximizing opportunities for project success (Wang, Cui & Liu, 2018).

#### **2.6.5 JRM as Moderator**

Joint risk management has been used in the literature as a moderator and researchers have considered JRM to moderate the impact of Environmental

Uncertainty. In this regard, Singh (2020) has established the moderating effect of JRM to counter the effect of Environmental Uncertainty. Burke & Demirag (2019) also identified the mechanism of joint risk management in global PPP markets to address the uncertainties in PPP project success and thus addresses the concerns of Hodge, Greve, and Biygautane (2018) regarding the lack of empirical research in this area. Bopp et al., (2019) have investigated the impact of risk management to deal with uncertainty and found it significant, Keers & van Fenema (2018) who has validated the role of joint risk management for successful PPP projects by dealing with different risks/ uncertainties in PPP projects. Osipova (2015) investigated the impact of joint risk management to make the project performance better by moderating the negative effect of uncertainty in the project from the perspective of agency theory. Osipova & Eriksson (2013) has investigated and validated the importance of joint risk management to deal with the impact of uncertainty in any project. Li et al., (2015) have investigated and validated the role of joint risk management towards the success of projects by mitigating different risks/ uncertainty from the perspective of agency theory.

#### **2.6.6 Measurement of JRM**

Previous studies have explained that Joint Risk Management (JRM) is very effective in managing the risk present in public-private partnership projects (Kumaraswamy et al., 2005). The work of the above researchers in the field of PPP has mentioned that Joint Risk Management is an important factor, which plays a pivotal role in the PPP project's success. Doloi (2009) has formulated a scale for the measurement of Joint Risk Management and proved that risk efficiency of project management along with the agreement advantages can help to assess the risk management capability. Moreover, it was also proved that the successful delivery of a project and its monitoring with an effective communication mechanism can lead to Joint Risk Management. In all the cardinals, the importance of trust and confidence also needs to be viewed with concern. The following five indicators have been used to measure Joint Risk Management in public-private partnership projects (Doloi, 2009).

- Project management risk efficiency
- Relationship agreements advantages

- Successful project delivery and effective monitoring
- Effects on communication
- Importance of trust and confidence

## 2.7 Trust

Trust is very extensively discussed in the literature; it can be defined in many ways. Generally, it is believed that to trust a person, it is expected that the other will not take benefit from opportunistic behavior even if the opportunity arises at some time during the agreement (Klijn, Edelenbos&Steijn, 2010). In this regard when parties will communicate with each other about their intentions and collaborate with respecting the intents of each other then trust will develop (Warsen et al., 2018).

In inter-organizational collaboration, trust is a willingness to have confidence and rely on an exchange partner (Ganesan & Hess, 1997), it is also a degree of reliability and integrity of partners in each other (Aulakh, Kotabe& Sahay, 1996). Thus, we can say that trust is a combination of integrity, benevolence, credibility, and dependability (Harris, 2006).

### 2.7.1 Trust in Public-Private Partnership Projects

Williamson (1996), a famous scholar discussing the theoretical underpinning of PPP projects has argued that trust is more or less a redundant concept in an economic transaction based on contracts (Cohen, 2014). However, an extensive range of literature contradicts the statement of Williamson (1996) and emphasizes the importance of trust in partnership projects (Warsen et al., 2018).

According to Vangen and Huxham (2013), literature is full of arguments containing the role of trust in alliance. Researchers have also highlighted the importance of trust in partnership (Huxham&Vangen 2005; Ansell & Gash 2008). Trust encompasses the following aspects in public-private partnership projects.

- **Trust facilitates cooperation.** According to Nooteboom (2002), trust reduces risks in PPP projects and trust facilitates cooperation between partners.

- **Trust enhances creativity.** Parker and Vaidya (2001) have highlighted that trust reduces thick contracts as thick contracts are mostly costly. So trust between partners provides a foundation to reduce thick contracts and provide more room for creativity.
- **Trust solidifies cooperation.** Trust between partners enhances cooperation and then they invest more resources, time, and knowledge in an uncertain environment with the belief that other partners will not act opportunistically. Thus trust can lead to stability by dealing with the negative impact of uncertainty in PPP projects. (Klijn, Edelenbos&Steijn, 2010).
- **Trust enhances performance.** Trust also enhances the performance of a project through the exchange of information and knowledge to achieve a new solution. In this way, a trust-based project yields better performance in comparison to other projects (Brogaard, 2019).

Trust enhances the public value in PPP projects but its role in enhancing the business value in PPP is unclear and therefore it cannot be prioritized based on business value (Brogaard, 2019). The consideration is in the process to see whether contracts only can ensure the benefits of a new product or network. However, trust moderates the conflicts and motivates partners to undertake the innovation process where the outcome is uncertain (Klijn et al., 2010). Therefore, trust can also be defined as the expectations of willingness to accept vulnerabilities from uncertain situations (Henry & Dietz, 2011). Scholars at various times have highlighted the importance of trust and managerial effort to obtain successful PPP projects (Klijn&Koppenjan, 2016).

Trust enhances the probability of actors' behavior and in this way, it helps in transaction cost reduction and increases the partner's value (Edelenbos, Klijn&Steijn, 2007; Rufin& Rivera-Santos, 2012). There are four dimensions, which capture the degree of trust between the partners.



- Trust is the perception of the competencies of other partners and whether they can perform the task as per the requirement of the partnership (Lewicki & Brinsfield, 2012).
- Trust is benevolence or goodwill, in which partners believe to have their self-interest in mind (Edelenbos & Meerkerk, 2016).
- Trust is the consideration of the integrity of other partners i.e the partner can expect one another to do what has been agreed upon (Lambright, Mischen & Laramée, 2010).
- As the partners in PPP projects come from different sectors therefore they lack mutual understanding and prior interaction to have a better relationship. Thus interaction plays important role in the development of trust among the partners (Rufin & Rivera-Santos, 2012).

The strategic intricacies in public-private partnerships make it very difficult for partners to predict and calculate possible contingencies appearing in that specific project (Koppenjan & Klijn, 2004). If partners have trust in each other they will no longer just calculate the negative outcomes because they will expect that the other party will look after their interests (Klijn, Steijn & Edelenbos, 2010). In the presence of trust, both parties get convinced that their partners will not behave opportunistically and will be ready to invest their resources in collaboration and uncertain activities. (Mohr & Puck, 2013). Literature highlights that trust is an important factor to cope with external shocks, project complexities, and uncertain events in any project (Klijn et al., 2016).

The public-private partnership is frequently used in many countries but there is no unanimous judgment about the performance of PPP (Hodge & Greve, 2017). The confusion about the successful PPP could not be answered unanimously nor factors making PPP successful could be streamlined. Similarly, the literature on governance and relational contracting has highlighted the importance of trust and informal communication for PPP performance.

### 2.7.2 Trust as Moderator

Trust is one of the basic factors in any work organization and one of the extensively studied factors in organizational relation research today (Fry, Nyein & Wildman, 2017). The studies are fragmented in this regard as trust has never been used as a core variable in most of the studies. Rather it has been mostly used as a predictor of performance or to specify the relationship between team performance and independent variables. (De Jong, Dirks & Gillespie, 2016). Thus, it has appeared in literature as a mediator as well as a moderator both ways. The effect size of trust in different studies had been different and it had substantially varied in magnitude and direction with some had been supporting the positive impact of trust (De Jong & Elfring, 2010) whereas some remained unable to find any impact of trust (Aubert & Kelsey, 2003) and some even reported a negative impact of trust on performance (Langfred, 2004). Therefore, we can conclude that the cumulative body of evidence about the impact of trust on performance is lacking (Weißmüller & Vogel, 2021).

Wei, Wong, and Lai (2012) also mentioned that trust plays an important moderating role to counter Environmental Uncertainty to improve performance. Lu et al. (2016) have also highlighted that external uncertainty can pose threat to a project. The impact of Environmental Uncertainty creates challenges for project management to maintain project performance. Therefore, project managers to make more efforts to develop trust amongst the stakeholders to decrease the negative impact of Environmental Uncertainty.

Hodge, Greve & Biygautane (2018) established that trust is very important to obtain desirable results in PPP projects. They also concluded that trust can enhance the cooperation between partners to deal with any eventuality posed by the external environment (Cheng, Liu & Chi, 2021)..According to Sako 1998, Parker and Vaidya 2001 and Ring and Van Der Ven 1992 trust compensates for uncertainty and enhances performance (Warsen et al. 2018). Khosravi, Rezvani & Ashkanasy (2020) has worked out the moderating role of trust and claimed that trust among partners can play an important role to reduce the negative impact of uncertainty or any conflict on performance. In this way, trust can play a fundamental role in moderating the negative effects of uncertainty on performance.

The mixed answer about the impact of trust warrants further attention to trust in the performance of partnership projects. Although attempts to find the impact of trust as a moderator is encouraging these studies have produced inconsistent results regarding the moderating impact of the various factor (Kassa, 2017). In this study, the researcher has tried to examine the moderation impact of trust on the impact of uncertainty to achieve sustainable performance in public-private partnership projects.

### **2.7.3 Measurement of Trust**

Nederhand&Klijn(2019) developed the measurement scale of trust by the tendency of the benefit of the doubt from any happenings, and the reliability of the partners for each other in any contract. The scale also included the absence of opportunistic behavior in the partners as well as the goodwill of trust. The scale formulated by Nederhand&Klijn (2019) includes the following items:

- The benefit of the doubt
- Reliability
- Absence of opportunistic behavior
- Goodwill trust

## **2.8 Theory Basis for Studies**

Theories used in PPPs have been mentioned at **Appendix ‘B’**. However, this study has used critical success factor theory and agency theory as the study basis. Although agency theory is an overarching theory in my study and critical success factor theory has been used as a supporting theory. The rationale for their use is described in the ensuing paragraphs.

### **2.8.1 Critical Success Factor Theory**

The idea of the ‘success factor’ was presented in 1961 in management literature by D. Ronald Daniel. He claimed that few factors in any industry are important for

success relevant to companies in that particular field which can be claimed as a ‘success factor’ (Daniel, 1961). Based on this, Rockart introduced the mechanism to identify the needs of the chief executive officer and termed it a “critical success factor” (Rockart, 1979). Later this concept encompasses all the areas of business management and has been used extensively in all types of organizations (Wronka, 2013). The original concept of CSF theory was formulated based on Pareto’s findings as Pareto's law states that 80 % of the effects come from 20 % of causes. Similarly, according to CSF theory, organizations need to focus on 20 % which is causing 80 % towards the success or failure of any project or organization’s goal (Kannan, 2018; Aldona et al., 2012; Wronka, 2013; Hood, 1991). Critical success factors are the “few key areas that must go well to ensure the success of any project” (Moohebat et al., 2010; Ngai et al., 2008; Amberg et al., 2005; Bullen & Rockart, 1986; Boynton and Zmud, 1984). According to Dora et al. (2013), we can apply this definition of CSF to any type of sector or project. The CSF theory provides the concept of a smarter way to identify certain factors that must be present in the project. Moreover, CSFs can be considered as a tool to measure the performance of a project to achieve the desired goals (Kannan, 2018).

PPP projects are using the CSFs concept for the last many years to maintain their success (Sehgal et al., 2019; Debela, 2019; Ahenkan, 2019; Opawole et al., 2019; Osei-Kyei et al., 2019; Cui, Liu, Hope, & Wang, 2018; Ullah & Thaheem, 2018; Almarri & Boussabaine, 2017; Sanni, 2016; Al-Saadi & Abdou, 2016). Keeping the above in view this study has used CSF theory for the exploration and identification of CSFs for PPP so that the performance of PPP projects may be evaluated based on identified CSFs.

### **2.8.2 Agency Theory**

The agency theory (i.e. principal-agent theory) surfaced in 1970 through the amalgamation of economics and institutional theory (Reddy, 2014). The institutional theory presents a unique approach to studying economic, social, and political dynamics in which the rules of games are formed by the institution. When the institutional structure operates properly, it reduces transaction costs, risk, and uncertainty (Kuijpers & Eijdenberg, 2021). An economic theory is a set of principles and ideas that describes the functioning of different economies. Thus an economist may employ

different theories for different purposes according to economic phenomena (Hodgson, 1998). Later the agency theory moved beyond the institutional and economic study to various aspects including information asymmetry, risk management, and uncertainty. Agency theory is widely used in multiple disciplines since its origin i.e. four decades ago. Now this theory has captured the focus of project management, corporate governance, and operation management literature (Parker et al., 2018).

Agency theory talks about the relationship in PPP, the public context refers to the citizens as the ultimate principle-i.e public authority (Mayston, 1993; Moe, 1984) and the agent is commonly referred to as a private company. Agency theory originated from the work of Jensen and Meckling (1976). It is an economic relationship between partners by observing them as self-interested and rational actors. Eisenhardt (1989) reviewed two extreme positions on agency theory i.e. the exponents who argued that agency theory is a revolutionary theory (Jensen & Ruback, 1983) and the opponents who stated agency theory is narrow, not clear, and has testable implications (Perrow, 1986). Most researchers have concluded about agency theory that it is unique, clear, and empirically testable that can be used in any organization or business arrangement to address principal-agent issues. Agency theory since evolution remained applicable in very specific domains and there is a need for its further theoretical development (Bendickson, Muldoon, Liguori, & Davis, 2016).

The theoretical framework for this study has been derived from the principal-agent theory. In this regard, there is a need to understand the nature of the relationship that exists between public and private partners to work together to deliver services to the citizens through the use of agency theory. The relationship between the agent and the principal is labeled as a relationship or contract. Agency relationships exist when the principal employs the agent to do some tasks on his behalf (Bjurstrom, 2020). In this arrangement, there are likely chances to appear some problems in the relationship which are called the agency problem (Smith, Umans, & Thomasson, 2018). In this context, the agency theory review focus on various aspects of the principal-agent relationship that have been anticipated and verified in the different study domain (Rose, 2019).

The agency theory revolves around different aspects of agency problems and their solution (Panda & Leepsa, 2017). Therefore, we can say that agency theory is an

analytical lens that is used for the assessment of the contractual arrangement between the partners (Addisalem et.al., 2018). Usually, in a PPP arrangement, the focus of the principal remains on the optimization of service delivery whereas the agents strive for economic benefits maximization from the contractual arrangement (Muhanguzi, 2019).

Agency theory deals with a few assumptions regarding agency problems and those are conflicting interests of partners, the idea of rationality to undertake some steps, asymmetric information, uncertainty, and risk management. Mutuality between the partners is most difficult to achieve because of the different orientations and understanding of different collaborators (Liu et al., 2013).

Agency theory provides a very useful framework to identify issues that can significantly impact relationships and expose their effects. The main aspects are the identification of compatible objectives for which the project participants have formulated a partnership along with their risk attitude difference towards uncertainty and complexity (Tipu& Yousaf, 2022).. Therefore, agency theory is used to answer the questions which can foster a collaborative relationship among the partners by dealing with uncertainty with proper risk management strategies (Osipova, 2015).

Many factors dictate the partnership arrangement in public-private partnership projects leading to success vis-à-vis sustainable project success. Therefore, the agency theory lens has been used considering the all-encompassing facets of this particular study. There is very little discussion on the agency problems in the PPP relationship especially the uncertainty aspect (Smith, Umans, & Thomasson, 2018). There is a requirement to evaluate the agency problem i.e uncertainty to provide the solution to the application problem by keeping in mind the agency theory (Cheng et al., 2021). Moreover, trust and project risk management need to be seen through the lens of the principal-agent model in the PPP arrangement (Niwabiine, 2019) to have SPPPP by tackling agency problems.

This research has used an agency theory to investigate the relationship between critical success factors and sustainable PPP performance of a project that is being undertaken by the mutual coordination of partners. According to Miller environmental uncertainty leads to uncertainty in the performance of any project. (Utomo&Susanta, 2021). Thus, the impact of Environmental Uncertainty has been evaluated on the

relationship to formulate the strategy to mitigate it. Researchers have also investigated the role of Trust as a moderator in PPP projects and highlighted that Trust may resolve the agency problem which arises in PPP projects from an agency theory perspective (Panda, 2016). It has also been discovered in the literature that the effect of uncertainty can be mitigated by Joint Risk Management in PPP projects from the agency theory viewpoint (Li, Lee & Cheng, 2015). Therefore, in this study, the outcome of moderated impact on Environmental Uncertainty has been moderated by Trust and Joint Risk Management as a solution to agency problems (i.e. environmental uncertainty) to have sustainable PPP performance in the result.

This research has used the critical success factor theory to explore/ identify the CSFs in PPP projects and investigate their relationship with the sustainable PPP performance of a project. As this study has explored the CSFs and every CSFs in an arrangement provide different types of agency problems in the partner's relationship. Therefore, subsequently, this study has used the agency theory lens to evaluate the PPP arrangement with the view to investigate the impact of the agency problem and the mechanism to resolve the agency problem. Thus this study has bridged two theories i.e. critical success factor theory and agency theory for the achievement of sustainable PPP performance in projects.

## **2.9 Hypothesis Development**

### **2.9.1 Relationship between CSFs and Project performance**

In project management literature, the relationship between CSFs and project performance/ success has often been discussed. Researchers like Helmy et al. (2020), Sehgal & Dubey (2019), Pacagnella et al., (2019), Wang et al., (2018), and Luthra, Garg, & Haleem (2016) have talked about the significant relationship between CSFs and project performance. In this study, based on this foundation I conclude that CSFs for PPP will have a significant relationship with sustainable PPP performance. So I can state my hypothesis (1)

*“There is a significant relationship between the CSFs and sustainable PPP performance”*

### **2.9.1.1 Relationship between Political factor and Project performance**

In project management literature, the relationship between the Political Factor and project performance/ success has been discussed a lot. Researchers like Helmy et al., (2020), Opawole et al., (2019), and Koops et al., (2017) have investigated and validated the relationship between the political factor with project performance and project success. In this study, based on this foundation I have tried to establish the relationship between the political factor and sustainable PPP performance. Therefore, hypothesis 1(a) can be stated as,

*“There is a significant relationship between the Political Factor and sustainable PPP performance”*

### **2.9.1.2 Relationship between Technical factor and Project performance**

In project management literature, the relationship between the technical factor and project performance/ success has been discussed a lot. Researchers like Alvarenga et al., (2019), Opawole et al., (2019), Zhang et al., (2013), and Belout& Gauvreau (2004) have worked on the project's success and proved that technical factor is very much required for project performance as well as project success. In this study, based on this foundation I have tried to establish the relationship between the technical factor and sustainable PPP performance. Therefore, hypothesis 1(b) can be stated as,

*“There is a significant relationship between the Technical Factor and sustainable PPP performance”*

### **2.9.1.3 Relationship between Legal factor and Project performance**

In project management literature, the relationship between the legal factor and project performance/ success has been discussed a lot. Researchers like Helmy et al., (2020), Opawole et al., (2019), and Akanni, Oke, & Akpomiemie, (2015) have discussed the importance of legal factors and established their significant relationship with project performance. In this study, based on this foundation I have tried to establish the relationship between the legal factor and sustainable PPP performance. Therefore, hypothesis 1(c) can be stated as,



*“There is a significant relationship between the Legal Factor and sustainable PPP performance”*

#### **2.9.1.4 Relationship between Finance factors and Project performance**

In project management literature, the relationship between the finance factor and project performance/ success has been discussed a lot. Researchers like Helmy et al., (2020), Opawole et al., (2019), Mohamad et al., (2018), and Sebestyen (2017). all have highlighted the finance factor as an indicator of PPP project success and an important factor contributing to project success. Therefore, hypothesis 1(d) can be stated as,

*“There is a significant relationship between the Finance Factor and sustainable PPP performance”*

#### **2.9.1.5 Relationship between Economic factors and Project performance**

In project management literature, the relationship between the economic factor and project performance/ success has been discussed a lot. Researchers like Helmy et al., (2020), Opawole et al., (2019), and Mishra, Dangayach, & Mittal (2011) also investigated and finalized that economic factors play a very important role in project success. Therefore, hypothesis 1(e) can be stated as,

*“There is a significant relationship between the Economic Factor and sustainable PPP performance”*

#### **2.9.1.6 Relationship between Procurement factors and Project performance**

In project management literature, the relationship between the procurement factor and project performance/ success has been discussed a lot. Researchers like Pu et al., (2020). Helmy et al., (2020) and Opawole et al., (2019) have investigated the relationship between procurement factors and project success as well as PPP project success. Therefore, hypothesis 1(f) can be stated as,

*“There is a significant relationship between the Procurement Factor and sustainable PPP performance”*

### **2.9.1.7 Relationship between Regulation factors and Project performance**

In project management literature, the relationship between the regulation factor and project performance/ success has been discussed a lot. Researchers like Helmy et al., (2020), Opawole et al. (2019), Luthra, Garg & Haleem (2016), Mangla, Govindan, & Luthra (2016) have discussed the importance of regulatory factor and established its significant relationship with project performance as well as sustainable performance. Therefore, hypothesis 1(g) can be stated as,

*“There is a significant relationship between the Regulation Factor and sustainable PPP performance”*

### **2.9.1.8 Relationship between Market Maturity and Project performance**

In project management literature, the relationship between market maturity and project performance/ success has been discussed a lot. Researchers like Opawole et al., (2019) and Opawole&Jagboro (2017) have worked out the relationship between the impact of market maturity on project success. Therefore, hypothesis 1(h) can be stated as,

*“There is a significant relationship between the Market Maturity and sustainable PPP performance”*

## **2.9.2 Moderating impact of Environmental Uncertainty on the relationship between CSFs and sustainable PPP project performance**

In PPP, public and private partners formulate an arrangement to undertake a project and public sector is termed as principal and private is labelled as agent. The relationship between the agent and the principal is labeled as a relationship or contract. Agency relationships exist when the principal employs the agent to do some tasks on his behalf (Bjurstrom, 2020). In this arrangement, there are likely chances to appear some problems in the relationship which are called the agency problem (Smith, Umans,

& Thomasson, 2018). In this context, the agency theory review focus on various aspects of the principal-agent relationship that have been anticipated and verified in the different study domain (Rose, 2019).

There is very little discussion on the agency problems in the PPP relationship especially the uncertainty aspect (Smith, Umans, & Thomasson, 2018). There is a requirement to evaluate the agency problem i.e uncertainty to provide the solution to the application problem by keeping in mind the agency theory (Cheng et al., 2021).

The effect of Environmental Uncertainty on the project, process activities, and product success has been measured by Bstieler and Gross (2003). They measured and found the moderating effect of environmental uncertainty (Bstieler& Gross, 2003). The moderating effect of Environmental Uncertainty has been investigated by Wang and Fang (2012). Similarly, Chin et al. (2014) determined the adverse moderating effect of environmental uncertainty on the relationship between performance and external integration. Rahim and Zainuddin (2016) have also proposed and established the moderating effect of Environmental Uncertainty on business performance. According to Saeed et al. (2021), uncertainty has a moderating effect on the relationship between project performance and an organization's innovation capability (Saeed et al., 2021). ThereforeI can make my hypothesis 2 and all its sub-hypotheses based on the above-mentioned references:

H2: There is a significant moderating impact of Environmental Uncertainty on the relationship between CSFs and sustainable PPP performance.

H2 (a): There is a significant moderating impact of Environmental Uncertainty on the relationship between the political factor and sustainable PPP performance.

H2 (b): There is a significant moderating impact of Environmental Uncertainty on the relationship between the technical factor and sustainable PPP performance.

H2 (c): There is a significant moderating impact of Environmental Uncertainty on the relationship between the legal factor and sustainable PPP performance.

H2 (d): There is a significant moderating impact of Environmental Uncertainty on the relationship between finance factor and sustainable PPP performance.

H2 (e): There is a significant moderating impact of Environmental Uncertainty on the relationship between the economic factor and sustainable PPP performance.

H2 (f): There is a significant moderating impact of Environmental Uncertainty on the relationship between procurement factor and sustainable PPP performance.

H2 (g): There is a significant moderating impact of Environmental Uncertainty on the relationship between the regulation factor and sustainable PPP performance.

H2 (h): There is a significant moderating impact of Environmental Uncertainty on the relationship between market maturity and sustainable PPP performance.

### **2.9.3 Moderating Impact of JRM on the moderated outcome of Environmental Uncertainty on the relationship between CSFs and sustainable PPP project performance**

The risk management system is used by organizations to manage uncertainty to increase the probability to achieve objectives as well as the allocation and utilization of resources attributable to opportunities and threats identified in projects to treat specific risks (Denney, 2018). The viewpoint of risk management is to treat uncertainties to obtain project success. In PPP, public and private partners are involved in the cooperative arrangement and have interdependencies with each other (Boussabaine, 2013). Duration of projects, scope, and PPP project intricacy present various additional risks including political, technical, regulatory, financial, market maturity, legal, and economics (Taruvunga, 2017).

Agency theory provides a very useful framework to identify issues that can significantly impact relationships and expose their effects. The main aspects are the

identification of compatible objectives for which the project participants have formulated a partnership along with their risk attitude difference towards uncertainty and complexity (Tipu& Yousaf, 2022).. Therefore, agency theory is used to answer the questions which can foster a collaborative relationship among the partners by dealing with uncertainty with proper risk management strategies (Osipova, 2015).

Risk management is used to tackle uncertainty in projects when formally confronted with such happenings. Urke&Demirag (2019) identified the mechanism of joint risk management in global PPP markets to address the uncertainties in PPP project success and thus addresses the concerns of Hodge, Greve, and Biygautane (2018) regarding the lack of empirical research in this area. Bopp et al., (2019) also investigated the impact of risk management to deal with uncertainty and found it significant, Keers& van Fenema (2018) who has validated the role of joint risk management for successful PPP projects by dealing with different risks/ uncertainties in PPP projects, Osipova (2015) also investigated the impact of joint risk management to make the project performance better by dealing the negative effect of uncertainty in the project by the perspective of agency theory, Osipova& Eriksson (2013) has investigated and validated the importance of joint risk management to deal the impact of uncertainty in any project, Li et al., (2015) has investigated and validated the role of joint risk management towards the success of projects by mitigating different risks/ uncertainty from the perspective of agency theory.

Keeping in view the researcher's concerns and findings, we can comprehend that the negative impact of Environmental Uncertainty in PPP project success can be moderated by the JRM for the achievement of sustainable PPP project performance. ThusI can formulate my hypothesis (3) as follows:

H3: Joint Risk Management (JRM) will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between CSFs for PPP and sustainable PPP performance.

H3 (a): Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Political Factor (PF) and sustainable PPP performance (SPPPP).

H3 (b): Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Technical Factor (TF) and sustainable PPP performance (SPPPP).

H3 (c): Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Legal Factor (LF) and sustainable PPP performance (SPPPP).

H3 (d): Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Finance Factor (FF) and sustainable PPP performance (SPPPP).

H3 (e): Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Economic Factor (EF) and sustainable PPP performance (SPPPP).

H3 (f): Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Procurement Factor (PrF) and sustainable PPP performance (SPPPP).

H3 (g): Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Regulation Factor (RF) and sustainable PPP performance (SPPPP).

H3 (h): Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Market Maturity (MM) and sustainable PPP performance (SPPPP).

#### **2.9.4 Moderating Impact of Trust on the moderated outcome of Environmental Uncertainty on the relationship between CSFs and sustainable PPP project performance**

Environmental Uncertainty demands speedy and responsive decisions as well as action (Huber, Miller, & Glick, 1990: 13; Mintzberg, 1978). Therefore, there is a need to moderate the effect of Environmental Uncertainty. There is very little discussion on the agency problems in the PPP relationship especially the uncertainty aspect (Smith, Umans, & Thomasson, 2018). There is a requirement to evaluate the agency problem i.e uncertainty to provide the solution to the application problem by keeping in mind the agency theory (Cheng et al., 2021).

Researchers like Wei, Wong, and Lai (2012) have mentioned that Trust plays an important moderating role to counter Environmental Uncertainty to improve performance. Lu et al. (2016) have also highlighted that project managers to make more efforts to develop Trust amongst the stakeholders to decrease the negative impact of Environmental Uncertainty. Hodge, Greve&Biygautane (2018) also established that trust is very important to obtain desirable results in PPP projects. They also concluded that Trust can enhance the cooperation between partners to deal with any eventuality posed by the external environment. According to Sako 1998, Parker and Vaidya 2001 and Ring and Van Der Ven 1992 Trust compensates for uncertainty and enhances performance (Warsen et al. 2018). Moreover, trust and project risk management need to be seen through the lens of the principal-agent model in the PPP arrangement (Niwabiine, 2019) to have SPPPP by tackling agency problems.

Khosravi, Rezvani&Ashkanasy (2020) has worked out the moderating role of Trust and claimed that trust among partners can play an important role to reduce the negative impact of uncertainty or any conflict on project performance. In this way, trust can play a fundamental role in moderating the negative effects of uncertainty on performance. ThusI can formulate my hypothesis 4 as follows.

H4: Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between CSFs for PPP and sustainable PPP performance.

H4 (a): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between Political factor and sustainable PPP performance.

H4 (b): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between the technical factor and sustainable PPP performance.

H4 (c): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between the legal factor and sustainable PPP performance.

H4 (d): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between finance factor and sustainable PPP performance.

H4 (e): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between the economic factor and sustainable PPP performance.

H4 (f): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between procurement factor and sustainable PPP performance.

H4 (g): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between the regulation factor and sustainable PPP performance.



H4 (h): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between market maturity and sustainable PPP performance.

## 2.10 Conceptual Framework

Literature regarding critical success factors (CSFs) for Public-Private Partnership (PPP) projects, sustainable Public Private Partnership performance (PPP), uncertainty in Public-Private Partnership performance (PPP), Trust, and Joint Risk Management to tackle uncertainty for the attainment of sustainable Public Private Partnership performance (PPP) projects coupled with the existing gap in literature lead to the formulation of the following framework. The identified gap is very much aligned with the critical success factor theory and agency theory aspect as there lies a gap in agency problem understanding with the perspective of the agency theory. Moreover, the moderated variables i.e JRM and Trust have not been seen through the lens of agency theory. Thus we can say that the literature gap and theoretical gap very much align and dictate us to formulate the theoretical framework. The framework shows the relationship between CSFs for PPP and sustainable PPP performance. This framework provides the individual relationship of each variable (i.e political factor, technical factor, economic factor, finance factor, legal factor, regulation factor, procurement factor, and market maturity) with sustainable PPP project performance. It has Environmental Uncertainty as moderating variable on the relationship between CSF and sustainable PPP performance as well as the individual relationship between each CSF with sustainable PPP project performance. It is mentioned in the literature that Environmental Uncertainty has a moderating impact on project performance and in this way, we have tried to find out its impact on sustainable PPP project performance i.e the dependent variable in this study. Further, the outcome is moderated by the impact of Trust and Joint Risk Management. Literature has provided us with very much support on the moderation impact of Trust and JRM. Based on the contextual gap supplemented by the theoretical gap supported by the variables traits we can formulate a comprehensive framework to obtain sustainable PPP performance by tackling Environmental Uncertainty by the moderation of JRM and Trust. The conceptual framework is explained in figure 2.5 and 2.6 below:

Figure 2.5

Conceptual Framework (Broad)

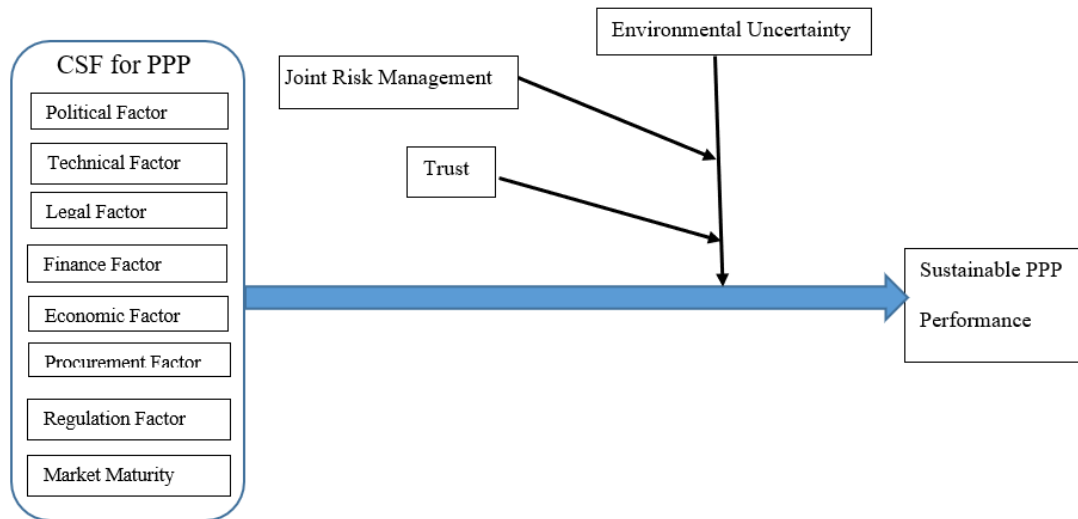
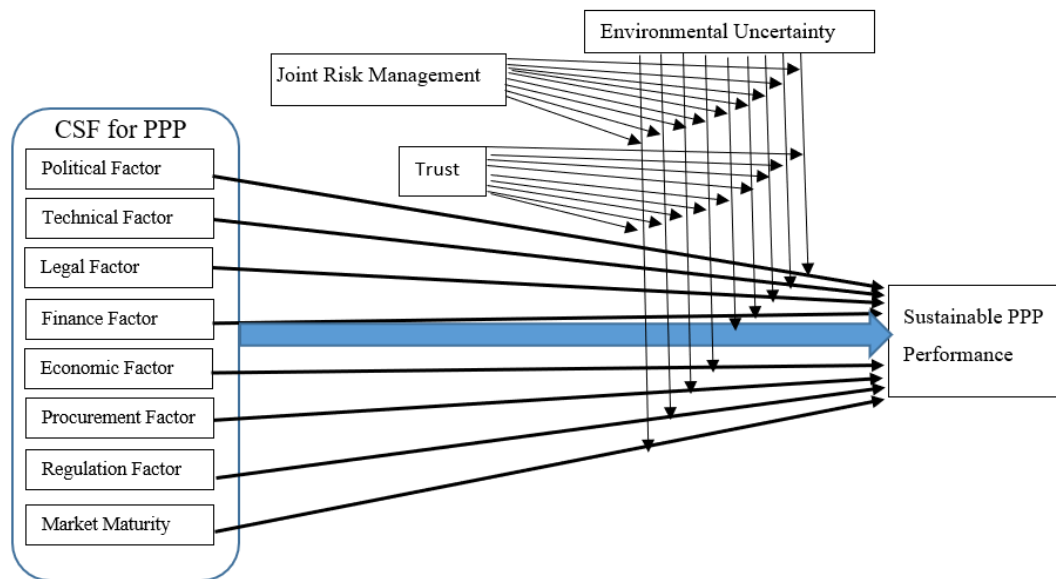


Figure 2.6

Conceptual Framework



## **Chapter 3:**

### **RESEARCH METHODOLOGY**

It was really hard to achieve the aims and objectives of this research being unique and challenging in nature. In this chapter, rationale/ justifications for the adopted research design has been presented to provide clarity about the research setting. This chapter has explained the basis and rationale for the research work for this study including the basic concepts of research design by explaining the Saunder et al. (2013) research onion encompassing the research philosophy, research approach, research strategy, research method, and time horizon. Data collection methods have also been explained along with instrumentation which is an adapted questionnaire. Population and sampling frame has been explained. In the end justification for the SPSS usage for this study has been elaborated.

#### **3.1 The Research Need Revisited**

The current research addresses six issues which are highlighted in chapter one and recognized as research gaps that need to be fulfilled. Conducting research on PPP specific to Pakistan (Gap 1). Exploration of CSFs for PPP projects in Pakistan (Gap 2). Working on sustainable PPP projects performance in Pakistan (Gap 3). Explore the impact of hindrance/ agency problems i.e EU on the PPP project's performance (Gap 4). Formulation of framework to deal with EU (Gap 5). Explore the role of Trust and Joint Risk Management to deal with the agency problem (Gap 6).

The study is explanatory in nature. It will contribute to agency theory by providing insight into the agency's problems and direction/ method to resolve the issue for the achievement of sustainable PPP performance. Previous studies have focused on one set of the PPP aspects but this study intends to blend the different aspects identified as gaps and work towards the attainment of PPP performance.

### 3.2 Research Design

Research design is the overall plot that describes the details of how the research questions have been answered by the researcher. Research design is very important and critical as it connects theories and arguments which is an outcome of the research and collected empirical data (Nachmias&Nachmias, 2008). Churchill believed that the direction of the collection and analysis of the data regarding a specific study is ascertained from the research design (Churchill Jr, 1979). The ‘Research onion’ approach explained by Saunders et al. (2015) has been adopted in this study to enlighten research design.

The research onion is composed of six layers encompassing all the tiers of research design the research philosophy and approach are denoted by the outer layer, and the core layer is explained by the choice of methodology, time horizon, techniques, and procedures. In this regard, the outer layer carries much importance as it defines the margins of the core layers including data collection techniques and adopted procedures. It is also assumed that the adoption of inappropriate research methodology may lead to undesired results outside the research perspective (Holden & Lynch, 2004). It happens because of the beliefs and inbuilt principles, which fall under the selected paradigm to provide an outline on which the thesis will rest.

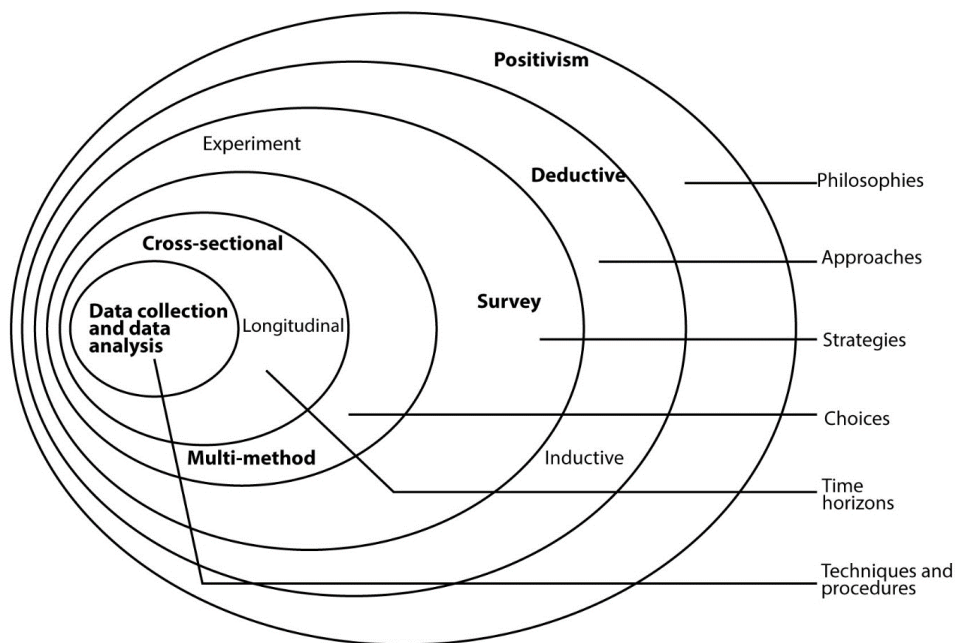
An extensive literature review regarding existing theories and relevant theoretical concepts was conducted to develop a theoretical framework to formulate a study design that could fit the research questions. This study design was based on pre-valid measurement scales adapted from related studies like the CSF scale from Opawole et al. (2019), sustainable PPP project performance from Liang et al. (2019), EU from (Bstieler& Gross, 2003), JRM from (Doloi, 2009) and Trust from Nederhand&Klijn (2019). The purpose of this research is to explore the relationship between different variables. This research is explanatory as a detailed literature review has been done and CSFs have been explored by adopting qualitative techniques i.e. PRISMA. Theory development is also one of the purposes of this study. Later, this research works on cross-sectional and quantitative survey design to form its methodological approach. A self-administered questionnaire was used to collect the response from respondents to predict the conceptual framework and hypotheses. Based

on the responses, the theoretical framework is tested and the relationship between study variables is explored. Then the results, conclusion, and recommendation were drawn for Public-private partnership projects.

The research onion used in research is explained in Figure 3.1. The details of the research onion are discussed in the ensuing paragraphs.

Figure 3.1

### Research Onion



### 3.3 Research Philosophy

Research philosophy marks the first layer in the research onion and it is very crucial as well. Research philosophy/ inquiry is directed by the belief sets which is also referred to as the research paradigm (Saunders & Lewis, 2018). A research paradigm is a pattern of basic belief systems comprising ontology, epistemology, and methodology which leads to choosing the overall research design (Creswell, 2014). Research philosophy explains the researcher's perception of knowledge development in that particular field. As it leads to the researcher's strategy based on his plans and methods.

There are different philosophies pronounced in the research union, they can be related to epistemology, ontology, and axiology (Saunders et al., 2012).

### **3.3.1 Ontology**

Ontology is a belief about the nature of reality and it also refers to the fundamental nature of being or reality. What is reality? what is true? Or what exists are the questions related to ontology. The assumptions that establish valid knowledge can also be viewed through ontology. Ontology can be classified as objectivism and subjectivism. Objectivism emphasizes the objects and can operate independently from the social context or it doesnot require any contextual reference whereas subjectivism talks about the interdependence between organizations and the environment of its operation (Grunert et al., 2004). Aligning with subjectivism ontology this study has explored the management of public-private partnership projects which are always based on the partnership of two parties and they are dependent on each other. This study explains the relationship CSFs with sustainable PPP projects and the impact of Environmental Uncertainty, Trust, and Joint Risk Management as three-way interactions. According to Creswell (2003) and Wilson (2010), three perceptions prevail regarding reality (1) there is one reality (2) there are multiple realities, and (3) reality is continuously negotiated and interpreted.

### **3.3.2 Epistemology**

Ontological beliefs lead to epistemology and methodology. Epistemology inspects the relationship between knowledge and the researcher during the discovery of knowledge and what can be known or how reality can be examined by the researcher. Thus, it describes how the researcher has managed to reach what he knew. (Wilson, 2010). There are three main perceptions of how reality can be examined from an epistemological perspective: (1) Reliable designs and tools can measure the knowledge, (2) the underlying meaning can be discovered, and, (3) knowledge can be examined with the available problem-solving tools. According to the set objectives of the study, an endeavor has been made to discover the relationship between CSFs, Sustainable PPP Project Performance, Environmental Uncertainty, Joint Risk Management, and Trust through the operationalization of the concept using statistical techniques.

### **3.3.3 Axiology**

According to Grunert et al. (2004), axiology explains what researchers valued during the research process. Sustainable PPP project performance is the subject of research that has not been exclusively researched till recently from CSFs for PPP. Thus we can say that the prime objective of this study is to achieve sustainable PPP projects performance from CSFs for PPP by evaluating the impact of Environmental Uncertainty, Trust, and Joint Risk Management.

### **3.3.4 Positivism and Interpretivism**

As per Burrell and Morgan (1979), the quantitative research technique will be evocative of the Positivist paradigm whereas qualitative research methods are more suggestive of interpretivism paradigm views (Holden & Lynch, 2004). Positivism follows the defined structure during the discussion and studies. Positivists believe that there are set rules and procedures due to which there will be minimal room for error. Such an arrangement provides very little room for variance and any extreme change in the variable. In this way, the study is likely to be more accurate in applications because it follows mathematical and scientific tools (Creswell, 2014). Therefore, positivism offers a suitable framework within which we can understand the research problem appropriately.

In this regard, ‘Positivism’ and ‘Interpretivism’ have been designated as opposite primary poles used to select the research philosophy affiliated with them (Easterby-Smith, 2003; Saunders et al., 2015). Petty et al. (2012) have described the difference between the two poles and these attributes are mentioned in **Appendix ‘C’**.

### **3.3.5 Positivist paradigm of inquiry**

The Positivist research paradigm assumes that there exists one uniform reality which can be assessed and this paradigm probes the truth and facts about reality (Bryman, 2012). As reality prevails therefore it can be revealed by the positivist paradigm through the objective of epistemology (Creswell, 2003). Here objectivity refers that the researcher maintaining a distance from what is being discovered and it should not influence the outcome of the researcher. Existing theories provide a ground

for the explanation and prediction of the phenomena in the positivist approach. This approach also integrates experimental or manipulative methodology. Quantitative methods are preferred for hypothesis testing in this paradigm (Brandimarte, 2011). In accordance with the positivist paradigm, this study explored the relationship between the Critical Success Factors for PPP, Sustainable PPP Project Performance, Environmental Uncertainty, Trust, and Joint Risk Management that is measured by objective lens via deducing hypothesis, operationalization of studied concept variable followed by the rigorous testing by using statistical analysis by SPSS version 25. The Positivist paradigm is also chosen when existing theories easily provide propositions, measures to quantify the variables are also available for hypothesis testing, and an adequate sample size from the target population is available to infer the underlying relationship.

The positivist view of research philosophy is the best to suit this study, as this study will be dependent on quantitative analysis techniques. As per Burrell and Morgan (1979), the quantitative research technique is evocative of the Positivist paradigm whereas qualitative research methods are more suggestive of interpretivism paradigm views (Holden & Lynch, 2004). Positivism follows the defined structure during the discussion and studies. Positivists believe that there are set rules and procedures due to which there will be minimal room for error. Such an arrangement provides very little room for variance and any extreme change in the variable. In this way, the study is likely to be more accurate in applications because it follows mathematical and scientific tools (Creswell, 2014). Therefore, positivism offers a suitable framework within which we can understand the research problem appropriately.

### **3.4 Research Approach**

The second layer of the research onion presents the research approach which is divided into two categories i.e. inductive approach and the deductive approach. The inductive approach describes data collection and then theory development based on data analysis whereas the deductive approach focuses on literature utilization for theory identification which the researcher intends to test by data utilization (Saunders et al., 2009). Collis & Hussey (2014) has explained the deductive approach as reasoning from general to specific or from theory to practice and the inductive as from practice to



theory i.e. from specific to general. In this study, the constructed relationship or hypotheses were discovered to comprehend the relationship of formulated model based on existing theories which align with the deductive approach. The deductive approach is considered the dominant approach in the social sciences as laws present the basis of explanation and forecast occurrences and thus permit their control (Collis & Hussey, 2014).

The deductive research approach provides comprehension of different facets of public-private partnership to achieve sustainable performance with the impact of Environmental Uncertainty and then the usage of Trust and Joint Risk Management to tackle Environmental Uncertainty for sustainable performance. This all is done through the execution of primary research with the use of a structured questionnaire to build an understanding of observation in addressing the research issues.

### **3.5 Research Strategy**

Research strategy is the third layer, which has been pronounced by Saunders et al. (2012) where development for research questions will take place. There are many strategies, which can be adopted by the researcher to answer the research questions. The most common are experiments, surveys, case studies, archival studies, grounded theories, and ethnography (Bowen, Rose & Pilkington, 2017). There are three considerations are suggested to select the most appropriate strategy including (1) the type of question posed, (2) the extent of control on behavioral events which a researcher wants, and (3) the degree of the focus on existing events (Wang & Yin, 2014).

PRISMA has been used to explore the CSFs from literature which forms part of the inductive approach. The survey strategy is generally linked with the deductive approach (Saunders & Lewis, 2018). It is one of the most common and popular strategies in management and business research. Mostly it is used for descriptive and exploratory research. One aspect which makes the survey strategy popular is the collection of a large amount of data from a large population in a very economical way. It is also argued that the survey strategy allows the collection of quantitative data for statistical tools. Moreover, the collected data helps to find out the specific relationship between variables and further model specification. A researcher can have better control

of the research process by the using a survey strategy when sampling is used. It provides a good representation of the whole population by collecting data (Collis & Hussey, 2014). This study used a pre-validated questionnaire for all the variables used in the model.

### **3.6 Research Method**

There are three categories of research methods in the literature, i-e qualitative, quantitative, and mixed methods (Saunders et al., 2012). The choice of appropriate research methods depends upon the topic, objectives, and research questions. It is assumed that each research is different from the other because of the objectives therefore they need to be tackled attributable to the required research methods aligning with the objectives and goals of that specific research (Punch, 2003).

The mixed method approach is a combination of quantitative and qualitative approaches in numerous aspects of the research process. It is mainly designed with philosophical assumptions and methods of inquiry. It comprises the theoretical assumptions that point towards the route of collections and analysis of statistics. Furthermore, this method focuses on the collection and analysis. The combined effect of qualitative and quantitative data produces a single or series of claims which provide an improved claim about the research objective.

Researcher in past has used a mixed-method approach with a different name like the multi-method approach (Campbell & Fiske, 1959), in this method many techniques in a single inquiry was used together i.e. quantitative or qualitative method (Creswell, 2003). This technique has also been termed the Hybrid approach (Ragin, Nagel & White, 2004) or methodological triangulation (Morse, 1991). It all confirms the concurrence of qualitative and quantitative data a combined approach (Creswell, 2003), and a mixed methodology that acknowledges both the method and philosophical aspect (Tashakkori, Teddlie & Teddlie, 1998).

Aligning with the positivist paradigm and research objectives, this study has used the quantitative approach to meet the research objectives. Quantitative research depends upon specific research questions, and hypotheses as well as the operationalization of theoretical concepts which need data collection from a sizable

population. This data further needs to be analyzed by using a statistical procedure with the help of statistical tools to provide results for the drawing of conclusions.

The quantitative method has been used in this research to investigate the relationship between critical success factors (CSFs) for Public-Private partnerships with the sustainable performance of public-private partnership projects. Then moderating impact of Environmental Uncertainty will be evaluated and further moderated moderation of Trust and Joint Risk Management (JRM) will be investigated towards the attainment of sustainable public-private partnership performance. Moreover, this research investigates the relationship between variables and according to Creswell the most suitable design to study the relationship among variables is predictive and correlational quantitative research (Creswell, 2017).

### **3.7 Time Horizon**

Before touching the core of the research onion, the neighboring layer describes the time horizon for the researcher to undertake the study. When a researcher has to deal with a problem in a particular period then cross-sectional data will be undertaken to solve the problem. In this scenario, the experiment (limited), survey, case study, or grounded theory is used. Contrarily, when a problem demands to be investigated for a longer period then the longitudinal route will be adopted (Brannen & Nilsen, 2007).

In this study, a cross-sectional study is used to collect data concerning one point in time. This design can measure the alterations between individuals, subjects, or phenomena rather than the change process. A cross-sectional study design uses a survey method for data collection to find out the interesting outcome because the sample is mostly collected in the complete population at one time. Therefore, it is also considered a relatively inexpensive study design (Setia, 2016). According to Saunders & Lewis (2018), cross-sectional studies often employ the survey strategy.

### **3.8 Data Collection Preparation**

#### **3.8.1 Instrumentation**

To test the proposed theoretical relationship between Critical Success Factors, Sustainable PPP performance, Environmental Uncertainty, Trust, and Joint Risk Management existing measures were used to evaluate each construct. These existing instruments were taken from the previous studies and the instruments were well-validated. The used instrument was taken from previous studies as following:

Table 3.1

Study Instrument

Ser No	Variables	Items	Instrument Author
1.	Critical Success Factors	28	Opawole et. al. (2019)
	• Technical Factor	5	
	• Legal Factor	2	
	• Political Factor	4	
	• Finance Factor	4	
	• Market maturity	3	
	• Economic Factor	2	
	• Procurement Factor	5	
	• Regulation Factor	3	
2.	Sustainable PPP Project Performance	25	Liang & Wang (2019)
3.	Environmental Uncertainty	8	Bstieler& Gross, (2003)
4.	Trust	4	Doloi (2009)
5.	Joint Risk Management	5	Nederhand&Klijn (2019)

These selected items of each construct were measured on a 7-point (1= Strongly disagree to 7= Strongly agree). Likert scales because the 7-point Likert scale provides chances of more variation in response thus considered more valid and reliable in repeated measures (Lewis, 1993; Preston & Colman, 2000). Owing to the psychometric properties 7-point Likert scale is preferred over the 5-point Likert scale (Leung, 2011).

Details about the operationalization of these instruments e.g. conceptual, operational definitions, number of items with coding for each construct, and the authors from which the measures are sourced have been mentioned at **Appendix 'D'**.

### **3.9 Pilot Study**

The selected research instruments for this study were already validated in previous studies and it is an important consideration that scales used in the questionnaire are reliable because the validity of items can support the theoretical model (Ruel, Wagner, & Gillespie, 2016). According to Babin et al. (2012), the theoretical framework will be validated if the validated questionnaires worked as per their original intent.

Although the instrument was previously validated as used in developing countries yet it has been adapted to localized and contextualized according to Pakistan. Adaptation is considered a process of considering the differences between the source and the target culture while maintaining equivalence of meaning so that the instrument is completely understood. There are different methods to fulfill this requirement including items, conceptual, operational, measurement, and functional aspects. (Payo et al., 2019). In this study, an endeavor has been made to take care of the aspects including items, concepts, and operational aspects of the instrument. The instrument was sent to thirteen (13) experts including five (5) from the companies undertaking PPP projects, three (3) consultants of PPP projects, and five (5) academicians dealing with the project management disciplines. A few amendments (like syntax errors, rephrasing of two questions, etc.) were recommended by them which were incorporated into the instrument. After the finalization of content/ item analysis, data was collected from the targeted population and a pilot study was conducted with a sample size of 87. The collected responses were statistically checked and the instrument was found reliable with the Cronbach alpha  $\alpha > 0.7$  (Taber, 2018; George & Mallery, 2003). After establishing the reliability of the adapted scale we have gone for the main study analysis as mentioned in subsequent sections.

### **3.10 Main study**

This section will describe the target population, sample size, sampling strategy, and procedure to collect the data for this study.

#### **3.10.1 Research Population**

The population is normally linked with the number of people living in a country and it is always very challenging to investigate the entire population for some study (Taherdoost, 2017). Therefore, to study some phenomenon researchers always study some specific collection of elements. However, research population identification helps in formulating a sample frame that can help to determine a suitable sample for empirical data collection (Saunders & Lewis, 2018). The research population provides a total number of individuals from whom the sample size is to be derived (Bryman & Bell, 2007). The population can also be considered as a precise number of subjects for the selection of a sample (Collis & Hussey, 2014). Defining the target population marks the beginning of the sampling process (Blumberg, Cooper & Schindler, 2014).

The population for this study includes people from the public and private sectors involved in public-private partnership projects. The public sector is comprised of the federal government and provincial government organizations (Kumar&Bano, 2017) dealing with public-private partnership projects. This includes the representation of the Pakistan public-private partnership Authority (PPPA) at the federal and provincial levels as well as the registered companies with the Pakistan Engineering Council (PEC) that have undertaken the public-private partnership construction projects and consultants for PPP projects working in Pakistan.

In Pakistan, no exclusive website is available which can provide data for the population of PPP projects. The PPPA regulates the PPP projects in Pakistan as being the government regulatory authority however, there are many firms/ companies which acts on behalf of private party. The construction projects mostly involved infrastructure projects and they fall under the jurisdiction of the National Highway Authority (NHA)

so NHA also becomes the regulatory body. Initially, most of the projects have been undertaken by the Frontier Works Organisation (FWO) as private partners in projects like Islamabad-Lahore Motorway, Hakla to Dera Ismail Khan Motorway, Lahore Sialkot Motorway, etc. FWO also sublet the contract to other contractors to undertake the PPP projects in the country. Apart from this National Logistic Cell (NLC) construction company, Highway construction company, Habib construction company, China stat construction company, SKB Engineer and construction company, and Metricon (etc.) are a few examples of private partners in Pakistan and are backed and supported by the Asian Development Bank, World Bank or any local bank for specific PPP project with specified terms and conditions. Apart from this National Engineering Services Pakistan (NESPAK), Pakistan Engineering Services (PES), and many other firms and individuals work as a consultant for PPP projects in Pakistan.

### **3.10.2 Sampling Frame**

The sampling frame needs to be determined after the identification of the research population. The sampling frame symbolizes a complete list of the cases in the target population (Saunders & Lewis, 2018). Most sampling frames are derived from the databases therefore, it becomes very crucial to demarcate them accurately. The sampling frame consists of the public and private sectors involved in public-private partnership projects. This includes the representation of the Pakistan public-private partnership Authority (PPPA) at the federal and provincial levels, companies undertaking public-private partnership construction projects, and experts/ consultants for PPP projects. The officers from PPPA, top and middle-level management from the companies undertaking PPP projects in Pakistan, and consultants of PPP projects have been incorporated as sampling frames in this study.

### **3.10.3 Sample Size**

The sample size is a very important consideration to investigate the empirical evidence of any research. The sample size is dependent on the purpose of the study and population size. Apart from this, three other considerations are also required to determine the appropriate sample size including the level of precision, the level of risk or confidence and the variability degree in the attributes to be measured (Miaoulis & Michener, 1976). The researcher cannot test the complete population due to time and

financial constraints therefore to achieve the research objective researcher must conclude about the sample of the target population (Saunders, 2012). There are rules of thumb and many tables to calculate sample size in social science research. Many factors must be considered while estimating the appropriate sample size which are the research approach, analytical method, model complexity or the number of variables, time and resource, completion rate, data analysis program, and sample size used in similar studies (Memon et al., 2020). The sample size for this research has been seen following the existing rules/ guidelines for sample size.

#### **3.10.3.1 Sample to Item Ratio**

Mostly this technique of sample size calculation is used in exploratory factor analysis. The ratio must not be less than 5-to-1 where 5 denotes the sample size and 1 signifies the item of measuring variable (Suhr, 2006). In this study, the measuring items are 70 and in this way, the sample size needs to be 350 for empirical analysis.

#### **3.10.3.2 Sample to Variable Ratio**

The sample-to-variable ratio suggests that there must be a 5:1 ratio between observation-to-variable but the preferred ratio is 15:1 or 20:1 (Hair et al., 2018). Applying this ratio statistics to this study we see that there are five latent variables in this study so the sample size must be more than 75 or 100 followings 15:1 or 20:1 respectively. As 5:1 is not considered sufficient for inferential studies (Bartlett et al., 2001).

#### **3.10.3.3 Krejcie and Morgan's Table**

The sample size determination table given by Krejcie and Morgan (Krejcie & Morgan, 1970) is considered very popular in social science research. It does not involve any calculation required for any defined population as KMT proposes the 384 sample size sufficient for a population of 1,000,000 or more. We can say that 384 has been taken as a 'magic' number and has been extensively used in thousands of articles and theses so far. It is preferred that KMT may be used while using the non-probability sampling techniques researcher may use other sample size determination techniques



(Memon et al., 2020). Keeping Krejcie and Morgan's table, the sample size for this study is 384.

#### **3.10.3.4 Online Calculator**

There are various online calculators available which can determine the sample size for any research. The Raosoft sample size (Raosoft, 2010) calculator and calculator.net are among the best as per the usage in the research articles of social science (see Nakku et al., 2020; Amzat et al., 2017; Othman & Nasrudin, 2016; Cruz et al., 2014; Fernandes et al., 2014;). Determining the sample size via an online calculator researcher needs to place confidence level, margin level, and population size to calculate the minimum number of samples required. Keeping this study in focus and maintaining a margin of error of 5 %, confidence level of 95 % and population size of around 100000 we calculated the sample size as 383.

#### **3.10.3.5 Roscoe's (1975) guidelines**

Roscoe's (1975) set of guidelines has been used to determine the sample size for the last many years. According to Roscoe sample size between 30 and 500 is suitable for most of the studies as a sample size greater than 500 may lead to type II error (Sekaran & Bougie, 2016).

#### **3.10.3.6 Power Analysis**

Power analysis has gained a lot of popularity among researcher to determine sample size (Hair et al., 2019; Uttley, 2019; Ringle et al., 2018; Hair et al., 2018; Hair et al., 2017; Kline, 2016;). Power analysis takes into account the part of the model with the largest number of predictors into consideration. Information related to power, effect size, and significance level is incorporated to calculate the minimum required sample size (Hair et al., 2018). Power analysis is conducted by G\*Power, IBM SPSS sample power, Solo power analysis, SAS power, etc.

### **3.10.3.7 The sample size for this study**

Although, all the sample size calculation methods are very important and have their importance in research yet researcher has to choose one for the guideline to apply in his research. Following the objectives of the study generally and specifically to the analysis methodology, The researcher has used Krejcie and Morgan's Table to calculate the sample size. Based on the response of respondents sample size for this study is 394 which is sufficient and in line with all the sample calculation methods above.

### **3.10.4 Sampling strategy**

The entire population could not be incorporated into the research due to financial limitations therefore sampling is considered to tackle this issue (Saunders & Lewis, 2018). A sample represents the entire population which was under consideration for data collection and further analysis (Bryman & Bell, 2015). The results of the analysis were further generalized to the targeted population. Mostly the sampling design was divided into two categories i.e. probability sampling technique and non-probability sampling technique (Gratton & Jones, 2014).

Probability and non-probability are two streams of sampling techniques. Probability or representative sampling includes drawing random samples from the targeted population in such a way that every unit gets an equal chance of selection, in this way sampling error may be reduced. There are different forms of probability sampling which include simple random, stratified random, systematic random, multistage, and cluster sampling techniques. Contrary to the probability sampling technique, the Non-probability or systematic sampling technique does not allow an equal chance for each unit for selection. It includes convenience sampling, purposive sampling, Quota sampling, theoretical sampling, and snowball sampling (Bryman & Bell, 2015; Saunders & Lewis, 2018).

In this study, the sampling frame included the public and private sectors involved in public-private partnership projects. This comprises the representation of the Pakistan public-private partnership Authority (PPPA) at the federal and provincial levels, companies that have undertaken public-private partnership construction projects, and experts/ consultants for PPP projects. Most of the PPP studies have used same

sample frame due to the nature of PPP projects and adopted the snowball sampling techniques (Liang & Wang, 2019; Opawole et. al., 2019) and purposive sampling techniques (Osei-Kyei& Chan, 2017; Ameyaw &Chen 2015; Cheung et. al., 2012; Chan et. al., 2009; Zhang, 2004). This study has used the research foundation of the researchers like Liang and Wang(2019), Opawole et. al.(2019), Osei-Kyei& Chan (2017), Ameyaw and Chen (2015), Cheung et. al. (2012), Chan et. al. (2009) and Zhang (2004) to use non-probability sampling in the quantitative study.

Following the objectives of this study, the sample size was based on a respondent-driven sampling approach because a comprehensive list of sample frames was not available. The response-driven strategy (RDS) leads the purposive sampling and enables the selection of asymptotically unbiased estimates from snowball samples in a study that has an undefined or unknown population (Opawole et. al., 2019). This technique signifies the advancement in sampling methodology relating to the network-based method. This methodology starts with a set of initial respondents who further refer to their peers. The RDS sampling method reduces the problem of bias in the sample by combing the network-based method with the statistical validity of the standard probability sampling technique (Salganik&Heckathorn, 2004).

### **3.10.5 Data collection procedure**

Data collection was an uphill task especially when the population is unknown and undefined. Data was collected using an adapted questionnaire and most data was collected personally and sometimes with help of peers and researchers. In this regards the officials of PPPA were personally approached with references. Some information regarding organizations undertaking PPP projects was taken from PPPA and they were further approached by the network method. Information was obtained from the organization undertaking PPP projects and PPPA some information regarding experts was obtained and then they were approached to collect the data. In the same way,a questionnaire was sent online to the individuals of PPPA, organizations undertaking PPP projects, and experts/ consultants. The incomplete questionnaires were discarded. The data collection process was completed over five months spanning from April to August 2021. The data collected was decoded in SPSS and further exposed to data cleaning. Study questionnaire is attached at **Appendix ‘E’**.

### 3.11 Selection of appropriate software for analysis

The selection of the best statistical software and appropriate statistical analysis is very much dependent on research objectives and research questions developed by the researchers as it is the prerequisite for any statistical analysis to be employed. The right selection of software helps the researcher to derive accurate results to explain the outcome of the proposed research objectives (Ong & Puteh, 2017). In this research, the main objective is to find out moderated moderation impact of Joint Risk Management, Trust, and Environmental Uncertainty on the relationship of CSFs for PPP and Sustainable PPP Project Performance. Although smart PLS is being extensively used in research nowadays due to its goods like working with complex theoretical models and small sample sizes yet researcher has preferred to use the SPSS version 25 software. PROCESS macro (v.4.0) written by Andrew F. Hayes was added-on to the SPSS package. This software can simultaneously handle moderated-moderation effects as well as mediation & moderation effect. (Shkoler & Kimura, 2020). Owing to the overriding characteristics of the software to tackle moderated-moderation analysis researcher has chosen SPSS. To avoid any confusion in interpretation as every software has its algorithm to operate researcher has preferred to use only one software in research i.e. SPSS version 25.

## Chapter 4:

### RESULTS AND DISCUSSIONS

This chapter has discussed the results and findings of the statistical analysis for this study. Initially, the demographic data of the respondents including their sector and experience of PPP in that specific sector has been explained. Then, measurement model's results were assessed on three levels; (1) internal consistency reliability has been estimated based on composite reliability (CR) and Cronbach's alpha ( $\alpha$ ) value; (2) convergent validity has been estimated on the bases of AVE (average variance extracted) as well as on factor loadings of the indicators. Third, discriminant validity was assessed using the items Fornell-Larcker criterion. After establishing model indices, statistical analyses including Correlation, Moderation and Moderated Moderation have been investigated to test the theoretical frame work vis hypothesis testing. In the end the results have been explained with two way and three way interaction graphs. Lastly, the summary of results have been explained for better comprehension.

#### 4.1 Demographic Profile

Demographic profile for this study has been explained in the following table.

Table 4.1

Demographic Profile of the Respondents

Variables	Characteristics	N	%age
Sector	<b>Public</b>	<b>112</b>	<b>28.4</b>
	Central Govt	30	7.6
	Local Govt	26	6.6
	Public Enterprise	56	14.2
	<b>Private</b>	<b>282</b>	<b>71.6</b>

	Contractors Only	108	27.4
	Consultant/ Advisor	56	14.2
	Operator/ Manager	118	29.9
<b>Industrial Experience</b>	5 or below	50	12.7
	6-10 Years	80	20.3
	11-15 Years	112	28.4
	15-20 Years	91	23.1
	20 years and above	61	15.5
	<b>Total</b>	<b>394</b>	<b>100.0</b>
<b>PPP Project Experience</b>	1	46	11.7
	2	130	33.0
	3	137	34.8
	4	64	16.2
	5 & above	17	4.3
	<b>Total</b>	<b>394</b>	<b>100.0</b>

In this study, around 500 individuals were approached as per sampling strategy i.e. snowball non-probability. 435 x responses were obtained of which 41 x responses were incomplete. So the remaining complete responses i.e. 394 were used for the study purpose. Thus, in this study, the sample size is 394 (n=394) and the sample was comprised of both the public and private sectors. The respondents from the public sector were 112 which forms 28.4 % of the sample size. Out of 112 public sector respondents, 30 were from the central government which forms 7.6 % of the total responses whereas 26.8 % of the public sector respondents. Local government respondents were 26 which is 6.6 % of the total response and 23.2% of the public sector response. Respondents from public enterprise organizations were 56 which forms 14.2 % of the total response and 50 % of the public sector response. The respondents from the private sector were 282 i.e. 71.6 % of the sample size. There were 108 contractors, 56 consultants/advisors, and 118 operators/managers who responded to this study which forms 27.4%, 14.2%, and 29.9 % of the total response whereas 38.3%, 19.9%, and 41.8 % of the total response respectively.

The industrial experience of respondents includes less than 5 years were 50 which is 12.7%, 80 respondents have industrial experience between 6-10 years i.e. 20.3 %, 112 respondents have 11-15 years experience i.e. 28.4 %, 91 respondents have 15-20 years experience i.e. 23.1 % and 61 respondents have more than 20 years experience i.e. 15.5 %.

We have also visualized the data according to the PPP experience. In this regard, the collected data explains that 46 respondents have undertaken only one PPP project i.e. 11.7 %, 130 respondents have undertaken two PPP projects i.e. 33 %, 137 respondents have undertaken three projects i.e. 34.8 %, 64 respondents have completed four PPP projects i.e. 16.2 % and 17 respondents have completed five or more than five PPP projects i.e. 4.3 %.

## 4.2 Normality Test

Normality test of data is mandatory to undertake any parametric statistical test in SPSS version 25 software. Tabachnik and Fidell (1996) have stated that the normality of data is tested because most of the analyses are performed on normally distributed data. Nornadiah and Yup (2011) have also mentioned that when the normality test is violated then the statistical results, inferences and interpretation may not be valid or reliable. In this study the normality of data has been obtained by the skewness and kurtosis as in Table 4.2 following:

Table 4.2

### Normality Test

<b>Descriptive Statistics</b>			
	N	Skewness	Kurtosis
Trust	394	-.993	-.139
EU	394	-.749	-.758
JRM	394	-.900	-.384
PF	394	-.654	.139
FF	394	-.904	-.167
TF	394	-.899	.100

EF	394	-.749	-.758
LF	394	-1.040	.063
MM	394	-.847	.627
PrF	394	-.993	1.048
RF	394	-.076	-.938
CSF	394	-.704	-.598
Valid N	394		
(listwise)			

*EU: Environmental Uncertainty; JRM: Joint Risk Management; PF: Political Factor; FF: Finance Factor; TF: technical Factor; EF: Economic Factor; LF: Legal Factor; MM: Market Maturity; PrF: Procurement Factor; RF: Regulation Factor; CSF: Critical Success Factor.*

According to Tabachnick and Fidell (1996), there are two aspects to measure normality i.e. skewness and kurtosis. The value of skewness must be between  $\pm 2$  and the value of kurtosis must be between  $\pm 1$  for normal data. Pallant (2010) has highlighted that skewness explains the symmetry of data distribution while kurtosis explains the peakedness of the distribution. Furthermore, Field (2009) has stated that the positive sign indicates the piling up of scores on the left of distribution while a negative sign signifies the piling up of data on right. He further added that the positive sign shows a heavy-tailed and pointed distribution while the negative sign shows a light-tailed and flat distribution. According to the set criteria, this study has got the normal data as explained in the data so we can move on to further statistical tests.

### 4.3 Measurement Model assessment

A measurement model confirms the relationships between indicators and their constructs through the estimation of reliability and validity measures. It is important to verify the data for implementation in the Pakistani context as it was an adapted questionnaire previously used by Opawole et al. (2019) for independent variables named critical success factors (i.e. political factor, technical factor, economical factor, financial factor, legal factor, procurement factor, market maturity, and regulation factor), Liang et. al., (2019) for dependent variables i.e. sustainable public-private partnership performance (Meeting design goals, benefit to end-user, benefit to the public sector, benefit to the private sector and preparing for the future), Bstieler and Gross (2003) for variable named Environmental Uncertainty, Doloj (2009) for variable named Joint Risk Management and Nederhand&Klijn (2019) for variable named Trust.



The results of the measurement model were assessed on three levels; first, internal consistency reliability was estimated based on composite reliability (CR), and Cronbach's  $\alpha$  (alpha) values in Table 4.3. Second, convergent validity was estimated based on the average variance extracted (AVE) and the factor loadings of the indicators in Table 4.4. Third, discriminant validity was assessed using the items Fornell-Larcker criterion in Table 4.5.

#### 4.3.1 Internal consistency reliability

The internal consistency reliability was tested by item-total relation correlation that compares the response distribution to each item with the distribution of total scores for all items in the scale of Cronbach's Alpha ( $\alpha$ ) as it concerns the ability to produce consistent results.

George and Mallery (2003) have suggested a few rules of thumb to assess Cronbach's alpha ( $\alpha$ ) as " $\alpha > 0.9$  denotes to Excellent score,  $\alpha > 0.8$  is Good,  $\alpha > 0.7$  is Acceptable,  $\alpha > 0.6$  is Questionable,  $\alpha > 0.5$  is Poor and less than 0.5 is Unacceptable". If the value of Cronbach's alpha ( $\alpha$ ) is closer to 1.0 it will show the greater internal consistency of the selected scale item (Gliem&Gliem, 2003). Taber (2018) has also described the interpretation of Cronbach's alpha ( $\alpha$ ) value from excellent to not satisfactory with different range brackets. Sometimes ambiguous questions are omitted or rearticulated to enhance the validity of the questionnaire and to obtain the desired results. In this study, Cronbach's alpha ( $\alpha$ ) for all the items appeared in Table 4.3 as follows.

Table 4.3

Reliability analysis

Variables	No of Items	Cronbach Alpha ( $\alpha$ )
CSF	24	0.702
SPPPP	25	0.849
EU	8	0.899
Trust	4	0.887

JRM	5	0.833
Over all scale	70	0.822

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*CSF: Critical Success Factor; SPPPP: Sustainable Public Private Partnership Project; EU: Environmental Uncertainty; JRM: Joint Risk Management;*

Table 4.3 describes the reliability analysis of the scale used in this study. The Cronbach's alpha ( $\alpha$ ) for the independent variables i.e CSF appeared at 0.687 which is less than 0.7 i.e below the acceptable range (George & Mallery, 2003). So the four problematic items EF-1, LF-2, RF-2, and FF-4 were identified and omitted step-wise. When we omitted these items from the reliability analysis the outcome for Cronbach's alpha ( $\alpha$ ) appeared as 0.702 which is an acceptable value for the reliable scale. The Cronbach's alpha ( $\alpha$ ) for the dependent variables i.e SPPPP appeared 0.849 i.e reliable. The Cronbach's alpha ( $\alpha$ ) for the Environmental Uncertainty appeared 0.899 i.e. excellent. The Cronbach's alpha ( $\alpha$ ) for the Trust appeared 0.887 i.e. good The Cronbach's alpha ( $\alpha$ ) for the Joint Risk Management appeared 0.833 i.e. good. . The Cronbach's alpha ( $\alpha$ ) for all the items is 0.822 which is reliable. (Gliem&Gliem, 2003).

#### 4.3.2 Convergent validity

In this study, convergent validity has been estimated based on the average variance extracted (AVE) and the outer loading ( $\lambda$ ) of the indicators. Table 4.4 shows that each construct's AVE was greater than 0.6 which is above the recommended threshold value of 0.5 (Urbach and Ahlemann, 2010; Garson, 2016). The AVE of all the constructs was high which indicates that more than 50% variance in each construct is explained by its indicator. All indicator loading values were loaded within the acceptable range of 0.70 to 1.0. An outer loading of  $\lambda \geq 0.7$  indicated that the indicators strongly correlate with its constructs confirming acceptable convergent validity.

Table 4.4

#### Results Summary for Measurement Model Assessment

Items	Factor Loading	CR	AVE
TF1	.877	0.888	0.665
TF2	.831		

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TF3	.791		
TF4	.757		
TF5	.735		
PrF4	.843	0.894	0.627
PrF3	.798		
PrF2	.783		
PrF1	.772		
PrF5	.760		
PF1	.846	0.895	0.680
PF3	.834		
PF2	.810		
PF4	.808		
MM1	.799	0.804	0.578
MM3	.779		
MM2	.700		
RF1	.814	0.757	0.516
RF3	.714		
RF2	.612		
LF1	.730	0.667	0.50
LF2	.684		
FF1	.821	0.783	0.480
FF3	.757		
FF4	.688		
FF2	.522		
EF1	.811	0.664	0.497
EF2	.590		
BPtS3	.871	0.939	0.659
BPtS4	.857		
BPtS1	.856		
BPtS2	.836		
BPtS6	.824		
BPtS5	.812		
BPtS7	.797		
BPtS8	.612		
BEU3	.831	0.904	0.654
BEU4	.815		
BEU5	.814		
BEU2	.801		
BEU1	.781		
BPbS1	.885	0.917	0.735
BPbS3	.853		
BPbS4	.849		
BPbS2	.840		

MDG4	.830	0.882	0.651
MDG3	.801		
MDG2	.801		
MDG1	.793		
PFF3	.870	0.903	0.701
PFF2	.812		
PFF4	.785		
PFF1	.678		
EU2	.885	0.914	0.579
EU3	.869		
EU8	.826		
EU6	.799		
EU4	.774		
EU1	.725		
EU5	.671		
EU7	.448		
JRM5	.867	0.864	0.565
JRM3	.865		
JRM1	.705		
JRM4	.694		
JRM2	.589		
T4	.898	0.906	0.708
T3	.896		
T2	.851		
T1	.706		

*PF: Political Factor; FF: Finance Factor; TF: technical Factor; EF: Economic Factor; LF: Legal Factor; MM: Market Maturity; PrF: Procurement Factor; RF: Regulation Factor; MDG: Meeting Design Goals; BPtS: Benefit to Private Sector; BPbS: Benefit to Public Sector; BEU: Benefit to End User; PFF: Preparing for Future; EU: Environmental Uncertainty; JRM: Joint Risk Management; T: Trust*

### 4.3.3 Competing Comparing Models of CFAs

One of the major issues that arises when conducting CFA is establishing whether the measurement model sufficiently explains the relationship among observed variables. Researchers find evidence for whether the hypothesized relationships among items are representative of the observed data through fit indices. Fit indices, broadly, measure how well a model reproduces the observed relationships or how poorly the relationships are captured by the model. If a researcher's hypothesized measurement model is able to represent and recapture the covariances among items, then the researcher has evidence that the hypothesized measurement model is appropriately

specified. The generally accepted guidelines for establishing model fit for CFA models are based on the  $\chi^2$  test of model fit and fit indices, such as the confirmatory fit index (CFI), Tucker–Lewis Index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). According to researchers like (Asparouhov&Muthén, 2007; Hox & Maas, 2001; Hsu et al., 2015; Ryu & West, 2009; Yuan &Bentler, 2003) the cutoff values of CFI i.e. comparative fit index  $>0.9$ ; TLI i.e. Tulerlewis index  $>0.9$  and RMSEA I.e. root mean square error of approximation  $<0.08$  are acceptable. The CFA procedure has been conducted for Critical Success Factors to compare competing models of CFAs. A summary of the models tested is mentioned in Table 4.5 below. Model number 1 obtained good fit according to both the RMSEA and CFI indices.

Table 4.5

## Competing Model Comparison of CFAs

Models	Factors	X <sup>2</sup>	df	CFI	TLI	RMSEA
1 (Best fit)	4	472.473	54	0.966	0.949	0.077
2	3	734.468	78	0.946	0.902	0.106
3	2	995.668	82	0.934	0.900	0.102
4	1	1249.100	98	0.901	0.871	0.106

*Confirmatory Fit Index; CFI; Tucker–Lewis Index: TLI;Root Mean Square Error of Approximation: RMSEA*

#### 4.3.4 Discriminant validity

Discriminant validity has been assessed by the Fornell-Larcker criterion as it establishes discriminant validity among the construct where the square root of each construct AVE (Average Extracted Value) is higher than the uppermost correlation values with other constructs (Fornell&Larcker, 1981). Table 4.6 presents the correlation values by the Fornell-Larcker criterion where the square root values of each construct's AVE are diagonally arranged in bold and values of correlations between constructs are

tabulated diagonally. As a result, based on the above estimates discriminant validity was established for each construct.

Table 4.6

Fornell–Larcker Discriminant Validity criterion Correlation Matrix

	<b>SPPPP</b>	<b>PF</b>	<b>FF</b>	<b>TF</b>	<b>EF</b>	<b>LF</b>	<b>MM</b>	<b>PrF</b>	<b>RF</b>
<b>SPPPP</b>	<b>1</b>								
<b>PF</b>	0.451	<b>0.8246</b>							
<b>FF</b>	0.618	0.332	<b>0.6928</b>						
<b>TF</b>	0.52	0.309	0.279	<b>0.8154</b>					
<b>EF</b>	0.343	0.58	0.486	0.25	<b>0.708</b>				
<b>LF</b>	0.298	0.269	0.208	0.298	0.265	<b>0.707</b>			
<b>MM</b>	0.757	0.452	0.699	0.42	0.627	0.415	<b>0.7602</b>		
<b>PrF</b>	0.35	0.317	0.367	0.444	0.422	0.395	0.463	<b>0.7918</b>	
<b>RF</b>	0.399	0.313	0.388	0.276	0.23	0.076	0.401	0.41	<b>0.718</b>

*SPPPP: Sustainable Public Private Partnership Project; PF: Political Factor; FF: Finance Factor; TF: technical Factor; EF: Economic Factor; LF: Legal Factor; MM: Market Maturity; PrF: Procurement Factor; RF: Regulation Factor*

Thus, it was concluded that the model exhibited adequate levels of reliability and validity suggesting the quality of the model is robust and conducive to further evaluation.

#### 4.4 Correlation Analysis

According to Bryman and Cramer (2001), we can obtain the strength and direction of the relationship between pairs of variables through correlation analysis. The correlation coefficient can range from +1 to -1 indicating that -1 is a perfect negative correlation and +1 is a perfect positive correlation between the variables. The correlation analysis among the variables used in this study is mentioned in Table 4.7 below.

Table 4.7

## Correlation Analysis

		<b>Correlations</b>									
		SPPPP	PF	FF	TF	EF	LF	MM	PrF	RF	CSF
SPPPP	Pearson Correlation	1									
PF	Pearson Correlation	<b>.451**</b>	1								
FF	Pearson Correlation	<b>.618**</b>	.332**	1							
TF	Pearson Correlation	<b>.520**</b>	.309**	.279**	1						
EF	Pearson Correlation	<b>.343**</b>	.580**	.486**	.250**	1					
LF	Pearson Correlation	<b>.298**</b>	.269**	.208**	.298**	.265**	1				
MM	Pearson Correlation	<b>.757**</b>	.452**	.699**	.420**	.627**	.415**	1			
PrF	Pearson Correlation	<b>.350**</b>	.317**	.367**	.444**	.422**	.395**	.463**	1		
RF	Pearson Correlation	<b>.399**</b>	.313**	.388**	.276**	.230**	.076	.401**	.410**	1	
CSF	Pearson Correlation	<b>.697**</b>	.660**	.716**	.581**	.737**	.537**	.851**	.701**	.576**	1

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

*SPPPP: Sustainable Public Private Partnership Project; PF: Political Factor; FF: Finance Factor; TF: technical Factor; EF: Economic Factor; LF: Legal Factor; MM: Market Maturity; PrF: Procurement Factor; RF: Regulation Factor; CSF: Critical Success Factor*

Table 4.7 explains the correlation between the study variable. The Pearson correlation moment between political factors and sustainable public-private partnership is found positive and significant i.e.  $r = 0.451$ ,  $p = 0.000$ . Thus it validates the hypothesis H1(a) that there is a significant relationship between PF and SPPPP. The correlation between financial factors and sustainable public-private partnership is found positive and significant i.e.  $r = 0.618$ ,  $p = 0.000$ . Thus it validates hypothesis H1(b) that there is a significant relationship between FF and SPPPP. Correlation between technical factors and sustainable public-private partnership is found positive and significant i.e.  $r = 0.520$ ,  $p = 0.000$ . Thus it validates hypothesis H1(c) that there is a significant relationship between TF and SPPPP. The correlation between economical factors and sustainable public-private partnership is found positive and significant i.e.  $r = 0.343$ ,  $p = 0.000$ . Thus it validates hypothesis H1(d) that there is a significant relationship between EF and SPPPP. The correlation between legal factors and sustainable public-private partnership is found positive and significant i.e.  $r = 0.298$ ,  $p = 0.000$ . Thus it validates hypothesis H1(e) that there is a significant relationship between LF and SPPPP. Correlation between market maturity and sustainable public-private partnership is found highly positive and significant i.e.  $r = 0.751$ ,  $p = 0.000$ . Thus it validates the hypothesis H1(f) that there is a significant relationship between MM and SPPPP. The correlation between procurement factor and sustainable public-private partnership is found positive and significant i.e.  $r = 0.350$ ,  $p = 0.000$ . Thus it validates hypothesis H1(g) that there is a significant relationship between PrF and SPPPP. The correlation between the regulation factor and sustainable public-private partnership is found positive and significant i.e.  $r = 0.399$ ,  $p = 0.000$ . Thus it validates hypothesis H1(h) that there is a significant relationship between RF and SPPPP. The correlation between critical success factors (CSF) and sustainable public-private partnership (SPPP) is found positive and significant i.e.  $r = 0.697$ ,  $p = 0.000$ . Thus it validates hypothesis H1 that there is a significant relationship between CSF and SPPPP.

#### **4.5 Regression Analysis**

Regression analysis is used to investigate the relationship among study variables. There are three types of regression, namely simple linear regression (SLR), stepwise regression, and hierarchical regression. In this study, simple regression has



been used to find out the model summary for regression analysis as mentioned in Table 4.8 below.

Table 4.8

#### Regression Analysis

<b>Model Summary</b>				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.841 <sup>a</sup>	.707	.701	.60874

a. Predictors: (Constant), RF, LF, EF, TF, FF, PF, PrF, MM

The result in table 4.8 explains several things. First, it explains how much variance in sustainable public-private partnerships will be there with the critical success factors. This is denoted by “R<sup>2</sup>” i.e. 0.707. Here the results explain that 70.7 % variance in a sustainable public-private partnership project performance is due to critical success factors.

Table 4.9

#### ANOVA

<b>ANOVA</b>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	344.972	8	43.121	116.367	.000 <sup>b</sup>
	Residual	142.667	385	.371		
	Total	487.639	393			

a. Dependent Variable: SPPPP

b. Predictors: (Constant), RF, LF, EF, TF, FF, PF, PrF, MM

The goodness of fit or model fitness is investigated by F statistics. In the above table F value (F-value =116.367 and p = 0.000 < 0.05) is found significant so it is assumed that the model is the best fit. So the output of above Table 4.9 explains that the model allows predicting Sustainable public-private partnership performance.

Table 4.10

## VIF and Tolerance Values

		Coefficients						
		Unstandardized Coefficients			Standardized Coefficients		Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-1.194	.334		-3.571	.000		
	PF	.330	.052	.226	6.353	.000	.601	1.663
	FF	.253	.051	.197	4.976	.000	.485	2.063
	TF	.378	.053	.230	7.074	.000	.716	1.397
	EF	-.381	.048	-.324	-7.930	.000	.456	2.194
	LF	-.053	.045	-.038	-1.178	.240	.718	1.393
	MM	.747	.055	.656	13.553	.000	.325	3.081
	PrF	-.082	.051	-.058	-1.617	.107	.583	1.715
	RF	.035	.043	.026	.796	.427	.694	1.442

a. Dependent Variable: SPPPP

*PF: Political Factor; FF: Finance Factor; TF: technical Factor; EF: Economic Factor; LF: Legal Factor; MM: Market Maturity; PrF: Procurement Factor; RF: Regulation Factor;*

Table 4.10 describes the statistics regarding multicollinearity by explaining the values of tolerance and VIF i.e. variance inflation factor. The Variance Inflation Factor (VIF) is the reciprocal of tolerance:  $1 / (1 - R^2_i)$ . The VIF has an intuitive interpretation in terms of the effects of  $R^2_i$  on the variance of the estimated regression coefficient for the  $i$ th independent variable. Different authors have explained different rules of thumb to measure the tolerance and VIF values, like O'Brien (2007) has explained  $VIF < 10$ , Kock (2012)  $VIF < 3.3$ , Andy Field (2013)  $VIF > 10$ , Hair et al. (2017)  $VIF < 5$  and Lavery et al. (2019)  $VIF > 4$ . Similarly, Kumari, (2008) has described that a tolerance value below zero is acceptable (O'Brien, 2007; Kumari, 2008). Keeping the reference ranges for tolerance and VIF in mind we can deduce that no multicollinearity exists in the data.

#### **4.6 Moderation Analysis**

The concept of moderation was initially proposed by Cohen and Cohen (1983), then followed by Barren and Kenny (1986), Jaccard et al. (1990), Preacher and Hayes (2007), and Hayes (2013 & 2017). These stalwarts of research have brought tremendous addition to the concept of moderation evaluation theoretically as well as statistically. The current study has used moderation analysis to meet the research objective. Moderated impact of Environmental Uncertainty on the relationship between IVs and DV has been investigated in subsequent tables. Moderation analysis stipulates a situation/ condition through which a predictor is related to the criterion variable.

##### **4.6.1 Moderated impact of Environmental Uncertainty on the relationship between PF and SPPPP**

This part was executed to test Hypothesis H2(a) i.e. There was a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the political factor (PF) and sustainable PPP performance (SPPPP). The process macro file of Hayes was used to test moderating hypotheses.

Table 4.11

Moderation of EU on the relationship between PF &amp; SPPPP

D.V	I.V	R	R <sup>2</sup>	F	$\beta$	se	t	p	LLCI	ULCI
SPPPP	Constant	0.5023	0.2523	43.8617	5.8160	0.0487	119.3896	0.000	5.7202	5.9118
	PF				0.6729	0.0643	10.4681	0.000	0.5465	0.7992
	EU				0.1559	0.0379	4.1163	0.000	0.0814	0.2304
	Int (PF*EU)				-0.1449	0.0530	-2.7354	0.002	-0.2490	-0.0407
	R2-chng	F	df1	df2	p					
X*W	0.0143	7.4823	1.0000	390.0000	0.0065					

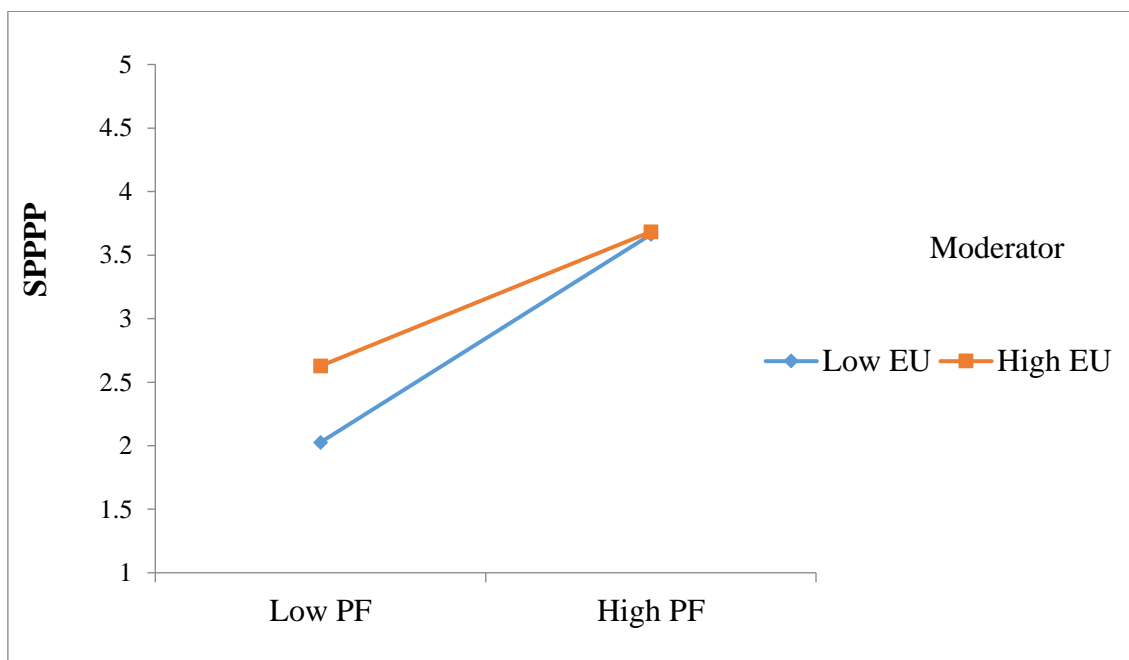
*SPPPP: Sustainable Public-Private Partnership Performance; PF: Political Factor; EU: Environmental Uncertainty;*

Table 4.11 presents the results of moderating effect of Environmental Uncertainty on the relationship between PF and SPPPP.  $R^2 = 0.2523$ , i.e. PF and EU explain a 25.23% variance upon SPPPP. The goodness of fit i.e. F value =43.861 is also found significant at  $p < 0.05$  level. It is revealed from Table 4.10 that PF has a positive and significant effect on SPPPP ( $0.6729^{***}$ ,  $p < 0.05$ ) in addition EU has also a positive and significant effect on EU ( $0.1559^{***}$ ,  $p < 0.05$ ) likewise Interaction term (PF\*EU) has a negative but significant effect on SPPPP ( $-0.1449^{**}$ ,  $p < 0.05$ ).  $\Delta R^2 = 0.0143$ , is found significant  $p < 0.05$  level with the goodness of fit  $F = 7.4823$  also significant at  $p < 0.05$ . Thus researcher found support for hypothesis H2 (a).

According to Barren and Kenny (1986), Preacher and Hayes (2007), and Hayes (2013 & 2017). Field (2017), Beeker et al. (2018), and Hair et al., (2019) that change in  $R^2$  with p-value significant validate the moderation effect of moderating variable. Thus researcher found support for “There is a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the political factor (PF) and sustainable PPP performance (SPPPP)”.

Figure 4.1

Moderated impact of EU on Relationship between PF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; PF: Political Factor; EU: Environmental Uncertainty;*

Two-way interactions between political factors (PF), Environmental Uncertainty (EU) upon sustainable public-private partnership performance (SPPPP) were plotted one standard deviation above and below the mean as shown in Figure 4.1. The blue line represents low EU while the red line represents high EU. It is evident from the above graph that high Environmental Uncertainty interacts with high political factor and affects the relationship between sustainable public-private partnership performance thus moderating the sustainable PPP performance. Low and high EU does not interact at a low level of PF.

#### 4.6.2 Moderated impact of Environmental Uncertainty on the relationship between FF and SPPPP

This part was executed to test Hypothesis H2 (b) i.e. There was a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the Financial Factor (FF) and sustainable PPP performance (SPPPP). The process macro file of Hayes was used to test moderating hypotheses.

Table 4.12

Moderation of EU on relationship between FF & SPPPP

D.V	I.V	R	R <sup>2</sup>	F	$\beta$	se	t	p	LLCI	ULCI
SPPPP	Constant	0.6440	0.4147	92.1220	5.8206	0.0432	134.8139	0.000	5.7357	5.9055
	FF				0.7887	0.0499	15.8084	0.000	0.6906	0.8868
	EU				0.1326	0.0335	3.9541	0.000	0.0667	0.1986
	Int (FF*EU)				-0.0971	0.0432	-2.2494	0.0250	-0.1820	-0.0122
	R2-chng	F	df1	df2	p					
X*W	0.0076	5.0600	1.0000	390.0000	0.0250					

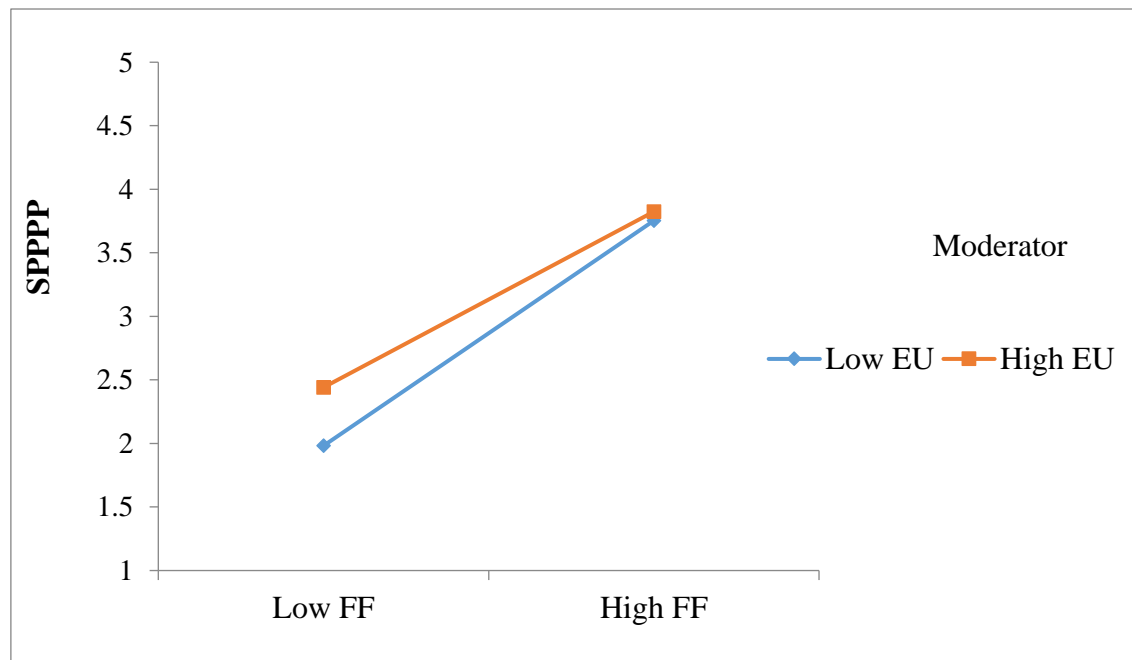
*SPPPP: Sustainable Public-Private Partnership Performance; FF: Finance Factor; EU: Environmental Uncertainty;*

Table 4.12 presents the results of the moderating effect of Environmental Uncertainty on the relationship between FF and SPPPP.  $R^2 = 0.4147$ , i.e. FF and EU explain 41.47 % variance upon SPPPP. The goodness of fit i.e. F value =92.1220 is also found significant at  $p < 0.05$  level. It is revealed from table 4.14 that FF has a positive and significant effect on SPPP ( $0.7887^{***}$ ,  $p < 0.05$ ) in addition EU has also a positive and significant effect on EU ( $0.1326^{***}$ ,  $p < 0.05$ ) likewise Interaction term (FF\*EU) has a negative but significant effect on SPPPP ( $-0.0971^{**}$ ,  $p < 0.05$ ).  $\Delta R^2 = 0.0076$ , is found significant  $p < 0.05$  level with the goodness of fit  $F = 5.0600$  also significant at  $p < 0.05$ . Thus we found support for hypothesis H2 (b).

According to Barren and Kenny (1986), Preacher and Hayes (2007), and Hayes (2013 & 2017). Field (2017), Beeker et al. (2018), and Hair et al., (2019 & 22) that change in  $R^2$  with p-value significant validate the moderation effect of moderating variable. Thus researcher found support for “There is a significant moderating impact EU on the relationship between the FF and SPPPP.

Figure 4.2

Moderated impact of EU on Relationship between FF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; FF: Financial Factor; EU: Environmental Uncertainty;*

Two-way interactions between financial factors (FF), and Environmental Uncertainty (EU) upon sustainable public-private partnership performance (SPPPP) were plotted one standard deviation above and below the mean as shown in Figure 4.2. Blue line represents low EU while the red line represents high EU. It is evident from the above graph that high environmental uncertainty interacts with high FF and affects the relationship between sustainable public-private partnership performance thus moderating the sustainable PPP performance. Low and high EU does not interact at a low level of FF.

#### **4.6.3 Moderated impact of Environmental Uncertainty on the relationship between TF and SPPPP**

This part was executed to test Hypothesis H2(c) i.e. There was a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the Technical Factor (TF) and sustainable PPP performance (SPPPP). The process macro file of Hayes was used to test the moderating hypothesis.



Table 4.13

Moderation of EU on the relationship between TF &amp; SPPPP

D.V	I.V	R	R <sup>2</sup>	F	$\beta$	se	t	p	LLCI	ULCI
SPPPP	Constant	0.5563	0.3095	58.2629	5.8408	0.0473	123.5047	0.000	5.7478	5.9337
	TF				0.8039	0.0700	11.4806	0.000	0.6662	0.9416
	EU				0.0836	0.0370	2.2605	0.0243	0.0109	0.1564
	Int (TF*EU)				-0.2004	0.0518	-3.8712	0.0001	-0.3022	-0.0986
	R2-chng	F	df1	df2	p					
X*W	0.0265	14.9862	1.0000	390.0000	0.0001					

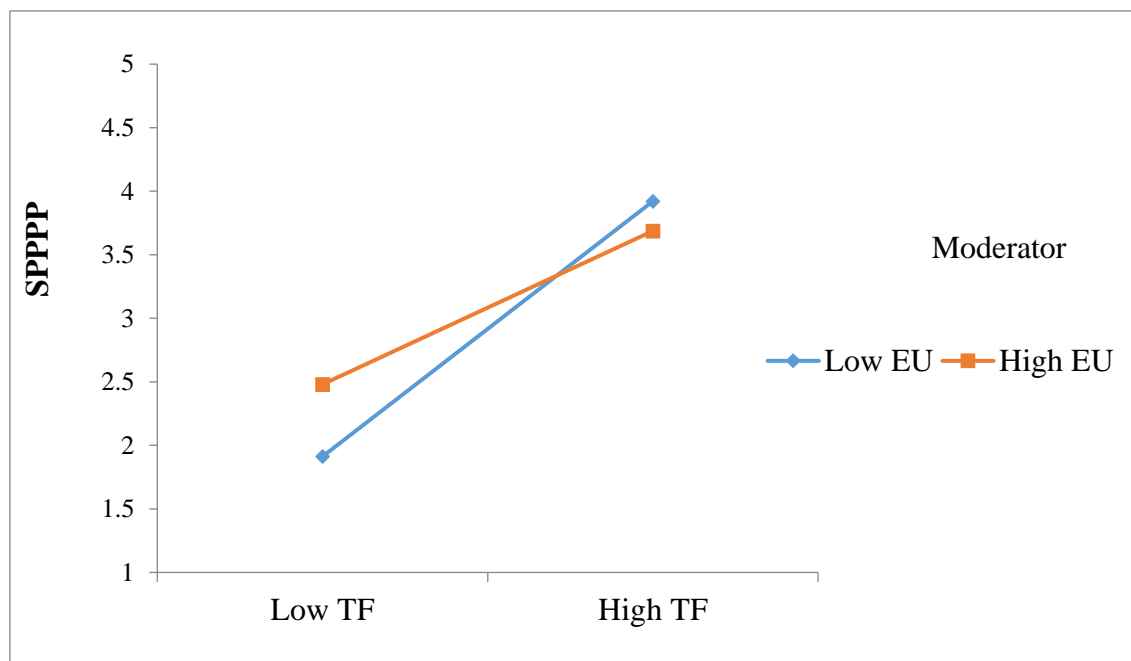
*SPPPP: Sustainable Public-Private Partnership Performance; TF: Technical Factor; EU: Environmental Uncertainty;*

Table 4.13 presents the results of the moderating effect of Environmental Uncertainty on the relationship between FF and SPPPP.  $R^2 = 0.3095$ , i.e. TF and EU explain a 30.95 % variance upon SPPPP. The goodness of fit i.e. F value =58.2629 is also found significant at  $p < 0.05$  level. It is revealed from table 4.15 that TF has a positive and significant effect on SPPP (0.8039\*\*\*,  $p < 0.05$ ) in addition EU has also a positive and significant effect on EU (0.0836\*\*\*,  $p < 0.05$ ) likewise Interaction term (TF\*EU) has a negative but significant effect on SPPPP (-0.2004\*\*,  $p < 0.05$ ).  $\Delta R^2 = 0.0265$ , is found significant  $p < 0.05$  level with the goodness of fit  $F = 14.9862$  also significant at  $p < 0.05$ . Thus we found support

for the hypotheses H2(c). According to Barren and Kenny (1986), Preacher and Hayes (2007), and Hayes (2013 & 2017). Field (2017), Beeker et al. (2018), and Hair et al., (2019 & 22). that change in  $R^2$  with p-value significant validate the moderation effect of moderating variable. Thus we found support for “There is a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the technical factor (TF) and sustainable PPP performance (SPPPP)”.

Figure 4.3

Moderated impact of EU on Relationship between TF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; TF: Technical Factor; EU: Environmental Uncertainty;*

Two-way interactions between technical factors (TF), and Environmental Uncertainty (EU) upon sustainable public-private partnership performance (SPPPP) was plotted one standard deviation above and below the mean as shown in Figure 4.3. Blue line represents low EU while the red line represents high EU. It is evident from the above graph that high Environmental Uncertainty interacts with high TF and affects the relationship between sustainable public-private partnership performance thus moderating the sustainable PPP performance. Low and high EU does not interact at a low level of TF.

#### 4.6.4 Moderated impact of Environmental Uncertainty on the relationship between EF and SPPPP

This part was executed to test Hypothesis H2(d) i.e. There was a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the Economic Factor (EF) and sustainable PPP performance (SPPPP). The process macro file of Hayes was used to test the moderating hypothesis.

Table 4.14

Moderation of EU on the relationship between EF & SPPPP

D.V	I.V	R	R <sup>2</sup>	F	$\beta$	se	t	p	LLCI	ULCI
SPPPP	<b>Constant</b>	0.4547	0.2068	33.8863	5.7912	0.0505	114.7468	0.000	5.6919	5.8904
	<b>EF</b>				0.4568	0.0537	8.5059	0.000	0.3512	0.5624
	<b>EU</b>				0.2055	0.0392	5.2388	0.0000	0.1284	0.2826
	<b>Int (EF*EU)</b>				-0.1909	0.0442	-4.3193	0.0000	-0.2778	-0.1040
<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>						
X*W	0.0379	18.6563	1.0000	390.0000	0.0000					

*SPPPP: Sustainable Public-Private Partnership Performance; EF: Economic Factor; EU: Environmental Uncertainty;*

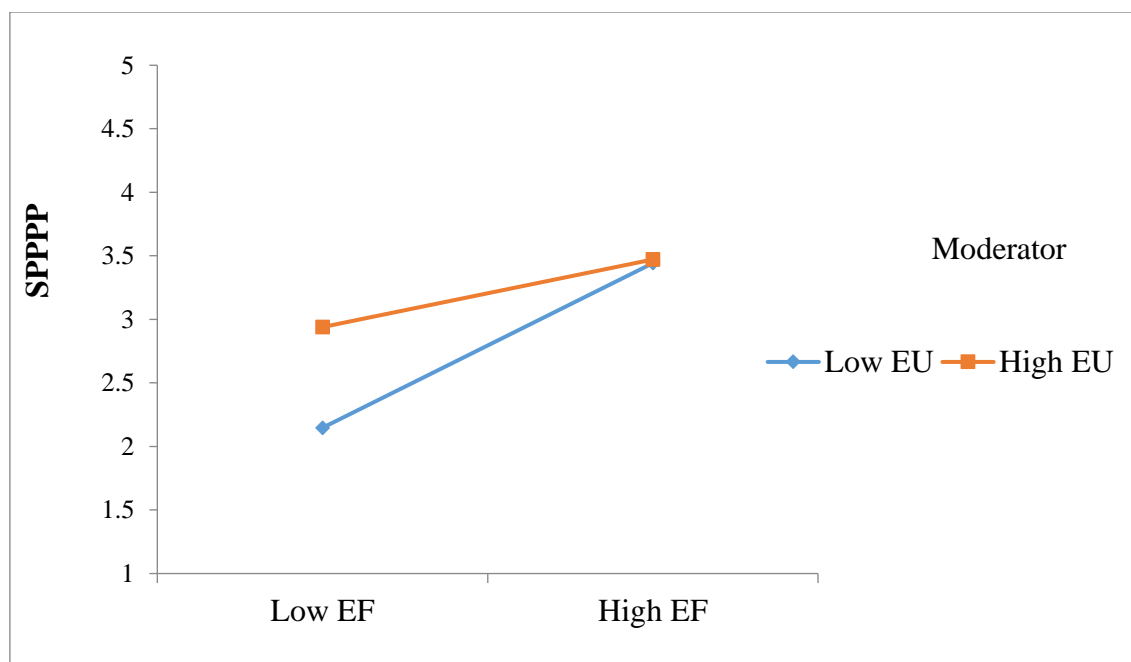
Table 4.14 presents the results of moderating effect of Environmental Uncertainty on the relationship between EF and

SPPPP.  $R^2 = 0.2068$ , i.e. EF and EU explain a 20.68 % variance upon SPPPP. The goodness of fit i.e. F value =33.8863 is also found significant at  $p < 0.05$  level..It is revealed from table 4.16 that EF has a positive and significant effect on SPPP (0.4568\*\*\*,  $p < 0.05$ ) in addition EU has also a positive and significant effect on EU (0.2055\*\*\*,  $p < 0.05$ ) likewise Interaction term (EF\*EU) has a negative but significant effect on SPPPP (-0.1909\*\*,  $p < 0.05$ ).  $\Delta R^2 = 0.0379$ , is found significant  $p < 0.05$  level with the goodness of fit  $F = 18.6563$  also significant at  $p < 0.05$ . Thus we found support for the hypotheses

According to Barren and Kenny (1986), Preacher and Hayes (2007), and Hayes (2013 & 2017). Field (2017), Beeker et al. (2018), and Hair et al., (2019 & 22) that change in  $R^2$  with p-value significant validate moderation effect of moderating variable. Thus researcher found support for “There is a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the economic factor (EF) and sustainable PPP performance (SPPPP)”.

Figure 4.4

#### Moderated impact of EU on Relationship between EF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; EF: Economic Factor; EU: Environmental Uncertainty;*

Two-way interactions between economical factors (EF), and Environmental Uncertainty (EU) upon sustainable public-private partnership performance (SPPPP) were plotted one standard deviation above and below the mean as shown in Figure 4.4. The blue line represents low EU while the red line represents high EU. It is evident from the above graph that high Environmental Uncertainty interacts with high EF and affects the relationship between sustainable public-private partnership performance thus moderating the sustainable PPP performance. Low and high EU does not interact at a low level of EF.

#### **4.6.5 Moderated impact of Environmental Uncertainty on the relationship between LF and SPPPP**

This part was executed to test Hypothesis H2(e) i.e. There was a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the Legal Factor (LF) and sustainable PPP performance (SPPPP). The process macro file of Hayes was used to test the moderating hypothesis.

Table 4.15

Moderation of EU on the relationship between LF &amp; SPPPP

<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.3476	0.1209	17.8703	5.8307	0.0533	109.3005	0.0000	5.7258	5.9356
	<b>LF</b>				0.3634	0.0667	5.4481	0.000	0.2323	0.4946
	<b>EU</b>				0.1301	0.0415	3.1371	0.0018	0.0486	0.2116
	<b>Int (LF*EU)</b>				-0.1056	0.0494	-2.1368	0.0332	-0.2028	-0.0084
<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>						
X*W	0.0103	4.5658	1.0000	390.0000	0.0332					

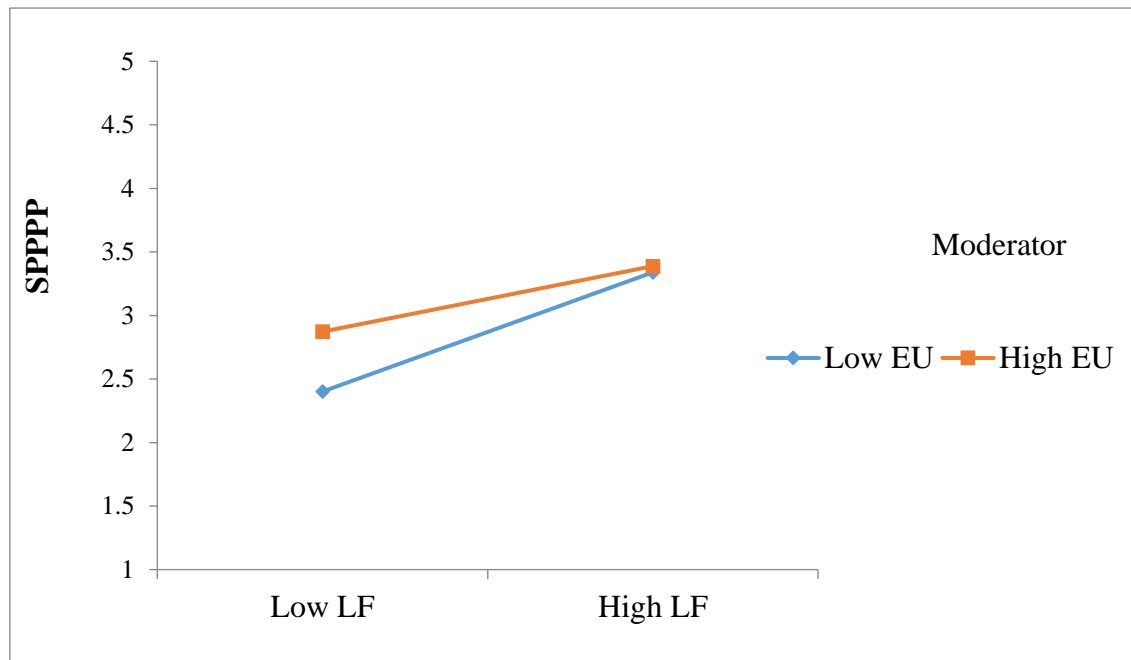
*SPPPP: Sustainable Public-Private Partnership Performance; LF: Legal Factor; EU: Environmental Uncertainty;*

Table 4.15 presents the results of moderating effect of Environmental Uncertainty on the relationship between FF and SPPPP.  $R^2 = 0.3476$ , i.e. LF and EU explain 34.76 % variance upon SPPPP. The goodness of fit i.e. F value =17.8703 is also found significant at  $p < 0.05$  level. It is revealed from Table 4.14 that LF has a positive and significant effect on SPPP (0.3634\*\*\*,  $p < 0.05$ ) in addition EU has also a positive and significant effect on EU (0.1301\*\*\*,  $p < 0.05$ ). likewise Interaction term (LF\*EU) has a negative but significant effect on SPPPP (-0.1056\*\*,  $p < 0.05$ ).  $\Delta R^2 = 0.0103$ , is found significant  $p < 0.05$  level with the goodness of fit  $F = 4.5658$  also significant at  $p < 0.05$ .

Thus we found support for the hypotheis. According to Barren and Kenny (1986), Preacher and Hayes (2007), and Hayes (2013 & 2017). Field (2017), Beeker et al. (2018), and Hair et al., (2019 & 22) that change in  $R^2$  with p-value significant validate the moderation effect of moderating variable. Thusresearcher found support for “There is a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the legal factor (LF) and sustainable PPP performance (SPPPP)”.

Figure 4.5

Moderated impact of EU on Relationship between LF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; LF: Legal Factor; EU: Environmental Uncertainty;*

Two-way interactions between legal factors (LF), and Environmental Uncertainty (EU) upon sustainable public-private partnership performance (SPPPP) were plotted one standard deviation above and below the mean as shown in Figure 4.5. Blueline represents low EU while the red line represents high EU. It is evident from the above graph that high Environmental Uncertainty interacts with high LF and affects the relationship between sustainable public-private partnership performance thus moderating the sustainable PPP performance. Low and high EU does not interact at a low level of LF.

#### 4.6.6 Moderated impact of Environmental Uncertainty on the relationship between MM and SPPPP

This part was executed to test Hypothesis H2(f) i.e. There was a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the Market Maturity (MM) and sustainable PPP performance (SPPPP). The process macro file of Hayes was used to test the moderating hypothesis.

Table 4.16

Moderation of EU on relationship between MM & SPPPP

D.V	I.V	R	R <sup>2</sup>	F	$\beta$	se	t	p	LLCI	ULCI
SPPPP	<b>Constant</b>	0.7749	0.6005	195.433	5.8240	0.0357	163.0540	0.0000	5.7538	5.8942
	<b>MM</b>				0.8373	0.0368	22.7408	0.0000	0.7650	0.9097
	<b>EU</b>				0.1092	0.0278	3.9341	0.0001	0.0546	0.1637
	<b>Int (MM*EU)</b>				-0.0907	0.0278	-3.2587	0.0012	-0.1454	-0.0360
<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>						
X*W	0.0109	10.6191	1.0000	390.0000	0.0012					

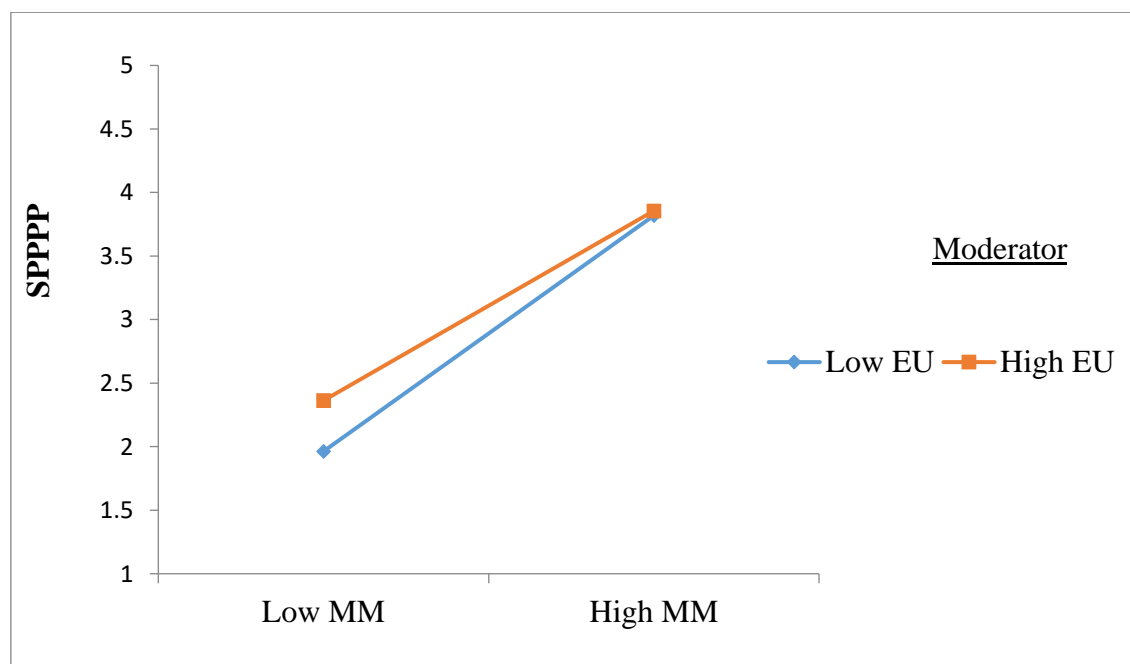
*SPPPP: Sustainable Public-Private Partnership Performance; MM: Market Maturity; EU: Environmental Uncertainty;*



Table 4.16 presents the results of a moderating effect of Environmental Uncertainty on the relationship between FF and SPPPP.  $R^2 = 0.6005$ , i.e. MM and EU explain 60.05 % variance upon SPPPP. The goodness of fit i.e. F value =195.4333 is also found significant at  $p < 0.05$  level. It is revealed from table 4.21 that MM has a positive and significant effect on SPPP (0.8373\*\*\*,  $p < 0.05$ ) in addition EU has also a positive and significant effect on EU (0.1092\*\*\*,  $p < 0.05$ ) likewise Interaction term (MM\*EU) has a negative but significant effect on SPPPP (-0.0907\*\*,  $p < 0.05$ ).  $\Delta R^2 = 0.0109$ , is found significant at  $p < 0.05$  level with the goodness of fit  $F = 10.6191$  also significant at  $p < 0.05$ . Thus we found support for the hypothesis H2(f). According to Barren and Kenny (1986), Preacher and Hayes (2007), and Hayes (2013 & 2017). Field (2017), Beeker et al. (2018), and Hair et al., (2019 & 22) that change in  $R^2$  with p-value significant validate the moderation effect of moderating variable. Thus researcher found support for “There is a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the market maturity (MM) and sustainable PPP performance (SPPPP).”).

Figure 4.6

Moderated impact of EU on Relationship between MM & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; MM: Market Maturity; EU: Environmental Uncertainty;*

Two-way interactions between market maturity (MM), and Environmental Uncertainty (EU) upon sustainable public-private partnership performance (SPPPP) were plotted one standard deviation above and below the mean as shown in Figure 4.6. Blue line represents low EU while the red line represents high EU. It is evident from the above graph that high Environmental Uncertainty interacts with high MM and affects the relationship between sustainable public-private partnership performance thus moderating the sustainable PPP performance. Low and high EU does not interact at a low level of MM.

#### **4.6.7 Moderated impact of Environmental Uncertainty on relationship between PrF and SPPPP**

This part was executed to test Hypothesis H2(g) i.e. There was a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the Procurement Factor (PrF) and sustainable PPP performance (SPPPP). The process macro file of Hayes was used to test the moderating hypothesis.

Table 4.17

Moderation of EU on relationship between PrF&amp; SPPPP

D.V	I.V	R	R <sup>2</sup>	F	$\beta$	se	t	p	LLCI	ULCI
SPPPP	<b>Constant</b>	0.431	0.1858	29.669	5.8079	0.0509	114.1534	0.0000	5.7079	5.9079
	<b>PrF</b>				0.4901	0.0645	7.5969	0.0000	0.3632	0.6169
	<b>EU</b>				0.1807	0.0395	4.5719	0.0001	0.1030	0.2584
	<b>Int(PrF*EU)</b>				-0.1481	0.0473	-3.1326	0.0019	-0.2410	-0.0551
<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>						
X*W	0.0205	9.8131	1.0000	390.0000	0.0019					

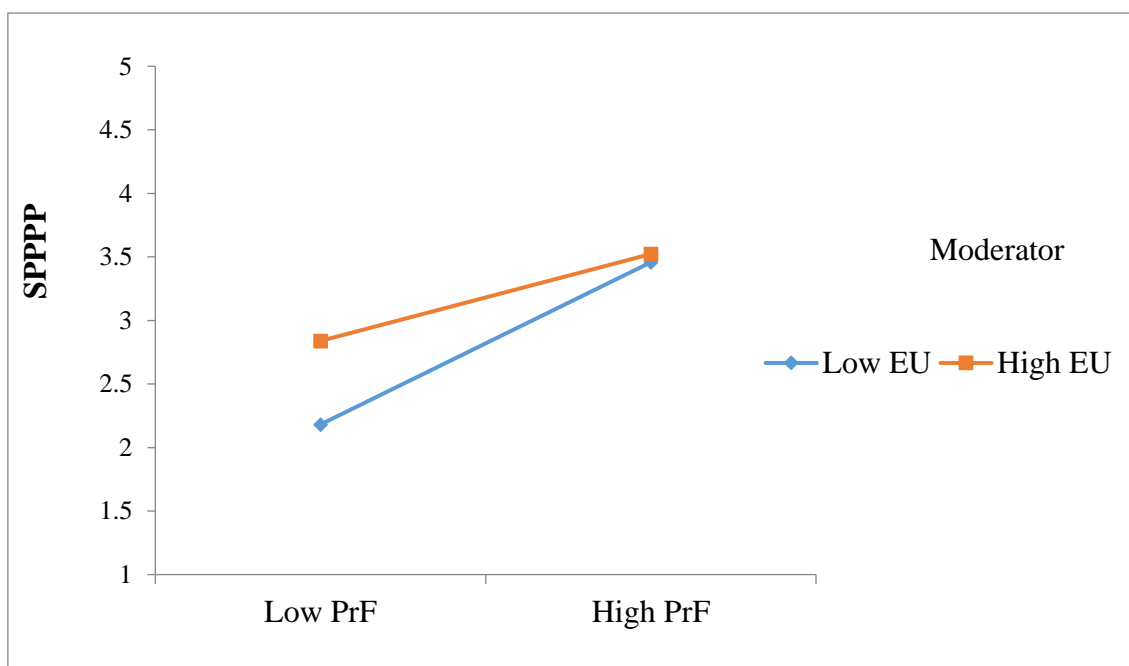
*SPPPP: Sustainable Public-Private Partnership Performance; PrF: Procurement Factor; EU: Environmental Uncertainty;*

Table 4.17 presents the results of the moderating effect of Environmental Uncertainty on the relationship between PrF and SPPPP.  $R^2 = 0.1858$ , i.e. PrF and EU explain an 18.58 % variance upon SPPPP. The goodness of fit i.e. F value =29.6696 is also found significant at  $p < 0.05$  level. It is revealed from table 4.19 that PrF has a positive and significant effect on SPPP (0.4901\*\*\*,  $p < 0.05$ ) in addition EU has also a positive and significant effect on EU (0.1807\*\*\*,  $p < 0.05$ ) likewise Interaction term (PrF\*EU) has a negative but significant effect on SPPPP (-0.1481\*\*,  $p < 0.05$ ).  $\Delta R^2 = 0.0205$ , is found significant at  $p < 0.05$  level with the goodness of fit  $F = 9.8131$  also significant at  $p < 0.05$ . Thus we found support for the hypotheses H2(g). According to Barren and Kenny (1986), Preacher and Hayes (2007), and Hayes (2013 & 2017). Field (2017), Becker et

al. (2018), and Hair et al., (2019 & 22) that change in  $R^2$  with p-value significant validate the moderation effect of moderating variable. Thus researcher found support for “There is a significant moderating impact of Environmental Uncertainty (EU) on the relationship between market maturity (MM) and sustainable PPP performance (SPPPP).

Figure 4.7

#### Moderated impact of EU on Relationship between PrF& SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; PrF: Procurement Factor; EU: Environmental Uncertainty;*

Two-way interactions between procurement factors (PrF), and Environmental Uncertainty (EU) upon sustainable public-private partnership performance (SPPPP) was plotted one standard deviation above and below the mean as shown in Figure 4.7. Blueline represents low EU while the red line represents high EU. It is evident from the above graph that high Environmental Uncertainty interacts with high PrF and affects the relationship between sustainable public-private partnership performance thus moderating the sustainable PPP performance. Low and high EU does not interact at a low level of PrF.

#### 4.6.8 Moderated impact of Environmental Uncertainty on the relationship between RF and SPPPP

This part was executed to test Hypothesis H2(h) i.e. There was a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the Regulation Factor (RF) and sustainable PPP performance (SPPPP). The process macro file of Hayes was used to test the moderating hypothesis.

Table 4.18

Moderation of EU on relationship between RF & SPPPP

D.V	I.V	R	R <sup>2</sup>	F	$\beta$	se	t	p	LLCI	ULCI
SPPPP	<b>Constant</b>	0.4821	0.2324	39.3595	5.7993	0.0496	116.9304	0.0000	5.7018	5.8968
	<b>RF</b>				0.5521	0.0585	9.4378	0.0000	0.4371	0.6671
	<b>EU</b>				0.2074	0.0386	5.3769	0.0000	0.1316	0.2833
	<b>Int(RF*EU)</b>				-0.1404	0.0445	-3.1571	0.0017	-0.2279	-0.0530
<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>						
X*W	0.0196	9.9674	1.0000	390.0000	0.0017					

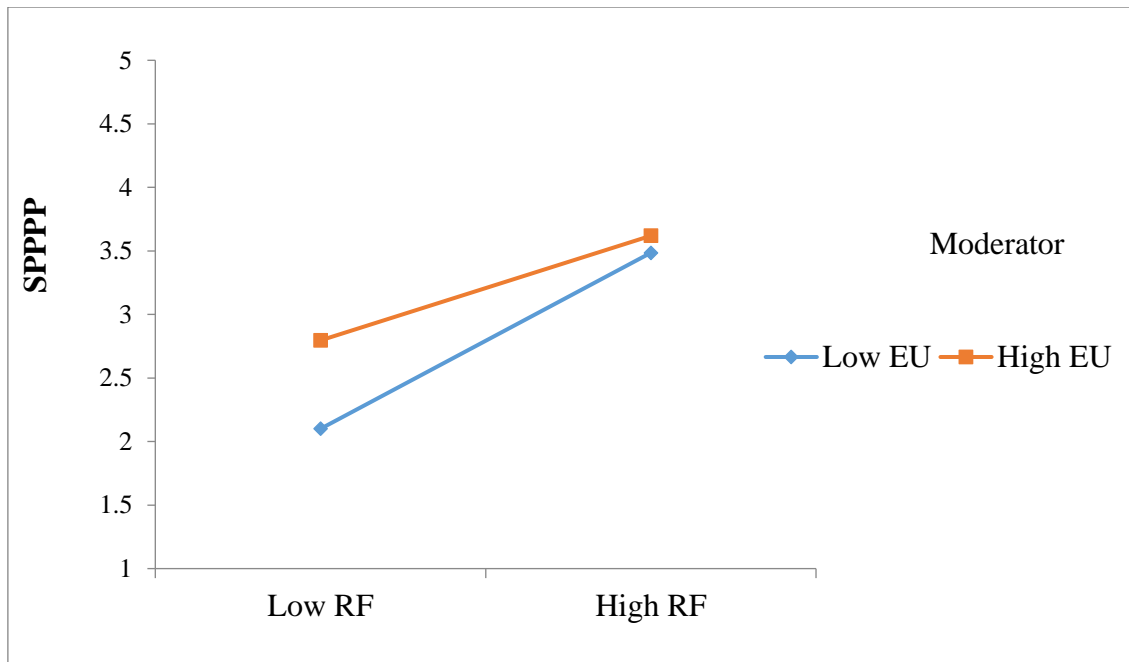
*SPPPP: Sustainable Public-Private Partnership Performance; RF: Regulation Factor; EU: Environmental Uncertainty;*

Table 4.18 presents the results of moderating effect of Environmental Uncertainty on the relationship between FF and SPPPP.  $R^2 = 0.4821$ , i.e. RF and EU explain 48.21 % variance upon SPPPP. The goodness of fit i.e. F value =39.3595 is also found significant at  $p < 0.05$  level. It is revealed from table 4.20 that RF has a positive and significant effect on SPPP ( $0.5521^{***}$ ,  $p < 0.05$ ) in addition EU has also a positive and significant effect on EU ( $0.2074^{***}$ ,  $p < 0.05$ ) likewise Interaction term (RF\*EU) has a negative but significant effect on SPPPP ( $-0.1404^{**}$ ,  $p < 0.05$ ).  $\Delta R^2 = 0.0196$ , is found significant  $p < 0.05$  level with the goodness of fit  $F = 9.9674$  also significant at  $p < 0.05$ .

Thus we found support for the hypotheses H2(h). According to Barren and Kenny (1986), Preacher and Hayes (2007), and Hayes (2013 & 2017). Field (2017), Beeker et al. (2018), and Hair et al., (2019 & 22) that change in  $R^2$  with p-value significant validate the moderation effect of moderating variable. Thus researcher found support for “There is a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the financial factor (FF) and sustainable PPP performance (SPPPP)”.

Figure 4.8

Moderated impact of EU on Relationship between RF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; RF: Regulation Factor; EU: Environmental Uncertainty;*

Two-way interactions between regulation factors (RF), and Environmental Uncertainty (EU) upon sustainable public-private partnership performance (SPPPP) were plotted one standard deviation above and below the mean as shown in Figure 4.8. Blueline represents low EU while the red line represents high EU. It is evident from the above graph that high Environmental Uncertainty interacts with high RF and affects the relationship between sustainable public-private partnership performance thus moderating the sustainable PPP performance. Low and high EU does not interact at a low level of RF.

#### **4.6.9 Moderated impact of Environmental Uncertainty on the relationship between CSFs and SPPPP**

This part was executed to test Hypothesis H2 i.e. There was a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the Critical Success Factor (CSF) and sustainable PPP performance (SPPPP). The process macro file of Hayes is used to test the moderating hypothesis.

Table 4.19

Moderation of EU on the relationship between CSF &amp; SPPPP

D.V	I.V	R	R <sup>2</sup>	F	$\beta$	se	T	p	LLCI	ULCI
SPPPP	<b>Constant</b>	0.729	0.5315	147.5108	5.8190	0.0386	150.8557	0.0000	5.7432	5.8948
	<b>CSF</b>				1.3346	0.0687	19.4301	0.0000	1.1996	1.4696
	<b>EU</b>				0.1445	0.0300	4.8245	0.0000	0.0856	0.2034
	<b>Int</b>				-0.1969	0.0522	-3.7686	0.0002	-0.2996	-0.0942
	<b>(CSF*EU)</b>									
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
X*W	0.0171	14.2024	1.0000	390.0000	0.0002					

*SPPPP: Sustainable Public-Private Partnership Performance; CSF: Critical Success Factor; EU: Environmental Uncertainty;*

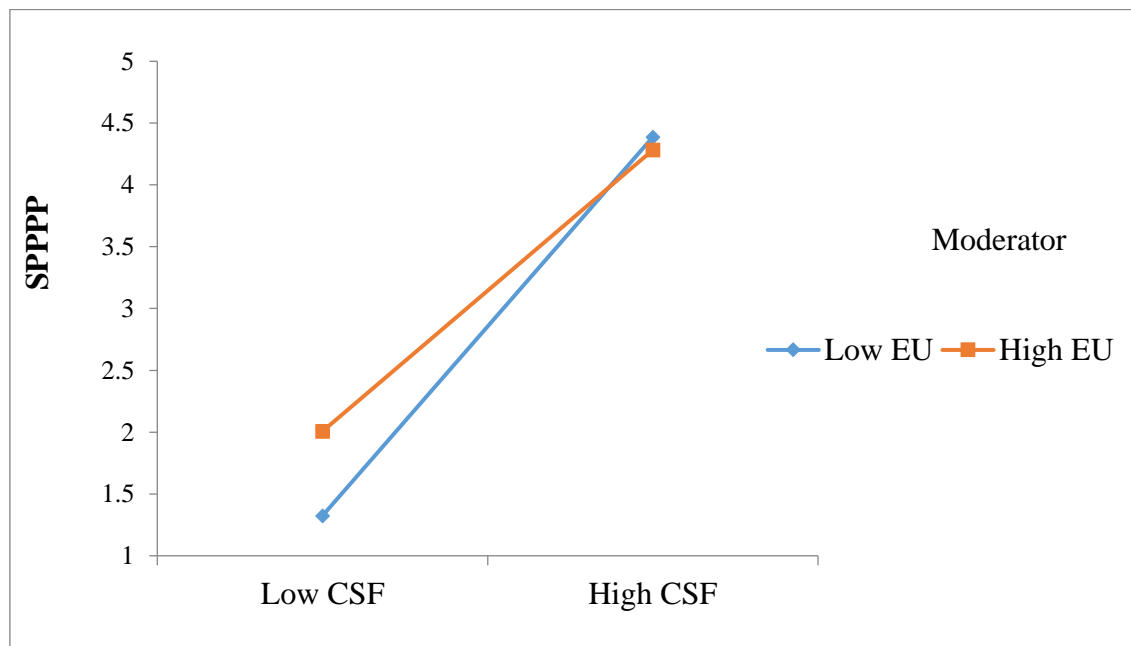
Table 4.19 presents the results of moderating effect of Environmental Uncertainty on the relationship between CSF and SPPPP.  $R^2 = 0.5315$ , i.e. CSF and EU explain 53.15% variance upon SPPPP. The goodness of fit i.e. F value =147.5108 is also found significant at  $p < 0.05$  level. It is revealed from table 4.18 that CSF has a positive and significant effect on SPPP (1.3346\*\*\*,  $p < 0.05$ ) in addition EU has also a positive and significant effect on EU (0.1445\*\*\*,  $p < 0.05$ ) likewise Interaction term (CSF\*EU) has a negative but significant effect on SPPPP (-0.1969\*\*,  $p < 0.05$ ).  $\Delta R^2 = 0.0171$ , is found significant  $p < 0.05$  level with the goodness of fit  $F = 14.2024$  also significant at  $p < 0.05$ .



Thus we found support for hypothesis H2(i). According to Barren and Kenny (1986), Preacher and Hayes (2007), and Hayes (2013 & 2017). Field (2017), Beeker et al. (2018), and Hair et al., (2019 & 22) that change in  $R^2$  with p-value significant validate the moderation effect of moderating variable. Thus researcher found support for “There is a significant moderating impact of Environmental Uncertainty (EU) on the relationship between the critical success factor (CSF) and sustainable PPP performance (SPPPP)”.

Figure 4.9

Moderated impact of EU on Relationship between CSF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; CSF: Critical Success Factor; EU: Environmental Uncertainty;*

Two-way interactions between critical success factors (CSF), and Environmental Uncertainty (EU) upon sustainable public-private partnership performance (SPPPP) were plotted one standard deviation above and below the mean as shown in Figure 4.9. The blue line represents low EU while the red line represents high EU. It is evident from the above graph that high Environmental Uncertainty interacts with high CSF and affects the relationship between sustainable public-private

partnership performance thus moderating the sustainable PPP performance. Low and high EU does not interact at a low level of CSF.

#### **4.7 Moderated Moderation Analysis**

Moderation analysis concept has been proposed by Cohen and Cohen (1983), then Barren and Kenny (1986) has persuaded the concept and Jaccard et al. (1990), Preacher and Hayes (2007), and Hayes (2013 &2017) are amongst those researchers who have discussed this concept in much detail. These stalwarts of research have brought tremendous addition to the concept of moderation evaluation theoretically as well as statistically. Moderated moderation has also been discussed by scholars in the literature (Hayes, 2013) and termed cascaded moderation by Hair et al., (2019). Hayes model 3 provides the conceptual understanding of moderated moderation for practical application (Hayes, 2013).

The current study has uniqueness in a sense that it has used moderation analysis initially to provide the empirical evidence regarding negative impact of EU. As this study pertains to PPP project performance and PPP is a complex arrangement. Therefore, to answer the complexity or problem, moderated moderation analysis technique has been used to answer study questions.

##### **4.7.1 Moderated Moderation impact of Joint Risk Management (JRM)**

###### **4.7.1.1 Moderated Moderation of JRM on the moderated impact of EU on the relationship between PF and SPPPP**

This part was executed to test Hypothesis H3(a) i.e. Joint Risk Management (JRM) would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Political Factor (PF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 is used to test moderated moderation hypotheses.

Table 4.20

Moderated Moderation of JRM on moderated outcome of EU on the relationship between PF and SPPPP

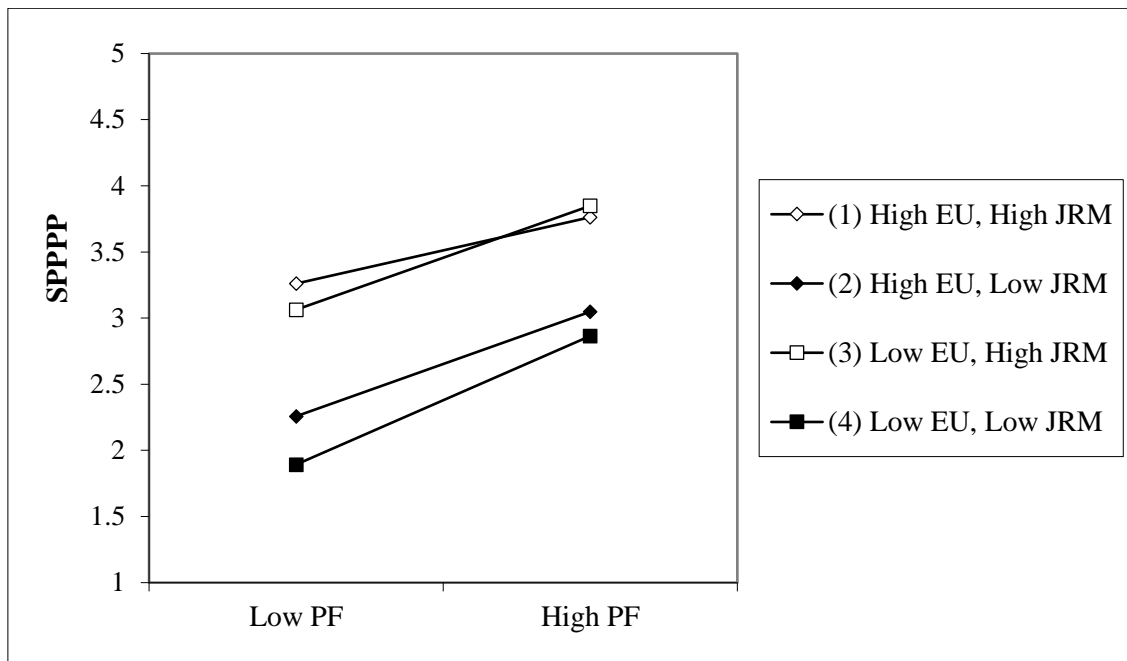
<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.763	0.5827	77.006	5.8459	0.0385	151.6574	0.0000	5.7701	5.9217
	<b>PF</b>				0.3812	0.0519	7.3374	0.0000	0.2790	0.4833
	<b>EU</b>				0.0824	0.0303	2.7194	.0068	0.0228	0.1420
	<b>Int(PF*EU)</b>				-0.0582	0.0450	-1.2938	.1965	-0.1466	0.0302
	<b>JRM</b>				0.4840	0.0296	16.3633	0.0000	0.4258	0.5421
	<b>Int(PF*JRM)</b>				-0.0594	0.0350	-1.6974	0.0904	-0.1281	0.0094
	<b>Int(EU*JRM)</b>				-0.0546	0.0231	-2.3664	0.0185	-0.0999	-0.0092
	<b>Int(PF*EU*JRM)</b>				-0.0127	0.0301	-0.4213	0.6738	-0.0720	0.0466
<b>X*W*Z</b>	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
	0.0002	0.1775	1.0000	386.0000	0.6738					

*SPPPP: Sustainable Public-Private Partnership Performance; PF: Political Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings according to table 4.20 revealed that PF, EU, and JRM combined variance upon SPPPP is  $R^2=0.5827$  i.e. 58.27%, the goodness of fit  $F=77.0062$ , at  $p<0.05$  while PF effect on SPPPP ( $0.3812^{***}, p<0.001$ ), in the same way, EU influence on SPPPP ( $0.084^{**}, p<0.05$ ) interaction term of PF and EU ( $-0.0582, P>0.05$ ) is not significant. When moderated moderator JRM is added to the regression equation it has an effect ( $0.484^{***}, p<0.001$ ) the interaction term of JRM and PF is ( $-0.0594, p>0.05$ ) not significant, interaction term 3 JRM and EU is ( $-0.0546^{**}, p<0.05$ ) is found significant and the interaction term of PF, EU, and JRM on SPPPP ( $-0.0127, p>0.05$ ) is not significant.  $\Delta R^2=0.0002$  is not significant. According to Bedeian&Mossholder (1994), Cohen (1993), and Kenny (1993)  $\Delta R^2$  is even non-significant in the evidence for moderation impact (Bedeian&Mossholder, 1994), thus the  $\Delta R^2$  validates that there is a three-way interaction of PF, EU, and JRM, on SPPPP. Thus the result supports the hypothesis that JRM will have moderated moderation impact on the moderated outcome of EU on the relationship between PF and SPPPP.

Figure 4.10

Moderated Moderation impact of JRM on Moderated Impact of EU on Relationship between PF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; PF: Political Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.10 above it is evident that high-level EU and low-level EU does not have interaction with low-level JRM and high-level JRM respectively and do not have three-way interactions with PF and SPPPP. However, its diagonal shape describes that there will be interaction between high level EU and high level JRM with low level EU and low level of JRM. Subsequently, the moderated moderation is likely to appear on the relationship between PF and SPPPP, so the moderated moderation variable has shown its presence by giving an angle the slope. Whereas, high and low-level EU (environmental uncertainty) interacts with the high level of JRM along with PF have a three-way interaction with an impact on SPPPP. This is evidence that a high level of JRM moderates the high, as well as low level of Environmental Uncertainty impact on the relationship between PF and SPPPP. and thus three-way interaction, appears i.e. moderated moderation.

#### **4.7.1.2 Moderated Moderation of JRM on the moderated impact of EU on the relationship between FF and SPPPP**

This part was executed to test Hypothesis H3(b) i.e. Joint Risk Management (JRM) would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Financial Factor (FF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 is used to test moderated moderation hypotheses.

Table 4.21

Moderated Moderation of JRM on the moderated outcome of EU on the relationship between FF and SPPPP

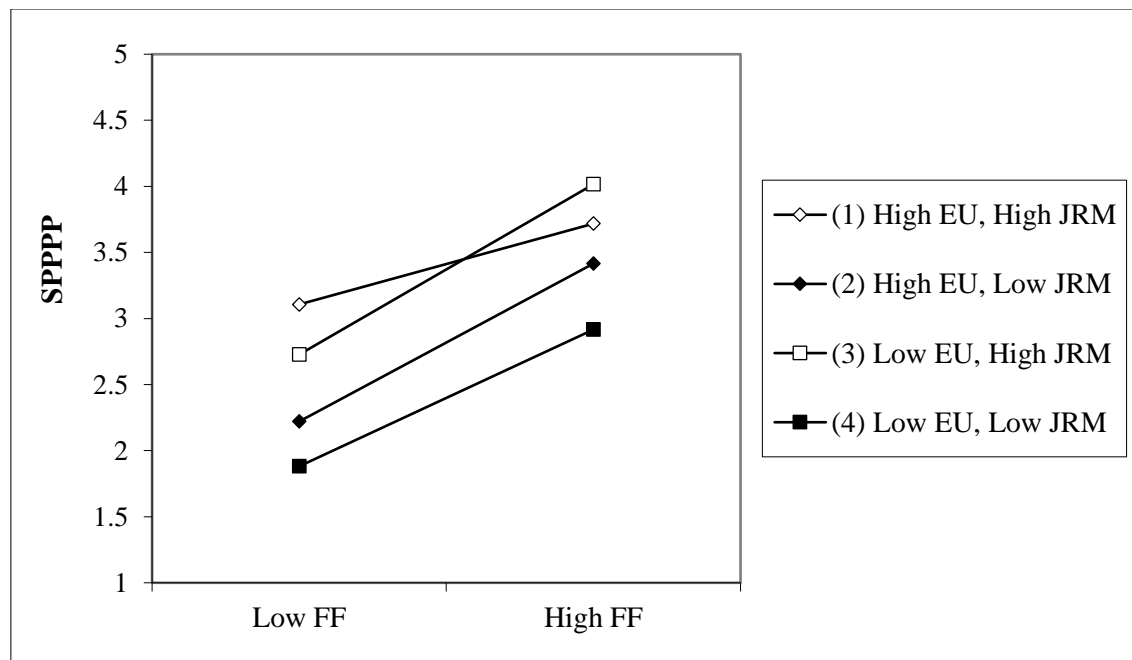
<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>T</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.8043	0.6470	101.048	5.8605	0.0373	156.9181	0.0000	5.7870	5.9339
	<b>FF</b>				0.5161	0.0449	11.4845	0.0000	0.4277	0.6044
	<b>EU</b>				0.1150	0.0281	4.0923	0.0001	0.0597	0.1702
	<b>Int(FF*EU)</b>				-0.0646	0.0386	-1.6758	0.0946	-0.1405	0.0112
	<b>JRM</b>				0.3917	0.0303	12.9367	0.0000	0.3321	0.4512
	<b>Int(FF*JRM)</b>				-0.0413	0.0291	-1.4191	0.1567	-0.0984	0.0159
	<b>Int(EU*JRM)</b>				-0.0946	0.0219	-4.3186	0.0000	-0.1376	-0.0515
	<b>Int(FF*EU*JRM)</b>				-0.1046	0.0253	-4.1346	0.0000	-0.1544	-0.0549
<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>						
<b>X*W*Z</b>	0.0156	17.0946	1.0000	386.0000	0.0000					

*SPPPP: Sustainable Public-Private Partnership Performance; FF: Finance Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings according to table 4.21 revealed that FF, EU, and JRM combined variance upon SPPPP is  $R^2=0.6470$  i.e. 64.70%, the goodness of fit  $F=101.0487$ , at  $p<0.05$  while FF effect on SPPPP ( $0.5161^{***}$ ,  $p<0.001$ ), in the same way, EU influence on SPPPP ( $0.1150^{**}$ ,  $p<0.05$ ) interaction term of FF and EU ( $-0.0646$ ,  $P>0.05$ ) is not significant. When moderated moderator JRM has been added to the regression equation it has an effect ( $0.3917^{***}$ ,  $p<0.001$ ) the interaction term of JRM and FF is ( $-0.0413$ ,  $p>0.05$ ) not significant, interaction term 3 i.e. JRM and EU is ( $-0.0946^{***}$ ,  $p<0.001$ ) is found significant and the interaction term of FF, EU, and JRM on SPPPP ( $-0.1046^{***}$ ,  $p<0.001$ ) is significant.  $\Delta R^2=0.0156$  is found significant i.e.  $p<0.001$  with the goodness of fit i.e.  $F=17.0946$ . It means there is a three-way interaction of FF, EU, and JRM, on SPPPP and  $R^2$  change with a p-value significant support the hypothesis that JRM has moderated moderation impact on the outcome of the moderated impact of EU on the relationship between FF and SPPPP.

Figure 4.11

Moderated Moderation impact of JRM on Moderated Impact of EU on Relationship between FF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; FF: Financial Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*



A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.11 above it is evident that high-level EU and low-level EU does not have interaction with low-level JRM and high-level JRM respectively and do not have three-way interactions with FF and SPPPP. However, its diagonal shape describes that there will be interaction between high level EU and high level JRM with low level EU and low level of JRM. Subsequently, the moderated moderation is likely to appear on the relationship between FF and SPPPP, so the moderated moderation variable has shown its presence by giving an angle the slope. Whereas, high and low-level EU (environmental uncertainty) interacts with the high level of JRM along with FF have a three-way interaction with an impact on SPPPP. This is evidence that a high level of JRM will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between FF and SPPPP and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.1.3 Moderated Moderation of JRM on the moderated impact of EU on the relationship between TF and SPPPP**

This part was executed to test Hypothesis H3(c) i.e. Joint Risk Management (JRM) would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Technical Factor (TF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.22

Moderated Moderation of JRM on the moderated outcome of EU on the relationship between TF and SPPPP

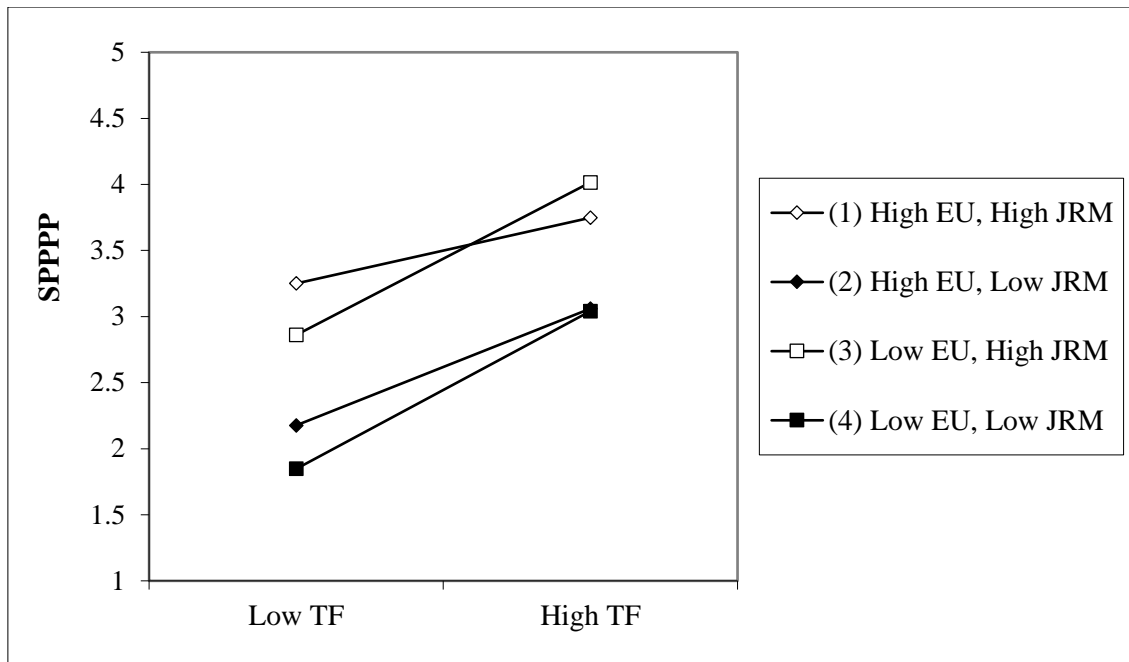
<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>B</b>	<b>se</b>	<b>t</b>	<b>P</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.7652	0.5856	77.9119	5.8490	0.0395	148.0908	0.0000	5.7713	5.9266
	<b>TF</b>				0.4662	0.0606	7.6913	0.0000	0.3470	0.5853
	<b>EU</b>				0.0588	0.0315	1.8678	0.0625	-0.0031	0.1207
	<b>Int(TF*EU)</b>				-0.1209	0.0486	-2.4885	0.0132	-0.2164	-0.0254
	<b>JRM</b>				0.4686	0.0302	15.5178	0.0000	0.4092	0.5280
	<b>Int(TF*JRM)</b>				-0.0531	0.0448	-1.1864	0.2362	-0.1411	0.0349
	<b>Int(EU*JRM)</b>				-0.0282	0.0248	-1.1402	0.2549	-0.0770	0.0205
	<b>Int(TF*EU*JRM)</b>				-0.0434	0.0328	-1.3238	0.1864	-0.01079	0.0211
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0019	1.7524	1.0000	386.0000	0.1864					

*SPPPP: Sustainable Public-Private Partnership Performance; TF: Technical Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings according to table 4.22 revealed that TF, EU, and JRM combined variance upon SPPPP is  $R^2=0.5856$  i.e. 58.56%, the goodness of fit  $F=77.9119$ , at  $p<0.05$  while TF effect on SPPP ( $0.4662^{***}, p<0.001$ ), in the same way, EU influence on SPPPP ( $0.0588, p>0.05$ ) i.e. not significant, the interaction term of TF and EU ( $-0.1209, P<0.05$ ) is not significant. When moderated moderator JRM has been added to the regression equation it has an effect ( $0.4686^{***}, p<0.001$ ) the interaction term of JRM and TF is ( $-0.0531, p>0.05$ ) not significant, interaction term 3 JRM and EU is ( $-0.0282, p>0.05$ ) is also not significant and the interaction term of PF, EU, and JRM on Sppp ( $-0.0434, p>0.05$ ) is not significant.  $\Delta R^2=0.0019$  is not significant. According to Bedeian&Mossholder (1994), Cohen (1993), and Kenny (1993)  $\Delta R^2$  is even non-significant in the evidence for moderation impact, thus the  $\Delta R^2$  validates that there is a three-way interaction of TF, EU, and JRM, on SPPPP. Thus the result supports the hypothesis that JRM will have moderated moderation impact on the moderated outcome of EU on the relationship between TF and SPPPP.

Figure 4.12

Moderated Moderation impact of JRM on Moderated Impact of EU on Relationship between TF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; TF: Technical Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.12 above it is evident that high-level EU and low-level EU have interaction with low-level JRM and high-level JRM respectively and have three-way interactions with TF and SPPPP. Whereas, high and low-level EU (environmental uncertainty) interacts with the high level of JRM along with TF have a three-way interaction with an impact on SPPPP. This is evidence that a high level of JRM will moderate the high as well as low level of Environmental Uncertainty impact on the relationship between TF and SPPPP and have slope interaction both at low level of EU and high level of EU. Thus, three-way interaction appears between the study variables in this hypothesis i.e. moderated moderation.

#### **4.7.1.4 Moderated Moderation of JRM on the moderated impact of EU on the relationship between EF and SPPPP**

This part was executed to test Hypothesis H3(d) i.e. Joint Risk Management (JRM) would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Economical Factor (EF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.23

Moderated Moderation of JRM on the moderated outcome of EU on the relationship between EF and SPPPP

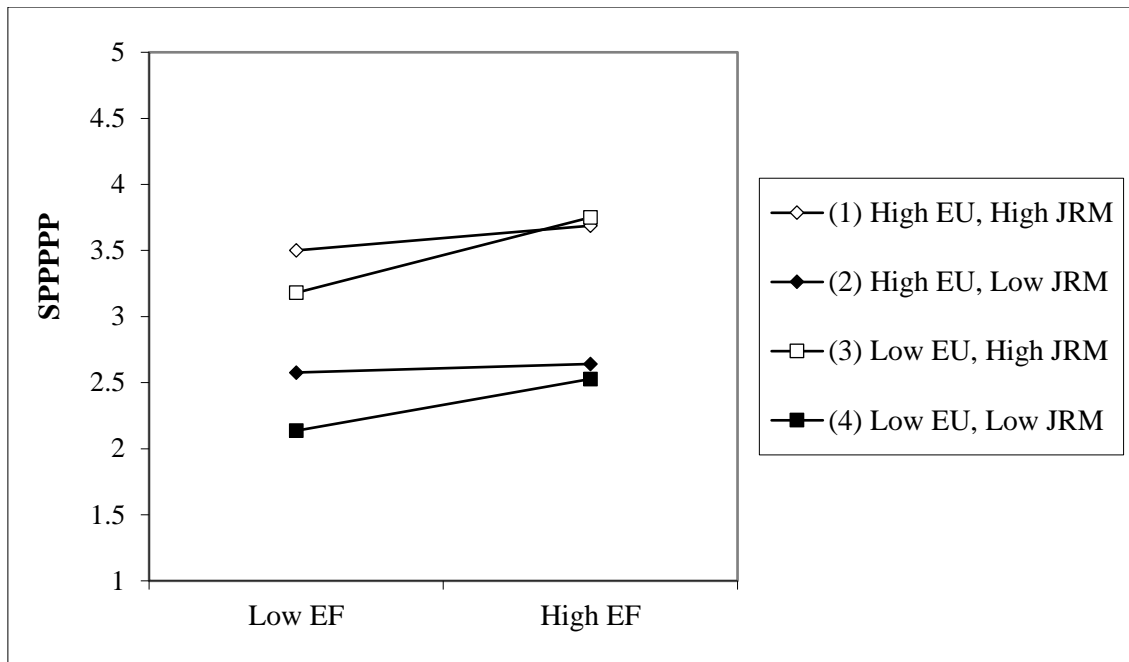
<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.7269	0.5283	61.7657	5.7942	0.0437	132.4559	0.0000	5.7081	5.8802
	<b>EF</b>				0.1517	0.0479	3.1639	0.0017	0.0574	0.2459
	<b>EU</b>				0.1015	0.0345	2.9384	0.0035	0.0336	0.1693
	<b>Int(EF*EU)</b>				-0.0888	0.0416	-2.1350	0.0334	-0.1706	-0.0070
	<b>JRM</b>				0.5296	0.0343	15.4577	0.0000	0.4623	0.5970
	<b>Int(EF*JRM)</b>				0.0376	0.0319	1.1786	0.2393	-0.0251	0.1003
	<b>Int(EU*JRM)</b>				-0.0371	0.0259	-1.4318	0.1530	-0.0881	0.0139
	<b>Int(EF*EU*JRM)</b>				-0.0071	0.0256	-0.2780	0.7812	-0.0574	0.0432
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0001	0.0773	1.0000	386.0000	0.7812					

*SPPPP: Sustainable Public-Private Partnership Performance; EF: Economic Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings according to table 4.23 revealed that EF, EU, and JRM combined variance upon SPPPP is  $R^2=0.5283$  i.e. 52.83%, the goodness of fit  $F=61.7657$ , at  $p<0.05$  while EF effect on SPPP ( $0.1517^{**}, p<0.05$ ), in the same way, EU influence on SPPPP ( $0.1015^{**}, p<0.05$ ) interaction term of PF and EU ( $-0.0888^{***}, P<0.001$ ) is significant. When moderated moderator JRM has been added to the regression equation it has an effect ( $0.5296^{***}, p<0.001$ ) the interaction term of JRM and EF is ( $0.0376, p>0.05$ ) not significant, interaction term 3 JRM and EU is ( $-0.0371, p>0.05$ ) is not significant and the interaction term of EF, EU, and JRM on SPPPP ( $-0.0071, p>0.05$ ) is not significant.  $\Delta R^2=0.0001$  is not significant. According to Bedeian&Mossholder (1994), Cohen (1993), and Kenny (1993)  $\Delta R^2$  is even non-significant in the evidence for moderation impact (Bedeian&Mossholder, 1994), thus the  $\Delta R^2$  validates that there is a three-way interaction of EF, EU, and JRM, on SPPPP. Thus the result supports the hypothesis that JRM will have moderated moderation impact on the moderated outcome of the EU on the relationship between EF and SPPPP.

Figure 4.13

Moderated Moderation impact of JRM on Moderated Impact of EU on Relationship between PF & SPPPP



*SPPPPP: Sustainable Public-Private Partnership Performance; EF: Economic Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.13 above it is evident that high-level EU and low-level EU does not have interaction with low-level JRM and high-level JRM respectively and do not have three-way interactions with EF and SPPPPP. However, its diagonal shape describes that there will be interaction between high level EU and high level JRM with low level EU and low level of JRM. Subsequently, the moderated moderation is likely to appear on the relationship between EF and SPPPPP, so the moderated moderation variable has shown its presence by giving an angle the slope. Whereas, high and low-level EU (environmental uncertainty) interacts with the high level of JRM along with EF and has a three-way interaction with an impact on SPPPPP. This is evidence that a high level of JRM will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between EF and SPPPPP and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.1.5 Moderated Moderation of JRM on the moderated impact of EU on the relationship between LF and SPPPPP**

This part was executed to test Hypothesis H3(e) i.e. Joint Risk Management (JRM) would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between

legal factor (PF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.



Table 4.24

Moderated Moderation of JRM on the moderated outcome of EU on the relationship between LF and SPPPP

<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.723	0.5239	60.6724	5.8228	0.0415	140.4184	0.0000	5.7413	5.9044
		8								
	<b>LF</b>				0.0876	0.0524	1.6727	0.0952	-0.0154	0.1905
	<b>EU</b>				0.0570	0.0326	1.7458	0.0816	-0.0072	0.1212
	<b>Int(LF*EU)</b>				-0.0686	0.0415	-1.6527	0.0992	-0.1501	0.0130
	<b>JRM</b>				0.5489	0.0313	17.5516	0.0000	0.4874	0.6104
	<b>Int(LF*JRM)</b>				0.0458	0.0388	1.1801	0.2387	-0.0305	0.1220
	<b>Int(EU*JRM)</b>				-0.0482	0.0245	-1.9680	0.0498	-0.0963	0.0000
	<b>Int(LF*EU*JRM)</b>				0.0264	0.0270	0.9785	0.3284	-0.0267	0.0796
<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>						
<b>X*W*Z</b>	0.0012	.9574	1.0000	386.0000	0.3284					

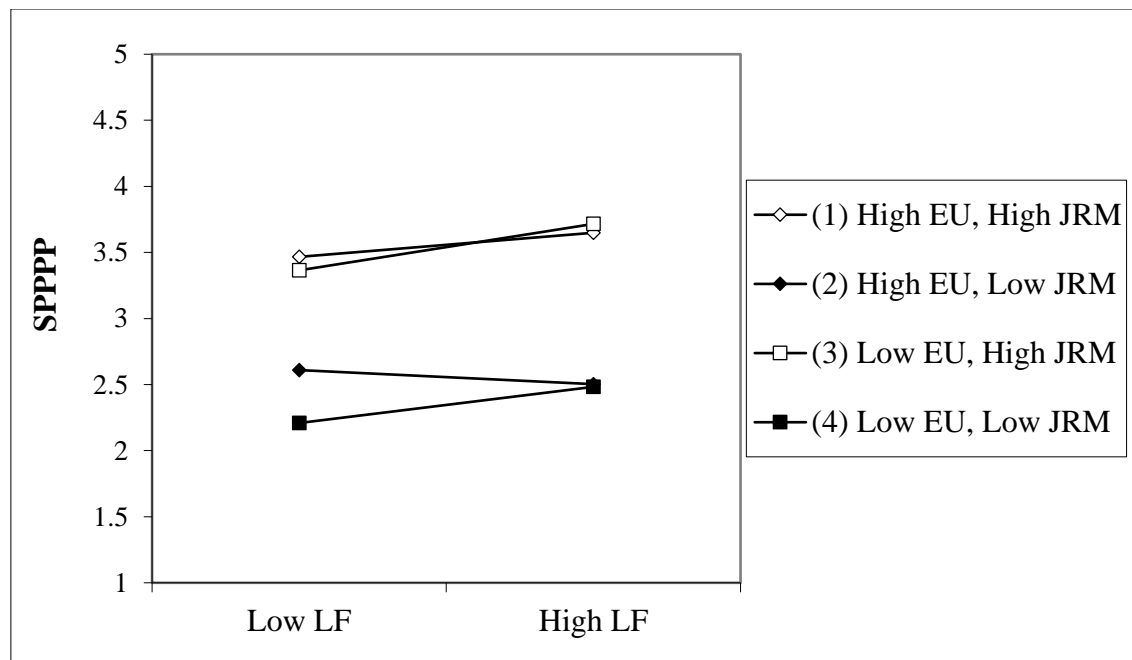
*SPPPP: Sustainable Public-Private Partnership Performance; LF: Legal Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings according to table 4.24 revealed that

LF, EU, and JRM combined variance upon SPPPP is  $R^2=0.5239$  i.e. 52.39%, the goodness of fit  $F=60.6724$ , at  $p<0.001$  while LF effect on SPPPP (0.0876,  $p>0.05$ ), in the same way, EU influence on SPPPP (0.0570,  $p>0.05$ ) interaction term of LF and EU (-0.0686,  $P>0.05$ ) is not significant. When moderated moderator JRM has been added to the regression equation it has an effect (0.5489\*\*\*,  $p<0.001$ ) the interaction term of JRM and LF is (0.0458,  $p>0.05$ ) not significant, interaction term 3 JRM and EU is (-0.0483,  $p>0.05$ ) is found not significant and the interaction term of LF, EU, and JRM on SPPPP (0.0264,  $p>0.05$ ) is not significant.  $\Delta R^2=0.0012$  is not significant. According to Bedeian&Mossholder (1994), Cohen (1993), and Kenny (1993)  $\Delta R^2$  is even non-significant in the evidence for moderation impact (Bedeian&Mossholder, 1994), thus the  $\Delta R^2$  validates that there is a three-way interaction of LF, EU, and JRM, on SPPPP. Thus the result supports the hypothesis that JRM will have moderated moderation impact on the moderated outcome of EU on the relationship between LF and SPPPP.

Figure 4.14

Moderated Moderation impact of JRM on Moderated Impact of EU on Relationship between LF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; LF: Legal Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.14 above it is evident that high-level EU and low-level EU does not have interaction with low-level JRM and high-level JRM respectively and do not have three-way interactions with LF and SPPPP. However, its diagonal shape describes that there will be interaction between high level EU and high level JRM with low level EU and low level of JRM. Subsequently, the moderated moderation is likely to appear on the relationship between LF and SPPPP, so the moderated moderation variable has shown its presence by giving an angle the slope. Whereas, high and low-level EU (environmental uncertainty) interacts with the high level of JRM along with LF and has a three-way interaction with an impact on SPPPP. This is evidence that a high level of JRM will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between LF and SPPPP, and thus three-way interaction appears i.e. moderated moderation. .

#### **4.7.1.6 Moderated Moderation of JRM on the moderated impact of EU on the relationship between MM and SPPPP**

This part was executed to test Hypothesis H3(f) i.e. Joint Risk Management (JRM) would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Market Maturity (MM) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.25

Moderated Moderation of JRM on the moderated outcome of EU on the relationship between MM and SPPPP

<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.8432	0.7110	135.6325	5.8435	0.0353	165.6360	0.0000	5.7741	5.9128
	<b>MM</b>				0.6031	0.0383	15.7555	0.0000	0.5278	0.6783
	<b>EU</b>				0.1184	0.0272	4.3521	0.0000	0.0649	0.1719
	<b>Int(MM*EU)</b>				-0.0873	0.0312	-2.7984	0.0054	-0.1487	-0.0260
	<b>JRM</b>				0.3040	0.0289	10.5116	0.0000	0.2472	0.3609
	<b>Int(MM*JRM)</b>				-0.0301	0.0236	-1.2784	0.2019	-0.0765	0.0162
	<b>Int(EU*JRM)</b>				-0.0374	0.0221	-1.6907	0.0917	-0.0808	0.0061
	<b>Int(MM*EU*JRM)</b>				-0.0590	0.0167	-3.5263	0.0005	-0.0920	-0.0261
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0093	12.4345	1.0000	386.0000	0.0005					

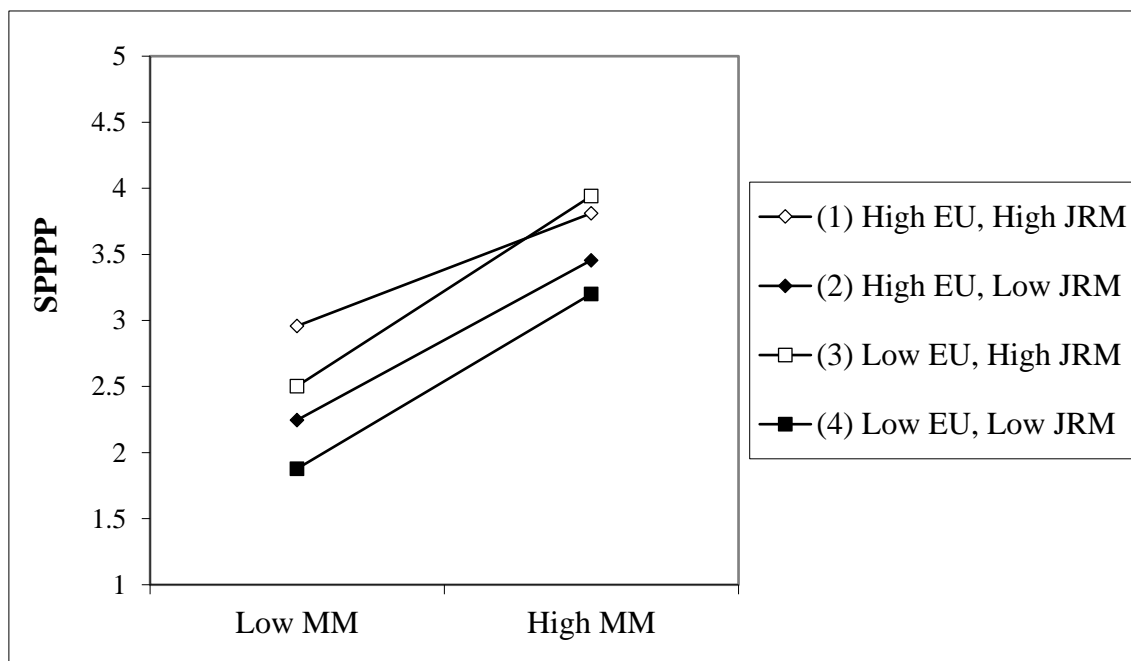
*SPPPP: Sustainable Public-Private Partnership Performance; MM: Market Maturity; EU: Environmental Uncertainty; JRM: Joint Risk Management*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings according to table 4.25 revealed that MM, EU, and JRM combined variance upon SPPPP is  $R^2=0.7110$  i.e. 71.10%, the goodness of fit  $F=135.6325$ , at  $p<0.001$  while MM effect on

SPPPP (0.6031\*\*\*,  $p < 0.001$ ), in the same way, EU influence on SPPPP (0.1184\*\*\*,  $p < 0.001$ ) interaction term of MM and EU (-0.0873\*\*,  $P < 0.05$ ) is significant. When moderated moderator JRM has been added to the regression equation it has an effect (0.3040\*\*\*,  $p < 0.001$ ) the interaction term of JRM and MM is (-0.0301,  $p > 0.05$ ) not significant, interaction term 3 i.e. JRM and EU is (-0.0374,  $p > 0.05$ ) is not significant and the interaction term of MM, EU, and JRM on SPPPP (-0.059\*\*,  $p < 0.05$ ) is significant.  $\Delta R^2 = 0.0093$  is found significant i.e.  $p < 0.05$  with the goodness of fit i.e.  $F = 12.4345$ . It means there is a three-way interaction of MM, EU, and JRM, on SPPPP and  $R^2$  change with a p-value significant support the hypothesis that JRM has moderated moderation impact on the outcome of the moderated impact of EU on the relationship between MM and SPPPP.

Figure 4.15

Moderated Moderation impact of JRM on Moderated Impact of EU on Relationship between MM & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; MM: Market Maturity; EU: Environmental Uncertainty; JRM: Joint Risk Management*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.15 above it is evident that high-level EU and low-level

EU does not have interaction with low-level JRM and high-level JRM respectively and do not have three-way interactions with MM and SPPPP. However, its diagonal shape describes that there will be interaction between high level EU and high level JRM with low level EU and low level of JRM. Subsequently, the moderated moderation is likely to appear on the relationship between MM and SPPPP, so the moderated moderation variable has shown its presence by giving an angle the slope. Whereas, high and low-level EU (environmental uncertainty) interacts with the high level of JRM along with MM have a three-way interaction with an impact on SPPPP. This is evidence that a high level of JRM will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between MM and SPPPP, and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.1.7 Moderated Moderation of JRM on the moderated impact of EU on the relationship between PrF and SPPPP**

This part was executed to test Hypothesis H3(g) i.e. Joint Risk Management (JRM) would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Political Factor (PF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.26

Moderated Moderation of JRM on the moderated outcome of EU on the relationship between PrF and SPPPP

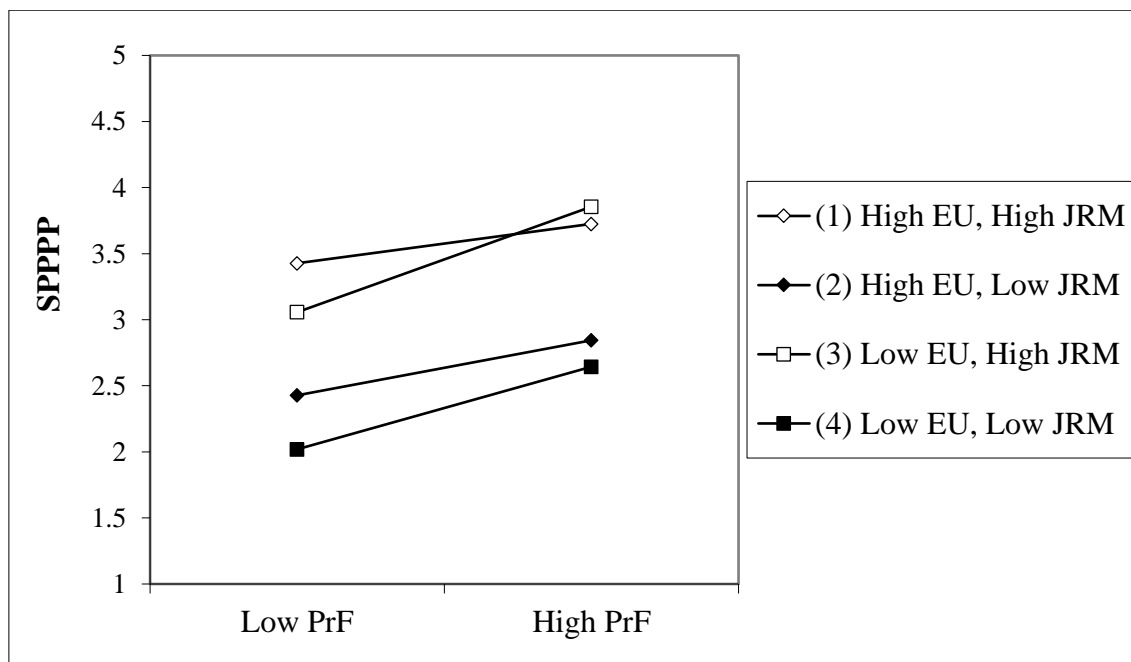
<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.7398	0.5474	66.6863	5.8149	0.0404	143.9571	0.0000	5.7355	5.8943
	<b>PrF</b>				0.2672	0.0526	5.0778	0.0000	0.1637	0.3706
	<b>EU</b>				0.1061	0.0323	3.2869	0.0011	0.0426	0.1696
	<b>Int(PrF*EU)</b>				-0.0886	0.0412	-2.1503	0.0322	-0.1696	-0.0076
	<b>JRM</b>				0.5162	0.0309	16.7139	0.0000	0.4555	0.5769
	<b>Int(PrF*JRM)</b>				0.0069	0.0368	0.1876	0.8513	-0.0654	0.0792
	<b>Int(EU*JRM)</b>				-0.0461	0.0244	-1.8906	0.0594	-0.0940	0.0018
	<b>Int(PrF*EU*JRM)</b>				-0.0365	0.0260	-1.4038	0.1612	-0.0877	0.0146
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0023	1.9706	1.0000	386.0000	0.1612					

*SPPPP: Sustainable Public-Private Partnership Performance; PrF: Procurement Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings according to table 4.26 revealed that PrF, EU, and JRM combined variance upon SPPPP is  $R^2=0.5474$  i.e. 54.74%, the goodness of fit  $F=66.6863$ , at  $p<0.001$  while PrF effect on SPPPP ( $0.2672^{***}, p<0.001$ ), in the same way, EU influence on SPPPP ( $0.1061^{**}, p<0.05$ ) interaction term of PrF and EU ( $-0.0886, P<0.05$ ) is significant. When moderated moderator JRM has been added to the regression equation it has an effect ( $0.5162^{***}, p<0.001$ ) the interaction term of JRM and PrF is ( $0.0069, p>0.05$ ) not significant, interaction term 3 JRM and EU is ( $-0.0461, p>0.05$ ) is found not significant and the interaction term of PrF, EU, and JRM on SPPPP ( $-0.0365, p>0.05$ ) is not significant.  $\Delta R^2=0.0023$  is not significant. According to Bedeian&Mossholder (1994), Cohen (1993), and Kenny (1993)  $\Delta R^2$  is even non-significant in the evidence for moderation impact (Bedeian&Mossholder, 1994), thus the  $\Delta R^2$  validates that there is a three-way interaction of LF, EU, and JRM, on SPPPP. Thus the result supports the hypothesis that JRM will have moderated moderation impact on the moderated outcome of EU on the relationship between LF and SPPPP.

Figure 4.16

Moderated Moderation impact of JRM on Moderated Impact of EU on Relationship between PrF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; PrF: Procurement Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*



A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.16 above it is evident that high-level EU and low-level EU does not have interaction with low-level JRM and high-level JRM respectively and do not have three-way interactions with PrF and SPPPP. However, its diagonal shape describes that there will be interaction between high level EU and high level JRM with low level EU and low level of JRM. Subsequently, the moderated moderation is likely to appear on the relationship between PrF and SPPPP, so the moderated moderation variable has shown its presence by giving an angle the slope. Whereas, high and low-level EU (environmental uncertainty) interacts with the high level of JRM along with PrF have a three-way interaction with an impact on SPPPP. This is evidence that a high level of JRM will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between PrF and SPPPP, and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.1.8 Moderated Moderation of JRM on the moderated impact of EU on the relationship between RF and SPPPP**

This part was executed to test Hypothesis H3(h) i.e. Joint Risk Management (JRM) would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Regulation Factor (RF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.27

Moderated Moderation of JRM on the moderated outcome of EU on the relationship between RF and SPPPP

<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.7790	0.6068	85.1041	5.8279	0.0372	156.7958	0.0000	5.7548	5.9009
	<b>RF</b>				0.3915	0.0432	9.0655	0.0000	0.3066	0.4764
	<b>EU</b>				0.1130	0.0295	3.8245	0.0002	0.0549	0.1711
	<b>Int(RF*EU)</b>				-0.0765	0.0335	-2.2818	0.0230	-0.1424	-0.0106
	<b>JRM</b>				0.5055	0.0277	18.2193	0.0000	0.4510	0.5601
	<b>Int(RF*JRM)</b>				-0.0579	0.0324	-1.7838	0.0752	-0.1216	0.0059
	<b>Int(EU*JRM)</b>				-0.0484	0.0213	-2.2710	0.0237	-0.0903	-0.0065
	<b>Int(RF*EU*JRM)</b>				-0.0182	0.0254	-0.7186	0.4728	-0.0681	0.0316
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0005	0.5163	1.0000	386.0000	0.4728					

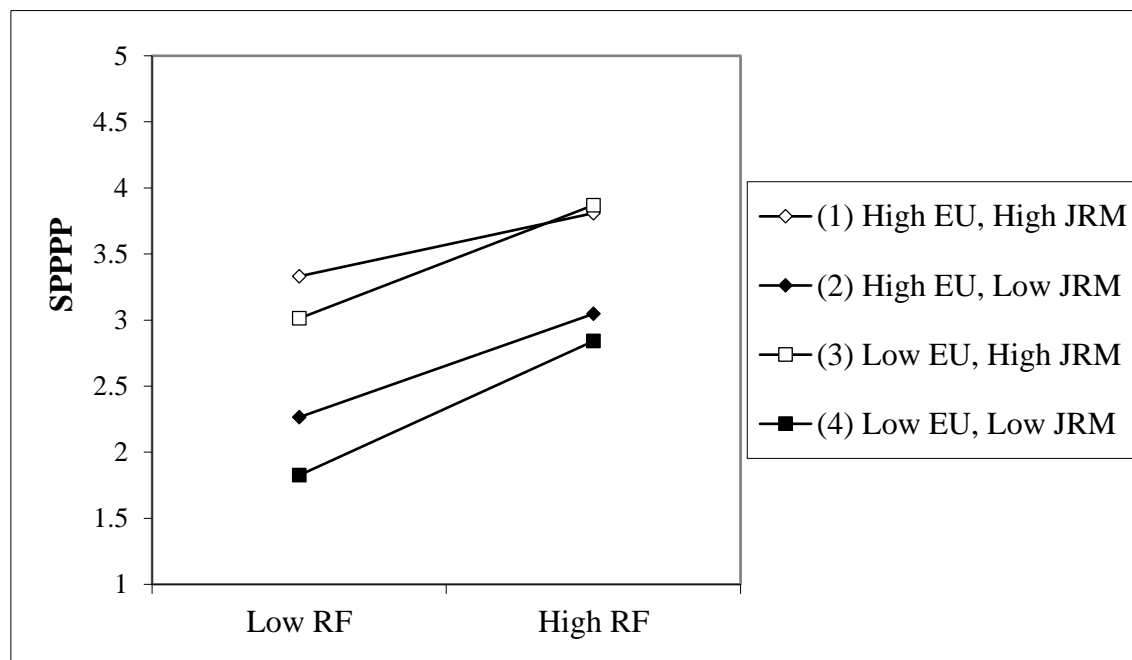
*SPPPP: Sustainable Public-Private Partnership Performance; RF: Regulation Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings according to table 4.27 revealed that RF, EU, and JRM combined variance upon SPPPP is  $R^2=0.6068$  i.e. 60.68%, the goodness of fit  $F=85.1041$ , at  $p<0.001$ , while RF effect on

SPPPP (0.3915\*\*\*,  $p < 0.001$ ), in the same way, EU influence on SPPPP (0.1130\*\*,  $p < 0.05$ ) interaction term of RF and EU (-0.0765,  $P < 0.05$ ) is also significant. When moderated moderator JRM has been added to the regression equation it has an effect (0.5055\*\*\*,  $p < 0.001$ ) the interaction term of JRM and RF is (-0.0579,  $p > 0.05$ ) not significant, interaction term 3 JRM and EU is (-0.0484\*\*,  $p < 0.05$ ) is found significant and the interaction term of RF, EU, and JRM on SPPPP (-0.0182,  $p > 0.05$ ) is not significant.  $\Delta R^2 = 0.0005$  is not significant. According to Bedeian & Mossholder (1994), Cohen (1993) and Kenny (1993)  $\Delta R^2$  is even non-significant in the evidence for moderation impact (Bedeian & Mossholder, 1994), thus the  $\Delta R^2$  validates that there is a three-way interaction of PF, EU, and JRM, on SPPPP. Thus the result supports the hypothesis that JRM will have moderated moderation impact on the moderated outcome of EU on the relationship between PF and SPPPP.

Figure 4.17

Moderated Moderation impact of JRM on Moderated Impact of EU on Relationship between RF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; RF: Regulation Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.17 above it is evident that high-level EU and low-level EU does not have interaction with low-level JRM and high-level JRM respectively and do not have three-way interactions with RF and SPPPP. However, its diagonal shape describes that there will be interaction between high level EU and high level JRM with low level EU and low level of JRM. Subsequently, the moderated moderation is likely to appear on the relationship between RF and SPPPP, so the moderated moderation variable has shown its presence by giving an angle the slope. Whereas, high and low-level EU (environmental uncertainty) interacts with the high level of JRM along with RF have a three-way interaction with an impact on SPPPP. This is evidence that a high level of JRM will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between RF and SPPPP and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.1.9 Moderated Moderation of JRM on the moderated impact of EU on the relationship between CSFs and SPPPP**

This part was executed to test Hypothesis H3 i.e. Joint Risk Management (JRM) would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Critical Success Factor (CSF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.28

Moderated Moderation of JRM on the moderated outcome of EU on the relationship between CSF and SPPPP

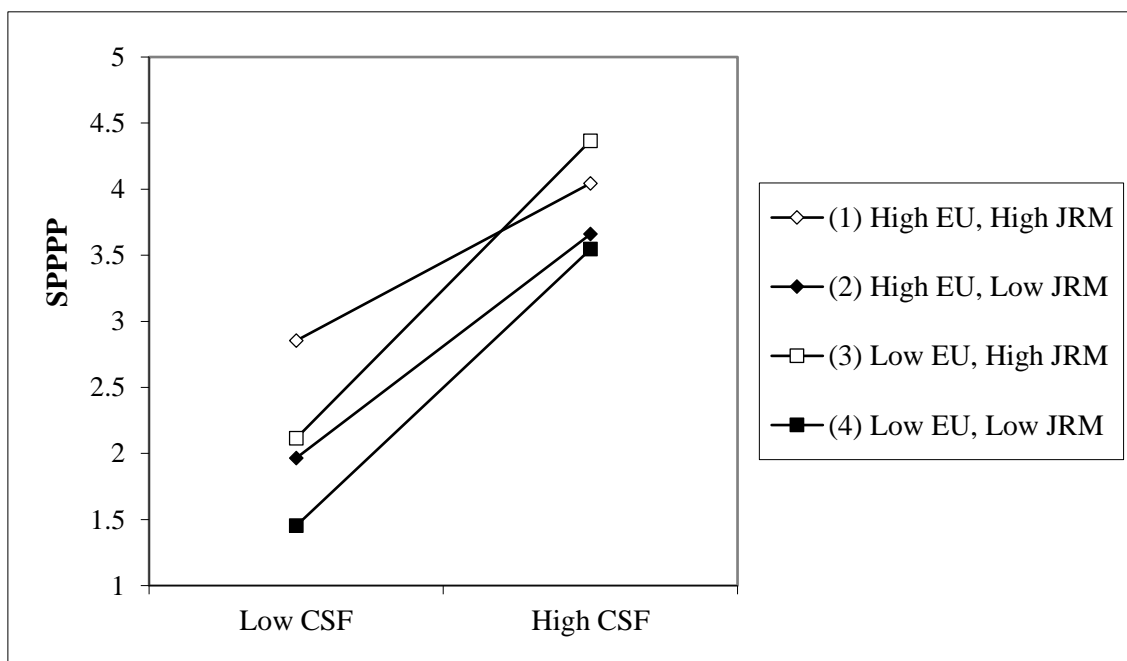
D.V	I.V	R	R <sup>2</sup>	F	$\beta$	Se	t	p	LLCI	ULCI
SPPPP	<b>Constant</b>	0.8183	0.6697	111.8016	5.8330	0.0375	155.3544	0.0000	5.7592	5.9068
	<b>CSF</b>				0.9036	0.0693	13.0345	0.0000	0.7673	1.0399
	<b>EU</b>				0.1305	0.0295	4.4204	0.0000	0.0725	0.1885
	<b>Int(CSF*EU)</b>				-0.1825	0.0576	-3.1691	0.0017	-0.2957	-0.0693
	<b>JRM</b>				0.3445	0.0305	11.2966	0.0000	0.2845	0.4044
	<b>Int(CSF*JRM)</b>				-0.0431	0.0436	-0.9866	0.3245	-0.1288	0.0427
	<b>Int(EU*JRM)</b>				-0.0262	0.0236	-1.1073	0.2689	-0.0726	0.0203
	<b>Int(CSF*EU*JRM)</b>				-0.0828	0.0327	-2.5339	0.0117	-0.1471	-0.0186
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0055	6.4207	1.0000	386.0000	0.0117					

*SPPPP: Sustainable Public-Private Partnership Performance; CSF: Critical Success Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings according to table 4.28 revealed that CSF, EU, and JRM combined variance upon SPPPP is  $R^2=0.6697$  i.e. 66.97%, the goodness of fit  $F=111.8016$ , at  $p<0.001$  while CSF effect on SPPPP ( $0.9036^{***}$ ,  $p<0.001$ ), in the same way, EU influence on SPPPP ( $0.1305^{***}$ ,  $p<0.001$ ) interaction term of CSF and EU ( $-0.1825^{**}$ ,  $P<0.05$ ) is significant. When moderated moderator JRM has added to the regression equation it has an effect ( $0.3445^{***}$ ,  $p<0.001$ ) the interaction term of JRM and CSF is ( $-0.0431$ ,  $p>0.05$ ) not significant, interaction term 3 i.e. JRM and EU is ( $-0.0262$ ,  $p>0.05$ ) is not significant and the interaction term of CSF, EU, and JRM on SPPPP ( $-0.0828^{**}$ ,  $p<0.05$ ) is significant.  $\Delta R^2=0.0055$  is found significant i.e.  $p<0.05$  with the goodness of fit i.e.  $F= 6.4207$ . It means there is a three-way interaction of CSF, EU, and JRM, on SPPPP and  $R^2$  change value with p-value significant support the hypothesis that JRM has moderated moderation impact on the outcome of the moderated impact of EU on the relationship between CSF and SPPPP.

Figure 4.18

Moderated Moderation impact of JRM on Moderated Impact of EU on Relationship between CSF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; CSF: Critical Success Factor; EU: Environmental Uncertainty; JRM: Joint Risk Management*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.18 above it is evident that high-level EU and low-level EU does not have interaction with low-level JRM and high-level JRM respectively and do not have three-way interactions with CSF and SPPPP. However, its diagonal shape describes that there will be interaction between high level EU and high level JRM with low level EU and low level of JRM. Subsequently, the moderated moderation is likely to appear on the relationship between CSF and SPPPP, so the moderated moderation variable has shown its presence by giving an angle the slope. Whereas, high and low-level EU (environmental uncertainty) interacts with the high level of JRM along with CSF have a three-way interaction with an impact on SPPPP. This is evidence that a high level of JRM will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between CSF and SPPPP and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.2 Moderated Moderation impact of Trust**

##### **4.7.2.1 Moderated Moderation of Trust on the moderated impact of EU on the relationship between PF and SPPPP**

This part was performed to test Hypothesis H4 (a) i.e. Trust would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Political Factor (PF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.29

Moderated Moderation of Trust on the moderated outcome of EU on the relationship between PF and SPPPP

<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.9129	0.8334	275.8208	5.8071	0.0261	222.7419	0.0000	5.7559	5.8584
	<b>PF</b>				0.1105	0.0351	3.1497	0.0018	0.0415	0.1794
	<b>EU</b>				-0.0168	0.0201	-0.8346	0.4045	-0.0564	0.0228
	<b>Int(PF*EU)</b>				0.0121	0.0299	0.4067	0.6845	-0.0466	0.0709
	<b>Trust</b>				0.7316	0.0209	35.0514	0.0000	0.6906	0.7727
	<b>Int(PF*Trust)</b>				0.0224	0.0233	0.9594	0.3380	-0.0235	0.0682
	<b>Int(EU*Trust)</b>				-0.0152	0.0143	-1.0578	0.2908	-0.0433	0.0130
	<b>Int(PF*EU*Trust)</b>				-0.0273	0.0161	-1.6888	0.0921	-0.0590	0.0045
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0012	2.8521	1.0000	386.0000	0.0921					

*SPPPP: Sustainable Public-Private Partnership Performance; PF: Political Factor; EU: Environmental Uncertainty;*

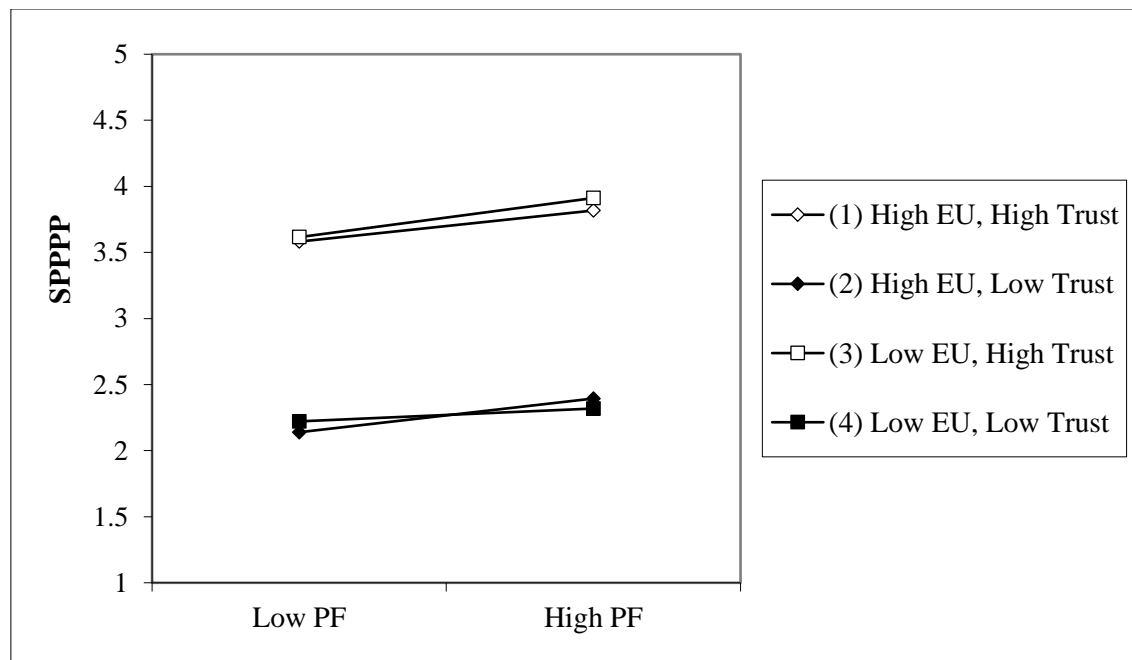
Three-way interaction or moderated moderation was run in the process file using model number 3, findings revealed that PF, EU, and Trust



combined variance upon SPPPP is  $R^2=0.8334$  i.e. 83.34%, the goodness of fit  $F=275.8208$ , at  $p<0.001$  while PF effect on SPPPP ( $0.1105^{**}, p<0.05$ ), in the same way, EU influence on SPPPP ( $0.0168^{**}, p>0.05$ ) i.e. not significant, the interaction term of PF and EU ( $0.0121, P>0.05$ ) is not significant. When moderated moderator Trust is added to the regression equation it has an effect ( $0.7316^{***}, p<0.001$ ) the interaction term of Trust and PF is ( $0.0224, p>0.05$ ) not significant, interaction term 3 EU and Trust is ( $-0.0152, p>0.05$ ) is also found not significant and the interaction term of PF, EU, and Trust on SPPPP ( $-0.0273, p>0.05$ ) is not significant.  $\Delta R^2=0.0012$  is not significant. According to Bedeian&Mossholder (1994), Cohen (1993), and Kenny (1993)  $\Delta R^2$  is even non-significant in the evidence for moderation impact (Bedeian&Mossholder, 1994), thus the  $\Delta R^2$  validates that there is a three-way interaction of PF, EU, and Trust, on SPPPP. Thus the result supports the hypothesis that Trust will have moderated moderation impact on the moderated outcome of the EU on the relationship between PF and SPPPP.

Figure 4.19

Moderated Moderation impact of Trust on Moderated Impact of EU on Relationship between PF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; PF: Political Factor; EU: Environmental Uncertainty;*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.19 above it is evident that high-level EU and low-level EU have interaction with low-level Trust and high-level Trust respectively and have three-way interactions with PF and SPPPP. Similarly, high and low-level EU (environmental uncertainty) interacts with the high level of Trust along with PF have a three-way interaction with an impact on SPPPP. This is evidence that a high level of Trust will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between PF and SPPPP, and thus three-way interaction appears i.e. moderated-moderation.

#### **4.7.2.2 Moderated Moderation of Trust on the moderated impact of EU on the relationship between FF and SPPPP**

This part was performed to test Hypothesis H4 (b) i.e. Trust would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Financial Factor (FF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.30

Moderated Moderation of Trust on the moderated outcome of EU on the relationship between FF and SPPPP

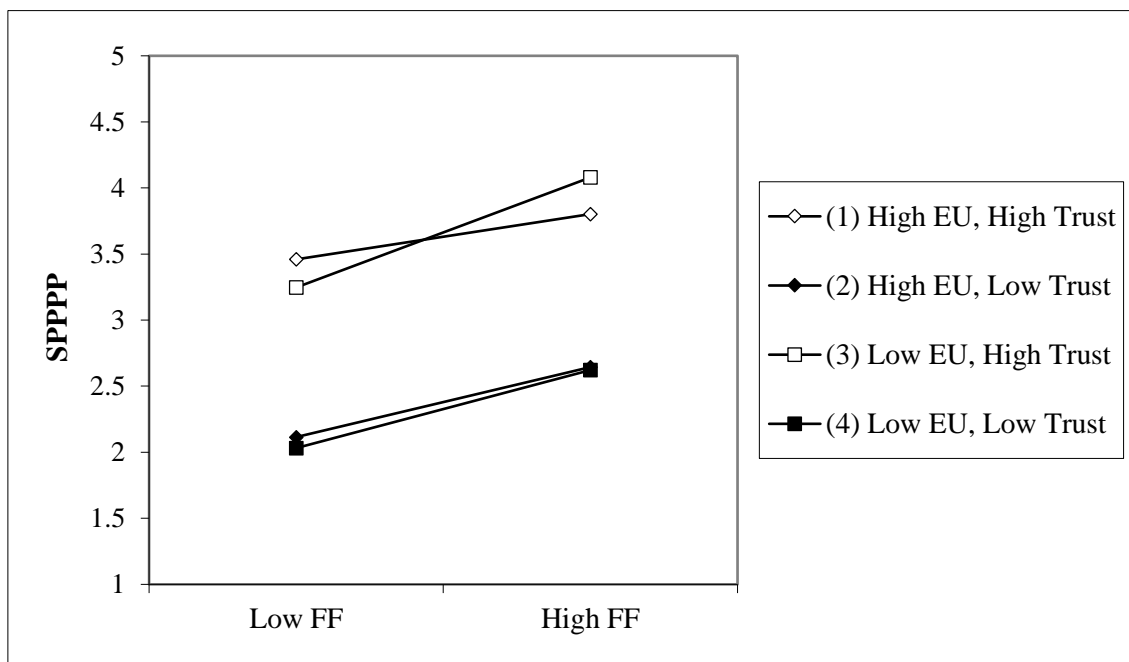
<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.9258	0.8572	330.8949	5.8200	0.0262	221.7895	0.0000	5.7684	5.8716
	<b>FF</b>				0.2869	0.0321	8.9349	0.0000	0.2238	0.3501
	<b>EU</b>				0.0051	0.0192	0.2674	0.7893	-0.0326	0.0429
	<b>Int(FF*EU)</b>				-0.0688	0.0282	-2.4437	0.0150	-0.1242	-0.0134
	<b>Trust</b>				0.6470	0.0232	27.9407	0.0000	0.6015	0.6925
	<b>Int(FF*Trust)</b>				0.0069	0.0207	0.3321	0.7400	-0.0338	0.0475
	<b>Int(EU*Trust)</b>				-0.0213	0.0142	-1.4939	0.1360	-0.0493	0.0067
	<b>Int(FF*EU*Trust)</b>				-0.0537	0.0155	-3.4674	0.0006	-0.0842	-0.0233
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0044	12.0229	1.0000	386.0000	0.0006					

*SPPPP: Sustainable Public-Private Partnership Performance; FF: Finance Factor; EU: Environmental Uncertainty;*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings revealed that FF, EU, and Trust combined variance upon SPPPP is  $R^2=0.8572$  i.e. 85.72%, the goodness of fit  $F=330.8949$ , at  $p<0.001$  while FF effect on SPPPP ( $0.2869^{***}, p<0.001$ ), in the same way, EU influence on SPPPP ( $0.0051^{***}, p<0.001$ ) interaction term of FF and EU ( $-0.0688, P<0.05$ ) is significant. When moderated moderator Trust is added to the regression equation it has an effect ( $0.6470^{***}, p<0.001$ ) the interaction term of FF and Trust is ( $0.0069, p>0.05$ ) not significant, interaction term 3 EU and Trust is ( $-0.0213, p>0.05$ ) is found not significant and the interaction term of FF, EU, and Trust on SPPPP ( $-0.0537, p<0.05$ ) is significant.  $\Delta R^2=0.0044$  is significant. It means there is a three-way interaction of FF, EU, and Trust, on SPPPP and  $R^2$  change value with p-value significant support the hypothesis that Trust has moderated moderation impact on the outcome of the moderated impact of EU on the relationship between FF and SPPPP.

Figure 4.20

Moderated Moderation impact of Trust on Moderated Impact of EU on Relationship between FF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; FF: Financial Factor; EU: Environmental Uncertainty;*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.20 above it is evident that high-level EU and low-level EU have interaction with low-level Trust and high-level Trust respectively and have three-way interactions with FF and SPPPP. Similarly, high and low-level EU (environmental uncertainty) interacts with the high level of Trust along with FF have a three-way interaction with an impact on SPPPP. This is evidence that a high level of Trust will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between FF and SPPPP, and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.2.3 Moderated Moderation of Trust on the moderated impact of EU on the relationship between TF and SPPPP**

This part was performed to test Hypothesis H4 (c) i.e. Trust would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Technical Factor (TF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.31

Moderated Moderation of Trust on moderated outcome of EU on the relationship between TF and SPPPP

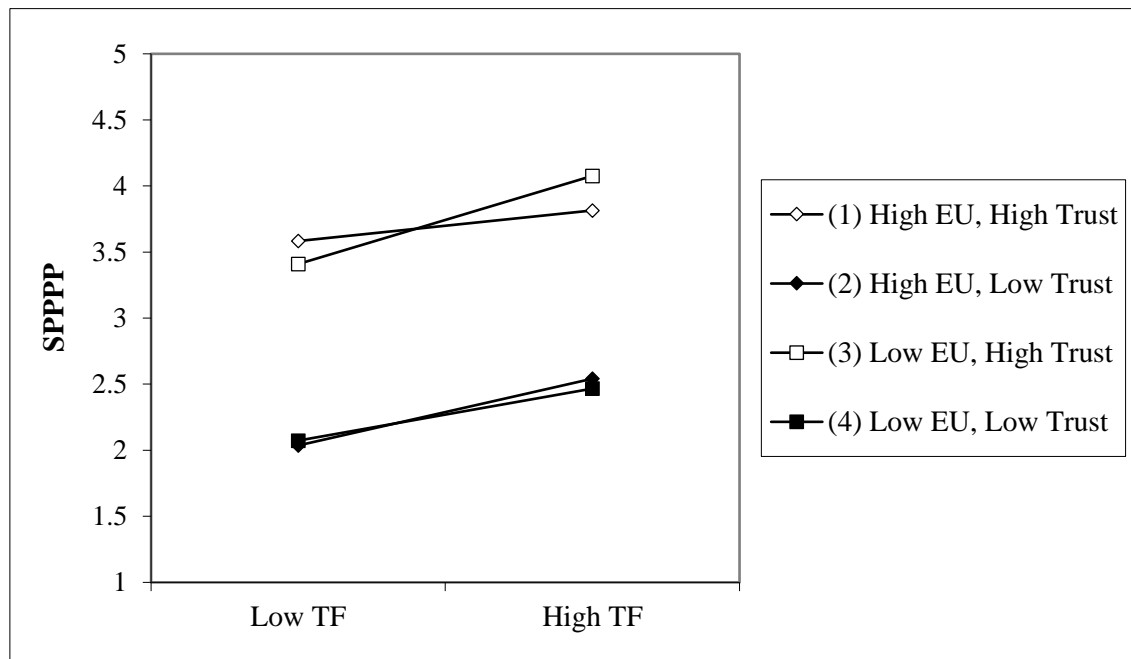
D.V	I.V	R	R <sup>2</sup>	F	$\beta$	se	t	p	LLCI	ULCI
SPPPP	<b>Constant</b>	0.9172	0.8412	292.0874	5.8059	0.0255	227.4255	0.0000	5.7557	5.8561
	<b>TF</b>				0.2247	0.0408	5.5076	0.0000	0.1445	0.3050
	<b>EU</b>				-0.0062	0.0201	-.3076	0.7586	-0.0457	0.0334
	<b>Int(TF*EU)</b>				-0.0405	0.0336	-1.2059	0.2286	-0.1064	0.0255
	<b>Trust</b>				0.7208	0.0206	34.9468	0.0000	0.6802	0.7613
	<b>Int(TF*Trust)</b>				0.0000	0.0307	0.0011	0.9991	-0.0603	0.0604
	<b>Int(EU*Trust)</b>				-0.0157	0.0157	-0.9990	0.3184	-0.0465	0.0152
	<b>Int(TF*EU*Trust)</b>				-0.0685	0.0194	-3.5287	0.0005	-0.1066	-0.0303
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0051	12.4518	1.0000	386.0000	0.0005					

*SPPPP: Sustainable Public-Private Partnership Performance; TF: Technical Factor; EU: Environmental Uncertainty;*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings in table 4.31 revealed that TF, EU, and Trust combined variance upon SPPPP is  $R^2=0.8412$  i.e. 84.12%, the goodness of fit  $F=292.0874$ , at  $p<0.001$  while TF effect on SPPPP ( $0.2247^{***}$ ,  $p<0.001$ ), in the same way, EU influence on SPPPP ( $-0.0062$ ,  $p>0.05$ ) interaction term of TF and EU ( $-0.0405$ ,  $P>0.05$ ) is not significant. When moderated moderator Trust is added to the regression equation it has an effect ( $0.7208^{***}$ ,  $p<0.001$ ) the interaction term of TF and Trust is ( $0.000$ ,  $p>0.05$ ) not significant, interaction term 3 EU and Trust is ( $-0.0157$ ,  $p>0.05$ ) is also found not significant and the interaction term of TF, EU, and Trust on SPPPP ( $-0.0685$ ,  $p<0.05$ ) is significant.  $\Delta R^2=0.0051$  is also significant. It means there is a three-way interaction of TF, EU, and Trust on SPPPP.  $R^2$  change value with p-value significant support the hypothesis that Trust has moderated moderation impact on the outcome of the moderated impact of EU on the relationship between TF and SPPPP.

Figure 4.21

Moderated Moderation impact of Trust on Moderated Impact of EU on Relationship between TF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; TF: Technical Factor; EU: Environmental Uncertainty;*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.21 above it is evident that high-level EU and low-level EU have interaction with low-level Trust and high-level Trust respectively and have three-way interactions with TF and SPPPP. Similarly, high and low-level EU (environmental uncertainty) interacts with the high level of Trust along with TF have a three-way interaction with an impact on SPPPP. This is evidence that a high level of Trust will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between TF and SPPPP, and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.2.4 Moderated Moderation of Trust on the moderated impact of EU on the relationship between EF and SPPPP**

This part was performed to test Hypothesis H4 (d) i.e. Trust would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Economical Factor (EF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.



Table 4.32

Moderated Moderation of Trust on moderated outcome of EU on the relationship between EF and SPPPP

<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.913	0.8350	279.0645	5.7930	0.0261	221.8523	0.0000	5.7417	5.8444
		8								
	<b>EF</b>				0.0855	0.0287	2.9834	0.0030	0.0292	0.1418
	<b>EU</b>				-0.0056	0.0207	-0.2700	0.7873	-0.0463	0.0351
	<b>Int(EF*EU)</b>				0.0351	0.0249	-0.5521	0.5812	-0.0628	0.0353
	<b>Trust</b>				0.7435	0.0206	36.0429	0.0000	0.7030	0.7841
	<b>Int(EF*Trust)</b>				0.0369	0.0195	1.8929	0.0591	-0.0014	0.0751
	<b>Int(EU*Trust)</b>				-0.0070	0.0143	-0.4937	0.6218	-0.0351	0.0210
	<b>Int(EF*EU*Trust)</b>				-0.0293	0.0128	-2.2861	0.0228	-0.0545	-0.0041
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0022	5.2260	1.0000	386.0000	0.0228					

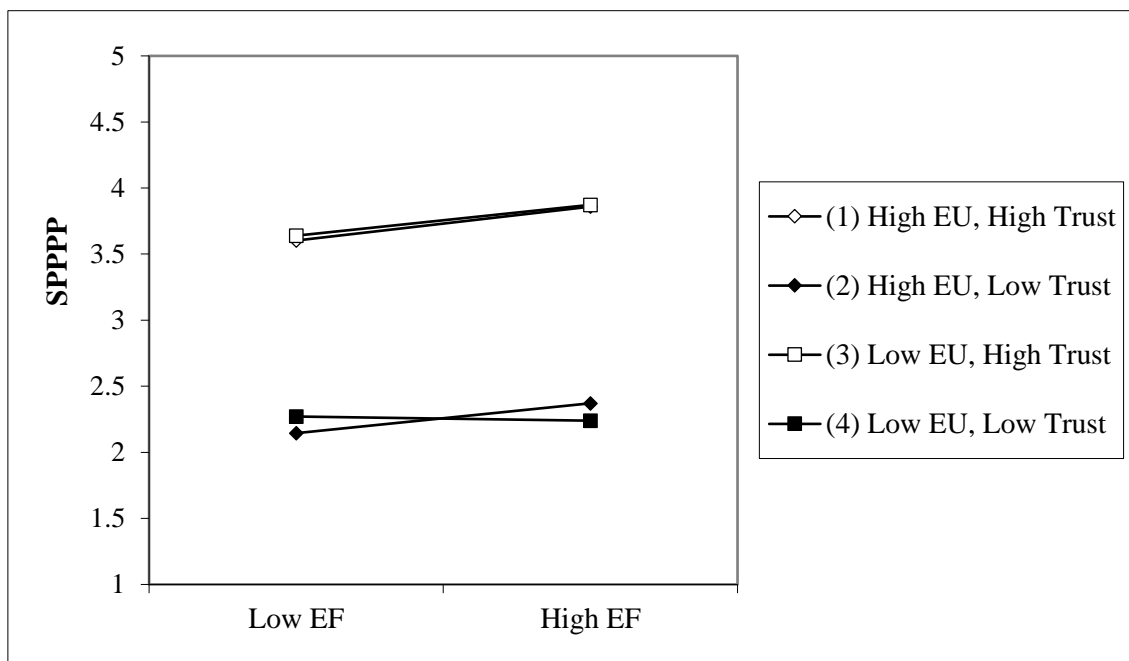
*SPPPP: Sustainable Public-Private Partnership Performance; EF: Economic Factor; EU: Environmental Uncertainty;*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings revealed that TF, EU, and Trust

combined variance upon SPPPP is  $R^2=0.8350$  i.e. 83.50%, the goodness of fit  $F=279.0645$ , at  $p<0.001$  while EF effect on SPPPP ( $0.0855^{**}, p<0.05$ ), in the same way, EU influence on SPPPP ( $-0.0056, p>0.05$ ) i.e. not significant, the interaction term of EF and EU ( $0.0351, P>0.05$ ) is not significant. When moderated moderator Trust is added to the regression equation it has an effect ( $0.7435^{***}, p<0.001$ ) the interaction term of EF and Trust is ( $0.0369, p>0.05$ ) i.e. not significant, interaction term 3 EU and Trust is ( $-0.0070, p>0.05$ ) is also found not significant and the interaction term of EF, EU, and Trust on SPPPP ( $-0.0293, p<0.05$ ) is significant.  $\Delta R^2=0.0022$  is also significant. It means there is a three-way interaction of EF, EU, and Trust on SPPPP.  $R^2$  change value with p-value significant support the hypothesis that Trust has moderated moderation impact on the outcome of the moderated impact of EU on the relationship between EF and SPPPP.

Figure 4.22

Moderated Moderation impact of Trust on Moderated Impact of EU on Relationship between EF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; EF: Economic Factor; EU: Environmental Uncertainty;*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.22 above it is evident that high-level EU and low-level EU have interaction with low-level Trust and high-level Trust respectively and have three-way interactions with EF and SPPPP. Similarly, high and low-level EU (environmental uncertainty) interacts with the high level of Trust along with EF and has a three-way interaction with an impact on SPPPP. This is evidence that a high level of Trust will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between EF and SPPPP and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.2.5 Moderated Moderation of Trust on the moderated impact of EU on the relationship between LF and SPPPP**

This part was performed to test Hypothesis H4 (e) i.e. Trust would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Legal Factor (LF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.33

Moderated Moderation of Trust on moderated outcome of EU on the relationship between LF and SPPPP

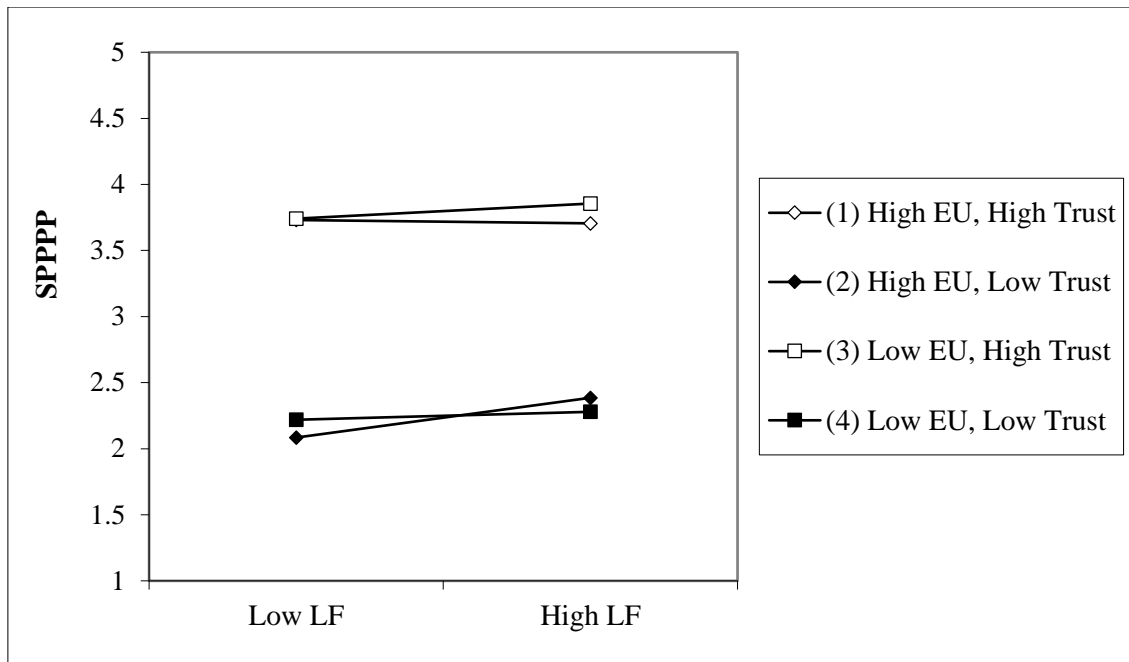
<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.9126	0.8328	274.6164	5.8198	0.0244	238.6192	0.0000	5.7718	5.8677
	<b>LF</b>				0.0563	0.0309	1.8208	0.0694	-0.0045	0.1171
	<b>EU</b>				-0.0236	0.0194	-1.2131	0.2258	-0.0618	0.0146
	<b>Int(LF*EU)</b>				0.0127	0.0249	0.5098	0.6105	-0.0363	0.0617
	<b>Trust</b>				0.7581	0.0194	39.1548	0.0000	0.7200	0.7961
	<b>Int(LF*Trust)</b>				-0.0340	0.0242	-1.4068	0.1603	-0.0815	0.0135
	<b>Int(EU*Trust)</b>				-0.0165	0.0143	-1.1540	0.2492	-0.0447	0.0116
	<b>Int (LF*EU*Trust)</b>				-0.0475	0.0147	-3.2243	0.0014	-0.0764	-0.0185
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0045	10.3958	1.0000	386.0000	0.0014					

*SPPPP: Sustainable Public-Private Partnership Performance; LF: Legal Factor; EU: Environmental Uncertainty;*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings revealed that LF, EU, and Trust combined variance upon SPPPP is  $R^2=0.8328$  i.e. 83.28%, the goodness of fit  $F=274.6164$ , at  $p<0.001$  while LF effect on SPPPP ( $0.0563^{***}, p<0.001$ ), in the same way, EU influence on SPPPP ( $-0.0236, p>0.05$ ) i.e. not significant, the interaction term of LF and EU ( $0.0127, P>0.05$ ) is also not significant. When moderated moderator Trust is added to the regression equation it has an effect ( $0.7581^{***}, p<0.001$ ) the interaction term of LF and Trust is ( $-0.0340, p>0.05$ ) i.e. not significant, interaction term 3 EU and Trust is ( $-0.0165, p>0.05$ ) is also found not significant and the interaction term of LF, EU, and Trust on SPPPP ( $-0.0475^{**}, p<0.05$ ) is significant.  $\Delta R^2=0.0045$  is also significant. It means there is a three-way interaction of LF, EU, and Trust on SPPPP.  $R^2$  change value with p-value significant support the hypothesis that Trust has moderated moderation impact on the outcome of the moderated impact of EU on the relationship between EF and SPPPP.

Figure 4.23

Moderated Moderation impact of Trust on Moderated Impact of EU on Relationship between LF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; LF: Legal Factor; EU: Environmental Uncertainty;*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.23 above it is evident that high-level EU and low-level EU have interaction with low-level Trust and high-level Trust respectively and have three-way interactions with LF and SPPPP. Similarly, high and low-level EU (environmental uncertainty) interacts with the high level of Trust along with LF have a three-way interaction with an impact on SPPPP. This is evidence that a high level of Trust will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between LF and SPPPP, and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.2.6 Moderated Moderation of Trust on the moderated impact of EU on the relationship between MM and SPPPP**

This part was performed to test Hypothesis H4 (f) i.e. Trust would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Market Maturity (MM) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.34

Moderated Moderation of Trust on the moderated outcome of EU on the relationship between MM and SPPPP

<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>t</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.9362	0.8764	391.0918	5.7907	0.0255	226.7015	0.0000	5.7405	5.8409
	<b>MM</b>				0.3564	0.0291	12.2613	0.0000	0.2992	0.4135
	<b>EU</b>				0.0393	0.0194	2.0236	0.0437	0.0011	0.0775
	<b>Int(MM*EU)</b>				-0.0707	0.0243	-2.9058	0.0039	-0.1185	-0.0229
	<b>Trust</b>				0.5883	0.0223	26.3863	0.0000	0.5445	0.6321
	<b>Int(MM*Trust)</b>				0.0174	0.0171	1.0208	0.3080	-0.0161	0.0510
	<b>Int(EU*Trust)</b>				-0.0045	0.0149	-0.3016	0.7631	-0.0338	0.0248
	<b>Int(MM*EU*Trust)</b>				-0.0501	0.0108	-4.6507	0.0000	-0.0713	-0.0289
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0069	21.6290	1.0000	386.0000	0.0000					

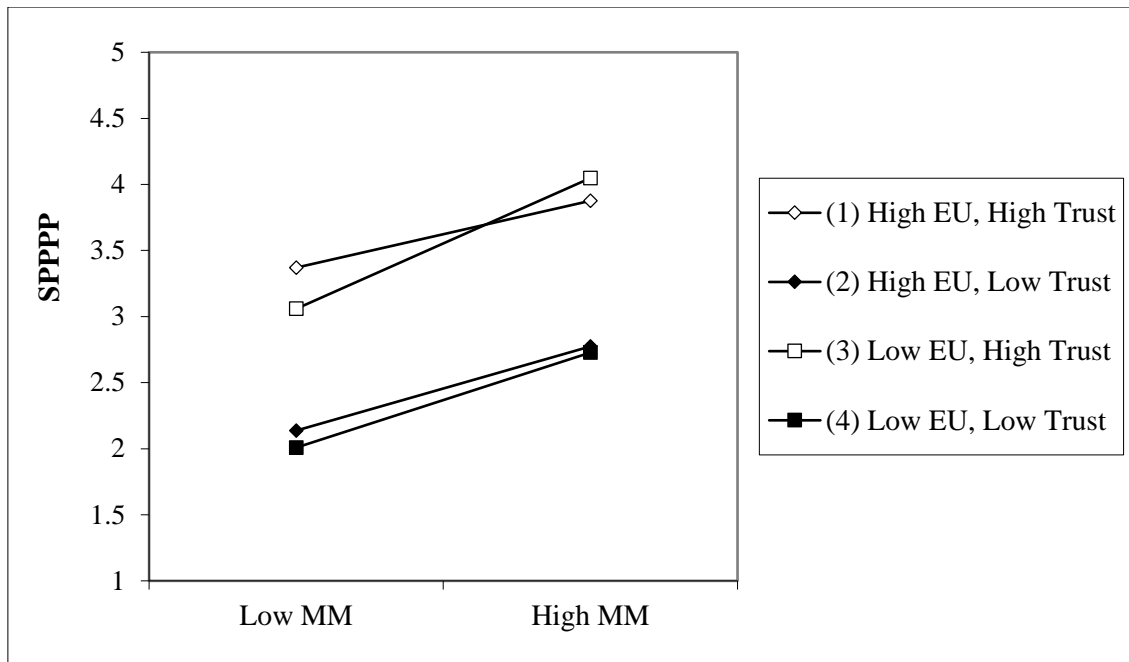
*SPPPP: Sustainable Public-Private Partnership Performance; MM: Market Maturity; EU: Environmental Uncertainty;*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings revealed that MM, EU, and Trust combined variance upon SPPPP is  $R^2=0.8764$  i.e. 87.64%, the goodness of fit  $F=391.0918$ , at  $p<0.001$  while MM effect on SPPP ( $0.03564^{***}, p<0.001$ ), in the same way, EU influence on SPPPP ( $0.0393^{**}, p<0.05$ ) i.e. significant, interaction term of MM and EU ( $0.0707^{**}, P<0.05$ ) is also significant. When moderated moderator Trust is added to the regression equation it has an effect ( $0.5883^{***}, p<0.001$ ) the interaction term of MM and Trust is ( $0.0174, p>0.05$ ) i.e. not significant, interaction term 3 EU and Trust is ( $-0.0045, p>0.05$ ) is also found not significant and the interaction term of MM, EU, and Trust on SPPPP ( $-0.0501^{***}, p<0.001$ ) is significant.  $\Delta R^2=0.0069$  is also significant. It means there is a three-way interaction of MM, EU, and Trust on SPPPP.  $R^2$  change value with p-value significant support the hypothesis that Trust has moderated moderation impact on the outcome of the moderated impact of EU on the relationship between MM and SPPPP.

Figure 4.24

Moderated Moderation impact of Trust on Moderated Impact of EU on Relationship between MM & SPPPP





*SPPPP: Sustainable Public-Private Partnership Performance; MM: Market Maturity; EU: Environmental Uncertainty;*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.24 above it is evident that high-level EU and low-level EU have interaction with low-level Trust and high-level Trust respectively and have three-way interactions with MM and SPPPP. Similarly, high and low-level EU (environmental uncertainty) interacts with the high level of Trust along with MM have a three-way interaction with an impact on SPPPP. This is evidence that a high level of Trust will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between MM and SPPPP, and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.2.7 Moderated Moderation of Trust on the moderated impact of EU on the relationship between PrF and SPPPP**

This part was performed to test Hypothesis H4 (g) i.e. Trust would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Procurement Factor (PrF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.35

Moderated Moderation of Trust on the moderated outcome of EU on the relationship between PrF and SPPPP

D.V	I.V	R	R <sup>2</sup>	F	$\beta$	se	t	p	LLCI	ULCI	
SPPPP	<b>Constant</b>	0.9127	0.8330	275.0359	5.8015	0.0258	224.6535	0.0000	5.7508	5.8523	
	<b>PrF</b>				0.1134	0.0336	3.3725	0.0008	0.0473	0.1795	
	<b>EU</b>				-0.0080	0.0211	-0.3771	0.7063	-0.0495	0.0335	
	<b>Int(PrF*EU)</b>				-0.0149	0.0272	-0.5481	0.5840	-0.0684	0.0386	
	<b>Trust</b>				0.7380	0.0201	36.7414	0.0000	0.6985	0.7775	
	<b>Int(PrF*Trust)</b>				0.0205	0.0245	0.8380	0.4026	-0.0276	0.0687	
	<b>Int(EU*Trust)</b>				-0.0063	0.0145	-0.4309	0.6668	-0.0348	0.0223	
	<b>Int(PrF*EU*Trust)</b>				-0.0301	0.0159	-1.8895	0.0596	-0.0614	0.0012	
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>						
	<b>X*W*Z</b>	0.0015	3.5703	1.0000	386.0000	0.0596					

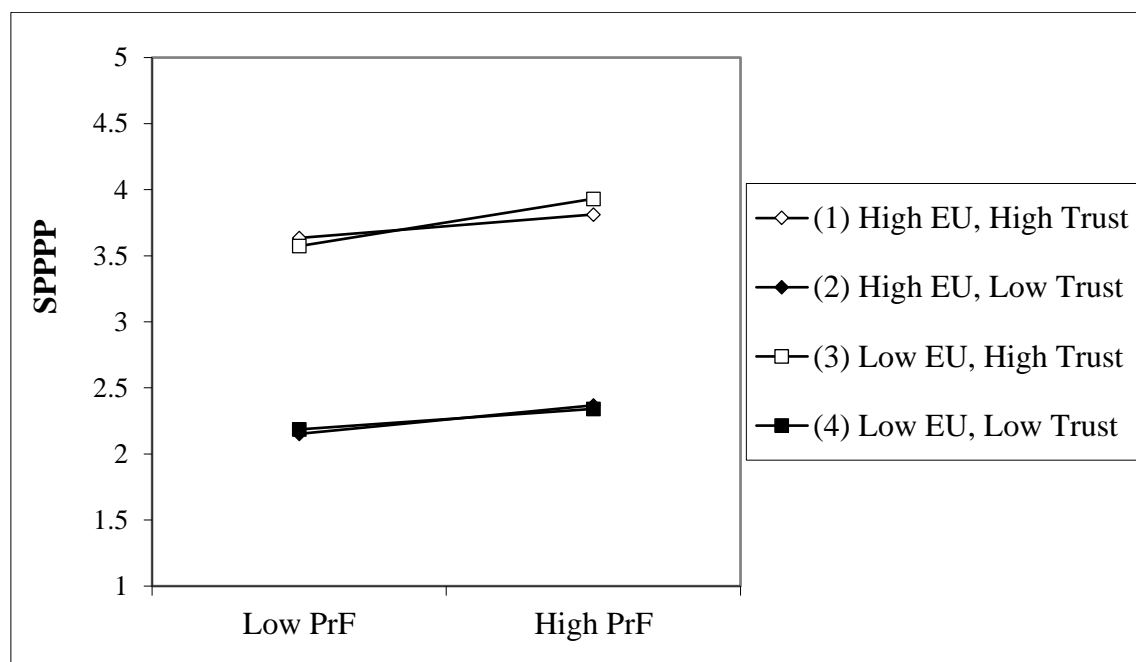
*SPPPP: Sustainable Public-Private Partnership Performance; PrF: Procurement Factor; EU: Environmental Uncertainty;*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings revealed that PrF, EU, and Trust combined variance upon SPPP is  $R^2=0.8330$  i.e. 83.30%, the goodness of fit  $F=275.0359$ , at  $p<0.001$  while PrF effect on SPPP ( $0.1134^{**}, p<0.05$ ), in the same way, EU influence on SPPPP ( $0.0080, p>0.05$ ) i.e. not significant, the interaction term of PrF and EU

(0.0149,  $P > 0.05$ ) is also not significant. When moderated moderator Trust is added to the regression equation it has an effect (0.738\*\*\*,  $p < 0.001$ ) the interaction term of PrF and Trust is (0.0205,  $p > 0.05$ ) i.e. not significant, interaction term 3 EU and Trust is (-0.0063,  $p > 0.05$ ) is also found not significant and the interaction term of PrF, EU, and Trust on SPPPP (-0.0301,  $p > 0.05$ ) is not significant.  $\Delta R^2 = 0.0015$  is also not significant. According to Bedeian & Mossholder (1994), Cohen (1993), and Kenny (1993)  $\Delta R^2$  is even non-significant in the evidence for moderation impact (Bedeian & Mossholder, 1994), thus the  $\Delta R^2$  validates that there is a three-way interaction of PrF, EU, and Trust, on SPPPP. Thus the result supports the hypothesis that Trust will have moderated moderation impact on the moderated outcome of the EU on the relationship between PrF and SPPPP.

Figure 4.25

Moderated Moderation impact of Trust on Moderated Impact of EU on Relationship between PrF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; PrF: Procurement Factor; EU: Environmental Uncertainty;*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.25 above it is evident that high-level EU and low-level EU have interaction with low-level Trust and high-level Trust respectively and have

three-way interactions with PrF and SPPPP. Similarly, high and low-level EU (environmental uncertainty) interacts with the high level of Trust along with PrF have a three-way interaction with an impact on SPPPP. This is evidence that a high level of Trust will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between PrF and SPPPP, and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.2.8 Moderated Moderation of Trust on the moderated impact of EU on the relationship between RF and SPPPP**

This part was performed to test Hypothesis H4 (h) i.e. Trust would have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Regulation Factor (RF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.36

Moderated Moderation of Trust on the moderated outcome of EU on the relationship between RF and SPPPP

D.V	I.V	R	R <sup>2</sup>	F	$\beta$	se	t	p	LLCI	ULCI
SPPPP	<b>Constant</b>	0.9187	0.8441	298.5055	5.8071	0.0256	227.2559	0.0000	5.7568	5.8573
	<b>RF</b>				0.1874	0.0303	6.1903	0.0000	0.1279	0.2470
	<b>EU</b>				-0.0071	0.0208	-0.3411	0.7332	-0.0480	0.0338
	<b>Int(RF*EU)</b>				-0.0167	0.0244	-0.6863	0.4929	-0.0647	0.0312
	<b>Trust</b>				0.7163	0.0198	36.2050	0.0000	0.6774	0.7552
	<b>Int(RF*Trust)</b>				0.0087	0.0215	0.4037	0.6866	-0.0335	0.0509
	<b>Int(EU*Trust)</b>				0.0039	0.0137	0.2849	0.7759	-0.0230	0.0307
	<b>Int(RF*EU*Trust)</b>				-0.0057	0.0152	-0.3732	0.7092	-0.0357	-0.0357
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0001	0.1393	1.0000	386.0000	0.7092					

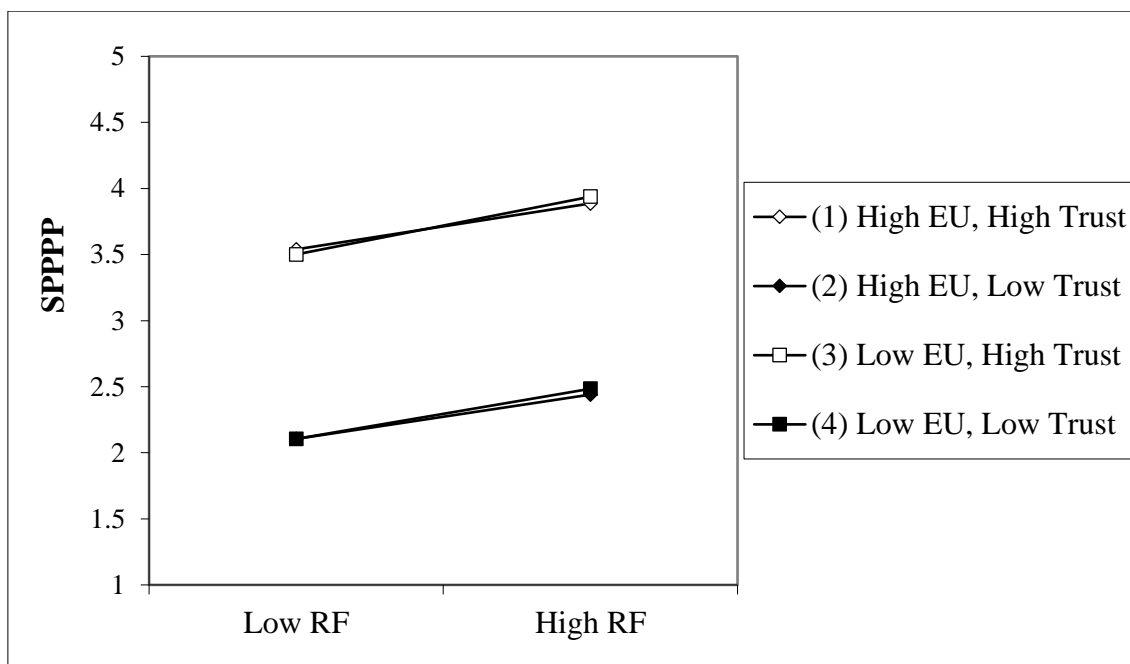
*SPPPP: Sustainable Public-Private Partnership Performance; RF: Regulation Factor; EU: Environmental Uncertainty;*

Three-way interaction or moderated moderation was run in the process file using model number 3, findings revealed that LF, EU, and Trust combined variance upon SPPPP is  $R^2=0.8441$  i.e. 84.41%, the goodness of fit  $F=298.5055$ , at  $p<0.001$  while LF effect on SPPPP ( $0.1874^{***}$ ,  $p<0.001$ ), in the same way, EU influence on SPPPP ( $-0.0071$ ,  $p>0.05$ ) i.e. not significant, the interaction term of LF and EU ( $-0.0167$ ,  $P>0.05$ ) is also not significant.

When moderated moderator Trust is added to the regression equation it has an effect (0.7163\*\*\*,  $p < 0.001$ ) the interaction term of LF and Trust is (0.0087,  $p > 0.05$ ) i.e. not significant, interaction term 3 EU and Trust is (0.0039,  $p > 0.05$ ) is also found not significant and the interaction term of LF, EU, and Trust on SPPPP (-0.0057,  $p > 0.05$ ) is not significant.  $\Delta R^2 = 0.0001$  is also not significant. According to Bedeian & Mossholder (1994), Cohen (1993), and Kenny (1993)  $\Delta R^2$  even non-significant is the evidence for moderation impact (Bedeian & Mossholder, 1994), thus the  $\Delta R^2$  validates that there is a three-way interaction of LF, EU, and Trust, on SPPPP. Thus the result supports the hypothesis that Trust will have moderated moderation impact on the moderated outcome of EU on the relationship between LF and SPPPP.

Figure 4.26

Moderated Moderation impact of Trust on Moderated Impact of EU on Relationship between RF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; RF: Regulation Factor; EU: Environmental Uncertainty;*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.26 above it is evident that high-level EU and low-level EU have interaction with low-level Trust and high-level Trust respectively and have

three-way interactions with RF and SPPPP. Similarly, high and low-level EU (environmental uncertainty) interacts with the high level of Trust along with RF have a three-way interaction with an impact on SPPPP. This is evidence that a high level of Trust will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between RF and SPPPP and thus three-way interaction appears i.e. moderated moderation.

#### **4.7.2.9 Moderated Moderation of Trust on the moderated impact of EU on the relationship between CSFs and SPPPP**

This part was performed to test Hypothesis H4 (i) i.e. Trust will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Critical Success Factors (CSF) and sustainable PPP performance (SPPPP). Process macro file of Hayes with Model 3 was used to test moderated moderation hypotheses.

Table 4.37

Moderated Moderation of Trust on moderated outcome of EU on the relationship between CSF and SPPPP

<b>D.V</b>	<b>I.V</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>F</b>	<b>β</b>	<b>se</b>	<b>T</b>	<b>p</b>	<b>LLCI</b>	<b>ULCI</b>
SPPPP	<b>Constant</b>	0.9270	0.8593	336.6979	5.7953	0.0269	215.2655	0.0000	5.7424	5.8482
	<b>CSF</b>				0.4678	0.0508	9.2036	0.0000	0.3678	0.5677
	<b>EU</b>				0.0332	0.0208	1.5939	0.1118	-0.0077	0.0741
	<b>Int(CSF*EU)</b>				-0.0606	0.0431	-1.4065	0.1604	-0.1452	0.0241
	<b>Trust</b>				0.6353	0.0233	27.2656	0.0000	0.5895	0.6811
	<b>Int(CSF*Trust)</b>				0.0157	0.0318	0.4928	0.6224	-0.0468	0.0781
	<b>Int(EU*Trust)</b>				-0.0085	0.0164	-0.5176	0.6050	-0.0407	0.0237
	<b>Int(CSF*EU*Trust)</b>				-0.0716	0.0198	-3.6121	0.0003	-0.1106	-0.0326
	<b>R2-chng</b>	<b>F</b>	<b>df1</b>	<b>df2</b>	<b>p</b>					
<b>X*W*Z</b>	0.0048	13.0471	1.0000	386.0000	0.0003					

*SPPPP: Sustainable Public-Private Partnership Performance; CSF: Critical Success Factor; EU: Environmental Uncertainty;*

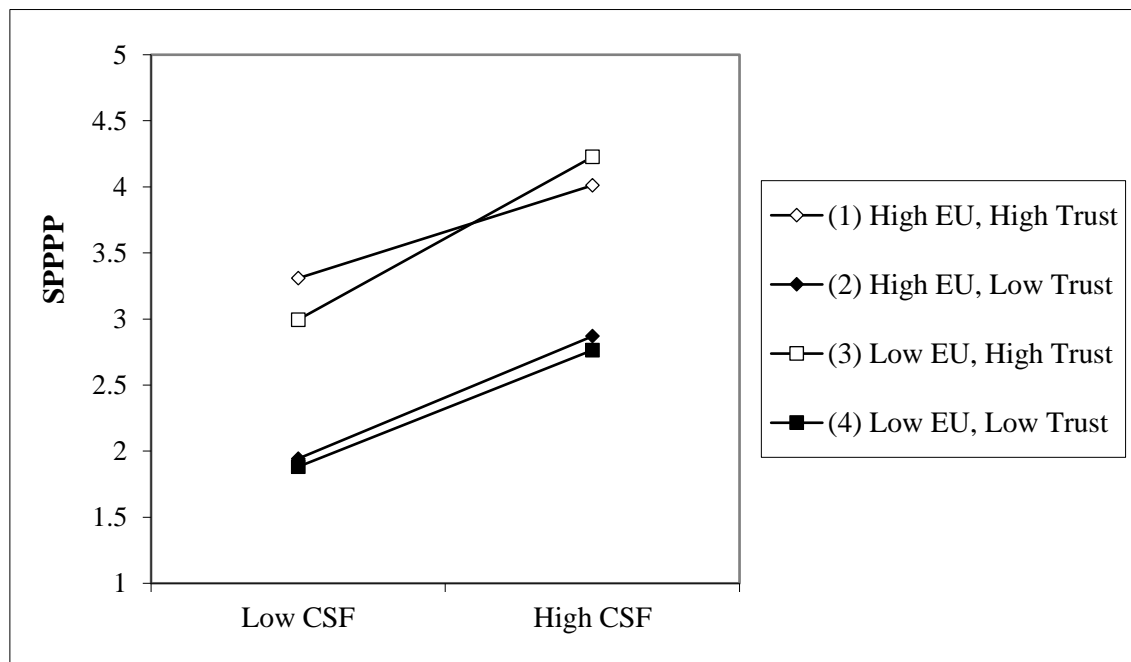
Three-way interaction or moderated moderation was run in the process file using model number 3, findings revealed that CSF, EU, and Trust combined variance upon SPPPP is  $R^2=0.8593$  i.e. 85.93%, the goodness of fit  $F=336.6979$ , at  $p<0.001$  while CSF effect on SPPPP (0.4678,  $p<0.001$ ), i.e. significant. the interaction term of CSF and EU (-0.0606,  $P>0.05$ ) is not significant.



When moderated moderator Trust is added to the regression equation it has an effect (0.6353\*\*\*,  $p < 0.001$ ) the interaction term of CSF and Trust is (0.0157,  $p > 0.05$ ) i.e. not significant, interaction term 3, EU and Trust is (-0.0085,  $p > 0.05$ ) is also found not significant and the interaction term of CSF, EU, and Trust on SPPPP (-0.0716,  $p < 0.05$ ) is significant.  $\Delta R^2 = 0.0048$  is also significant. It means there is a three-way interaction of CSF, EU, and Trust on SPPPP.  $R^2$  change value with p-value significant support the hypothesis that Trust has moderated moderation impact on the outcome of the moderated impact of EU on the relationship between CSF and SPPPP.

Figure 4.27

Moderated Moderation impact of Trust on Moderated Impact of EU on Relationship between CSF & SPPPP



*SPPPP: Sustainable Public-Private Partnership Performance; CSF: Critical Success Factor; EU: Environmental Uncertainty;*

A three-way interaction graph was created using an excel file given by Jeremy Dawson (2013). From Figure 4.27 above it is evident that high-level EU and low-level EU have interaction with low-level Trust and high-level Trust respectively and have three-way interactions with CSF and SPPPP. Similarly, high and low-level EU (environmental uncertainty) interacts with the high level of Trust along with CSF have

a three-way interaction with an impact on SPPPP. This is evidence that a high level of Trust will moderate the high, as well as low level of Environmental Uncertainty impact on the relationship between CSF and SPPPP, and thus three-way interaction appears i.e. moderated moderation.

#### 4.8 Result Summary

It was felt appropriate to provide the important considerations about the study outcome for better assimilation. As this study revolves around the moderation concept so once again the basic assumptions of moderation are reiterated. The main theme of the moderation analysis is to, “test and measure the differential effect of the IV on the DV as the function of the moderator” (Baron & Kenny, 1986). The steps involved in moderation analysis depend on the software used for the purpose. In this study as we used SPSS version 25 so we interpreted moderation according to the set criteria for SPSS. First, The most important criterion is to focus on the significance of moderating effect. Thus the decision about the moderating impact must be based on the significant relationship between moderating effect on the dependent variable (Memon et. al, 2019). Second, the researcher must see how much contribution to  $R^2$  change has been made by the moderator. Third, the moderation graph can provide a visual to comprehend the interaction of IV, DV, and moderating variables.

Considering the above-mentioned assumption, we have interpreted the study results and all four hypotheses (including three moderation hypotheses) appeared accepted and supported the study models. However, the results of a few sub-hypotheses in moderated moderation analysis in JRM and Trust appeared non-significant and seems failed to fulfill the moderation criteria as per the first assumption mentioned above. However, the stalwart of moderation analysis like Bedeian&Mossholder (1994), Cohen (1993), and Kenny (1993) have advocated that  $\Delta R^2$  even non-significant is the evidence for moderation impact (Bedeian&Mossholder, 1994) and Cohen(1993) expressed as ‘once we talk about interaction then  $\Delta R^2$  even non-significant is enough to conclude about moderation impact’. Taking this plea into consideration supplemented by graphs interpretation we also confirmed sub-hypotheses with non-significant results. Although the results of the main hypothesis are confirmed by all the

criteria so we have used this plea to align the direction of the study, therefore we have accepted them based on the premises mentioned above.

The correlation analysis between CSFs (i.e. Political factor, technical factor, legal factor, finance factor, economic factor, procurement factor, regulation factor, and market maturity) appeared significantly positive. The moderation impact of Environmental Uncertainty on the correlation results of CSFs cumulatively and individually between political factor, technical factor, legal factor, finance factor, economic factor, procurement factor, regulation factor, and market maturity were significant describing that the Environmental Uncertainty moderated the relationship between independent variables and dependent variable. Lastly, the moderated-moderation results of Trust and JRM on the moderated outcome of Environmental Uncertainty on the relationship between CSFs as a whole and individuals proved that moderated moderation happened. The summary of results is mentioned in the following tables:

Table 4.38

Correlation Between Sustainable PPP Performance and Critical Success Factors

<b>IV</b>	<b>DV</b>	<b>Pearson Correlation</b>	<b>Sig (2-tailed)</b>
CSF	SPPPP	0.697	0.000
PF	SPPPP	0.451	0.000
FF	SPPPP	0.618	0.000
TF	SPPPP	0.520	0.000
EF	SPPPP	0.343	0.000
LF	SPPPP	0.298	0.000
MM	SPPPP	0.757	0.000
PrF	SPPPP	0.350	0.000
RF	SPPPP	0.399	0.000

*SPPPP: Sustainable Public Private Partnership Project; PF: Political Factor; FF: Finance Factor; TF: technical Factor; EF: Economic Factor; LF: Legal Factor; MM:*

*Market Maturity; PrF: Procurement Factor; RF: Regulation Factor; CSF: Critical Success Factor*

Table 4.38

Moderation of Environmental Uncertainty on Relationship Between CSFs and Sustainable PPP Performance

<b>IV</b>	<b>DV</b>	<b>R<sup>2</sup></b>	<b>R<sup>2</sup> Chng</b>	<b>Inter IV*EU (<math>\beta</math>)</b>	<b>p-value</b>
CSF	SPPPP	0.5315	0.0171	-0.1969	0.0002
PF	SPPPP	0.2523	0.0143	-0.1449	0.0065
FF	SPPPP	0.4147	0.0076	-0.0971	0.0250
TF	SPPPP	0.3095	0.0265	-0.2004	0.0001
EF	SPPPP	0.2068	0.0379	-0.1909	0.0000
LF	SPPPP	0.1209	0.0103	-0.1056	0.0332
MM	SPPPP	0.6005	0.0109	-0.0907	0.0012
PrF	SPPPP	0.1858	0.0205	-0.1481	0.0019
RF	SPPPP	0.2324	0.0196	-0.1404	0.0017

*SPPPP: Sustainable Public Private Partnership Project; PF: Political Factor; FF: Finance Factor; TF: technical Factor; EF: Economic Factor; LF: Legal Factor; MM: Market Maturity; PrF: Procurement Factor; RF: Regulation Factor; CSF: Critical Success Factor*

Table 4.39

Moderated-Moderation of Joint Risk Management on Moderated outcome of Environmental Uncertainty on Relationship Between CSFs and Sustainable PPP Performance

IV	DV	R <sup>2</sup>	R <sup>2</sup> Chng	Inter IV*EU*JRM( $\beta$ )	p-value
CSF	SPPPP	0.6697	0.0055	-0.0828	0.0117
PF	SPPPP	0.5827	0.0002	-0.0127	0.6738
FF	SPPPP	0.6470	0.0156	-0.1046	0.0000
TF	SPPPP	0.5856	0.0019	-0.0434	0.1864
EF	SPPPP	0.5283	0.0001	-0.0071	0.7812
LF	SPPPP	0.5239	0.0012	-0.0264	0.3284
MM	SPPPP	0.7110	0.0093	-0.0590	0.0005
PrF	SPPPP	0.5474	0.0023	-0.0365	0.1612
RF	SPPPP	0.6068	0.0005	-0.0182	0.04728

*SPPPP: Sustainable Public Private Partnership Project; PF: Political Factor; FF: Finance Factor; TF: technical Factor; EF: Economic Factor; LF: Legal Factor; MM: Market Maturity; PrF: Procurement Factor; RF: Regulation Factor; CSF: Critical Success Factor*

Table 4.40

Moderated-Moderation of Trust on Moderated outcome of Environmental Uncertainty on Relationship Between CSFs and Sustainable PPP Performance

<b>IV</b>	<b>DV</b>	<b>R<sup>2</sup></b>	<b>R<sup>2</sup> Chng</b>	<b>Inter IV*EU*Trust (<math>\beta</math>)</b>	<b>p-value</b>
CSF	SPPPP	0.8593	0.0048	-0.0716	0.0003
PF	SPPPP	0.8334	0.0012	-0.0273	0.0921
FF	SPPPP	0.8572	0.0044	-0.0537	0.0006
TF	SPPPP	0.8412	0.0051	-0.0685	0.0005
EF	SPPPP	0.8350	0.0022	-0.0293	0.0228
LF	SPPPP	0.8328	0.0045	-0.0475	0.0014
MM	SPPPP	0.8764	0.0069	-0.0501	0.0000
PrF	SPPPP	0.8330	0.0015	-0.0301	0.0596
RF	SPPPP	0.8441	0.0001	-0.0057	0.7092

*SPPPP: Sustainable Public Private Partnership Project; PF: Political Factor; FF: Finance Factor; TF: technical Factor; EF: Economic Factor; LF: Legal Factor; MM: Market Maturity; PrF: Procurement Factor; RF: Regulation Factor; CSF: Critical Success Factor*

Table 4.41

## Summary of Result

<b>Hypothesis</b>	<b>Statement</b>	<b>Results</b>
<b>H1</b>	<b>There is a significant relationship between critical success factors and sustainable PPP performance.</b>	Accepted
H1(a)	There is a significant relationship between the political factor and sustainable PPP performance.	Accepted
H1(b)	There is a significant relationship between the technical factor and sustainable PPP performance.	Accepted
H1(c)	There is a significant relationship between the legal factor and sustainable PPP performance.	Accepted
H1(d)	There is a significant relationship between finance factor and sustainable PPP performance.	Accepted
H1(e)	There is a significant relationship between the economic factor and sustainable PPP performance.	Accepted
H1(f)	There is a significant relationship between procurement factor and sustainable PPP performance.	Accepted
H1(g)	There is a significant relationship between the regulation factor and sustainable PPP performance.	Accepted

H1(h)	There is a significant relationship between market maturity and sustainable PPP performance.	Accepted
<b>H2</b>	<b>There is a significant moderating impact of environmental uncertainty on the relationship between CSFs and sustainable PPP performance.</b>	Accepted
H2(a)	There is a significant moderating impact of environmental uncertainty on the relationship between the political factor and sustainable PPP performance	Accepted
H2(b)	There is a significant moderating impact of environmental uncertainty on the relationship between the technical factor and sustainable PPP performance.	Accepted
H2(c)	There is a significant moderating impact of environmental uncertainty on the relationship between the legal factor and sustainable PPP performance.	Accepted
H2(d)	There is a significant moderating impact of environmental uncertainty on the relationship between finance factor and sustainable PPP performance.	Accepted
H2(e)	There is a significant moderating impact of environmental uncertainty on the relationship between the economic factor and sustainable PPP performance.	Accepted
H2(f)	There is a significant moderating impact of environmental uncertainty on the relationship between procurement factor and sustainable PPP performance.	Accepted



H2(g)	There is a significant moderating impact of environmental uncertainty on the relationship between the regulation factor and sustainable PPP performance.	Accepted
H2(h)	There is a significant moderating impact of environmental uncertainty on the relationship between market maturity and sustainable PPP performance.	Accepted
<b>H3</b>	<b>Joint Risk Management (JRM) will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by environmental uncertainty on the relationship between CSFs for PPP and sustainable PPP performance.</b>	Accepted
H3(a)	Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of environmental uncertainty (EU) on the relationship between Political Factor (PF) and sustainable PPP performance (SPPPP).	Accepted
H3(b)	Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of environmental uncertainty (EU) on the relationship between Technical Factor (TF) and sustainable PPP performance (SPPPP).	Accepted
H3(c)	Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of environmental uncertainty (EU) on the	Accepted

relationship between Legal Factor (LF) and sustainable PPP performance (SPPPP).

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| H3(d) | Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of environmental uncertainty (EU) on the relationship between Finance Factor (FF) and sustainable PPP performance (SPPPP).      | Accepted |
| H3(e) | Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of environmental uncertainty (EU) on the relationship between Economic Factor (EF) and sustainable PPP performance (SPPPP).     | Accepted |
| H3(f) | Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of environmental uncertainty (EU) on the relationship between Procurement Factor (PrF) and sustainable PPP performance (SPPPP). | Accepted |
| H3(g) | Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of environmental uncertainty (EU) on the relationship between Regulation Factor (RF) and sustainable PPP performance (SPPPP).   | Accepted |
| H3(h) | Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of environmental uncertainty (EU) on the relationship between Market Maturity (MM)  | Accepted |

and sustainable PPP performance (SPPPP).

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| <b>H4</b> | <b>Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by environmental uncertainty on the relationship between CSFs for PPP and sustainable PPP performance.</b>  | Accepted |
| H4(a)     | Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by environmental uncertainty on the relationship between Political factor and sustainable PPP performance.     | Accepted |
| H4(b)     | Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by environmental uncertainty on the relationship between the technical factor and sustainable PPP performance. | Accepted |
| H4(c)     | Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by environmental uncertainty on the relationship between the legal factor and sustainable PPP performance.     | Accepted |
| H4(d)     | Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by environmental uncertainty on the relationship between finance factor and sustainable PPP                    | Accepted |

performance.

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| H4(e) | Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by environmental uncertainty on the relationship between the economic factor and sustainable PPP performance.   | Accepted |
| H4(f) | Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by environmental uncertainty on the relationship between procurement factor and sustainable PPP performance.    | Accepted |
| H4(g) | Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by environmental uncertainty on the relationship between the regulation factor and sustainable PPP performance. | Accepted |
| H4(h) | Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by environmental uncertainty on the relationship between market maturity and sustainable PPP performance.       | Accepted |
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#### **4.9 Summary and Discussion of Results**

Sustainability is one of the important aspects which is being discussed at the organizational, national, and international levels. Studies analyzing PPP reveal that PPP can be attributed to sustainable development concerning the UN's 17 sustainability goals (Pinz, Roudyani, & Thaler, 2018). The present study focused on sustainable public-private partnership performance by tackling environmental uncertainty by Joint Risk Management and Trust.

**H1: There is a significant relationship between critical success factors and sustainable PPP performance.**

The findings of the study have shown that critical success factors (CSFs) are significantly and positively related to sustainable public-private partnership performance (SPPPP). The total variance explained by the CSF is 70.7 % which shows a good contribution towards the achievement of SPPPP. The results are in line with the study results of Helmy et al. (2020), Sehgal & Dubey (2019), Wang et al., (2018), and Luthra, Garg, & Haleem (2016). Many other researchers have also discussed the contribution of CSFs to the achievement of project success by ranking these factors e.g. Osei-Kyei, Chan & Dansoh (2020), Opawole et al., (2019), Debela (2019), Muhammad & Johar, (2019) and Kavishe & Chileshe (2019).

This study along with other have very successfully investigated the impact of CSFs on PPP projects but the uniqueness of this study is that it has linked the CSFs with the sustainable public-private partnership projects performance. As mentioned and explained in detail the literature has plenty of critical success factors for projects success. It is also very much possible that CSF for one country may not be considered as CSF for another country therefore researchers have tried to rank them so their contribution towards the success of projects may be accounted for. This study has identified a few CSFs considering them important and relevant attributable to the country dynamics as these factors are most cited and mostly used in developing countries.

**H1 (a): There is a significant relationship between the political factor and sustainable PPP performance.**

The finding in the analysis part has proved that political factor has a significant relationship with sustainable public-private partnership project performance. This result aligns with the findings of previous researchers who have also established the relationship between the political factor and project success like Helmy et al., (2020), Opawole et al., (2019), and Koops et al., (2017).

The political factor of any country encourages the partners in the public-private partnership projects by minimizing the resistance and providing clear direction to execute a project properly. The political situation of any country has a direct relationship with policy related to PPP projects therefore political factor needs to be considered prior to planning any PPP project. (Chan et al., 2004). It is also very important that without political support no consent project can be awarded to undertake any public project, therefore political factor is included in critical success factors of PPP project success (Osei-Kyei & Chan, 2015). Therefore, we can say that the political factor has a significant relationship with sustainable public-private partnership project performance is validated.

**H1 (b): There is a significant relationship between the technical factor and sustainable PPP performance.**

In this study, the finding has proved that there is a significant relationship between the technical factor and sustainable PPP project performance. The findings align with the findings of Alvarenga et al., (2019), Opawole et al., (2019), Zhang et al., (2013), and Belout & Gauvreau (2004) who have worked on the project's success and proved that technical factor is very much required for project success.

The technical factor is an important factor that addresses the technical aspect of the PPP project. The aspects considered under the technical factors play a very important role in project success like indigenous technology which is the native technology used for the people in any facet. Availability of labor is another aspect that plays a role in PPP project success because labor coupled with indigenous technology can lead to project success. Technical factor has also been seen through the lens of well-organized regulatory authority and the availability of supporting infrastructure for transparency. These all aspects undoubtedly lay the foundation for successful project performance. These factors comprehensively mark the technical factor in the critical

success factor as used in this study and the outcome as a significant correlation with sustainable PPP project performance describes that it is an important aspect that must be incorporated in planning and execution to obtain sustainable PPP projects.

**H1(c): There is a significant relationship between the legal factor and sustainable PPP performance.**

In this study, it is proved that there is a significant relationship between the legal factor and sustainable public-private partnership project performance. The results align with the results of Helmy et al., (2020), Opawole et al., (2019), and Akanni, Oke, & Akpomiemie, (2015) who have discussed the importance of legal factors and established their significant relationship with project performance.

Legal factor related to any project, business, or organization affects performance directly. It has become very difficult to tackle the emerging legal technicalities without the proper framework of legal aspects for any project especially the public-private partnership projects which have the involvement of the partners. The legal factors are the codes/ regulations which defines the project with accuracy (Akanni, Oke, & Akpomiemie, 2015). In this study, the legal factor is clustered with the extent of compliance to international conventions, the status of domestication and implementation of international laws/ codes, and predictability in legal regimes and enforcement.

Like many other developing countries, it is witnessed that the PPP laws often play with the political ways once they stuck up to the delivery of any such project that's the reason most legal factors are placed with the political stability of any country (Opawole et al., 2019). Eaten et al. (2007) have also highlighted that a mature legal regime is linked with political stability and thus will lead to a successful PPP project.

In Pakistan, Public-Private Partnership Authority was established in 2017 by the direction of the Federal Government and is empowered to make the rule for the purpose. PPP act has been approved from the constitutional assembly and lay the legal foundation for PPP in Pakistan. The government is working on this aspect as this is the ingredient of successful PPP projects in any country.

Therefore, in this study legal factor has been considered a critical success factor as its right application can lead us to sustainable public-private partnership project performance.

**H1 (d): There is a significant relationship between financing factors and sustainable PPP performance.**

The findings of this study state that there is a significant correlation between financing factors and sustainable public-private partnership project performance. The finding very much aligns with the work of previous researchers like Helmy et al., (2020), Opawole et al., (2019), Mohamad et al., (2018), and Sebestyen (2017). all have highlighted the finance factor as an indicator of PPP project success and an important factor contributing to project success.

In this study, the financing factor encompasses the availability of a risk-sharing framework, the availability and stability of the financial market, the availability, and stability of the consumer market, and access to foreign finance. These all aspects have jointly indicated the financing factor required to make a sustainable public-private partnership project.

**H1 (e): There is a significant relationship between the economic factor and sustainable PPP performance.**

This study has investigated the relationship between economic factors and sustainable public-private partnership project performance and found it significantly correlated. The findings are in line with the findings of Helmy et al., (2020), Opawole et al., (2019), and Mishra, Dangayach, & Mittal (2011) who also investigated and finalized that economic factors play a very important role in project success.

In this study economic factors encompass the stability of the exchange rate and the stability of the interest rate. Jagboro et al. (2014) have also established that the stability of exchange rate and interest rate plays an important role in the contractual arrangement of public-private partnership projects agreement thus impacting project success. Macroeconomic indicators are also very crucial for the project's success (Yurdakul, Kamaşak&Öztürk, 2021).



Keeping the findings in mind we must keep this aspect in mind that stability in the interest rate and the exchange rate is a very important factor for any country. Policymakers must keep this aspect in mind as a good economic factor will lead to more sustainable public-private partnership project performance.

**H1 (f): There is a significant relationship between procurement factor and sustainable PPP performance.**

The relationship between procurement factor and sustainable PPP project performance and found significantly correlated. The findings align with the investigation of Pu et al., (2020). Helmy et al., (2020) and Opawole et al., (2019) have investigated the relationship between procurement factors and project success as well as PPP project success.

In this study, the procurement factor encompasses the level of understanding of public-private alliance transactions, the competitiveness of the bidding process, performance guarantee, political will by the public sector, and availability of guarantee and stand-by financing. These all aspects mark the procurement factor for PPP projects. The procurement factor is a factor by which a project is adjudicated to the contractor and many concerning facets of this factor can arise from the clientside or the contractor side or both. we can also term these issues from the public sector or private sector. Policy regarding procurement procedure plays a significant role in project success as the analysis has found it. Therefore, the procurement factor has to be viewed as wholesome as it has a significant role in sustainable public-private partnership projects' performance.

**H1 (g): There is a significant relationship between the regulation factor and sustainable PPP performance.**

In this study, we have investigated and proved that there is a significant relationship between the regulation factor and sustainable public-private partnership project performance. The results align with the results of Helmy et al., (2020), Opawole et al. (2019), Luthra, Garg & Haleem (2016), Mangla, Govindan, & Luthra (2016) have discussed the importance of regulatory factor and established its significant relationship with project performance as well as sustainable performance.

In this study, the regulatory factor encompasses the existence of clear investment laws, delay in land acquisition, and the existence and adequacy of the legal framework for concession. Once we implement these factors then we can claim the execution of regulatory factors in PPP projects. In the absence of a regulatory factor or framework, opportunistic tendencies may arise which can affect the project performance. Although governments around the globe are focusing on this factor as its contribution to the success of any projects has been highlighted by the authors in the literature yet this aspect needs emphasis in PPP projects due to their longevity and partnership technicalities. It is quite evident from this study and the previous author's findings that regulatory factor is significantly related to sustainable PPP projects performance.

**H1 (h): There is a significant relationship between market maturity and sustainable PPP performance.**

In this study, we have investigated the relationship between market maturity and sustainable PPP project performance and found this relationship significant. The study aligns with the result of Opawole et al., (2019) and Opawole&Jagboro (2017) who have worked out the relationship between the impact of market maturity on the project success.

In this study market maturity, construct encompasses stability of the inflation rate, PPP human capacity index, and tariff control policy and framework. Different authors Kerf et al. (1998); Sachs et al. (2007); Cruz and Marques (2012) and Thatchenkery and Koizumi (2010) have discussed the importance and relevance of these items in the relationship of market maturity.

Presently in developing countries, the market maturity has hampered the success of PPP projects very much as this factor is not being addressed properly. Mostly the inflation rate stability and tariff control policy along with the PPP human capacity index have to be viewed with great concern to incorporate all these aspects in policy-making for the successful PPP project implementation.

**H2: There is a significant moderating impact of environmental uncertainty on the relationship between CSFs and sustainable PPP performance.**

In this study, the moderating impact of the EU has been explored and result appeared significant. This significant result has proved that the EU has moderated the relationship whereas the –ve beta value proves that the relationship direction has changed. Thus moderation of the EU gets confirmed. The result of this study the findings of Agbejule (2005) and Hussain et al (2021) who have established that the EU has moderating impact on project success/ performance.

In this study, initially, we have found a significant correlation between CSF and sustainable PPP performance and in this hypothesis, we have found the moderating role of Environmental Uncertainty which appeared significant. This finding shows in case of Environmental Uncertainty the sustainable PPP performance will get disturbed as the beta value appears with –ve signs which is an indication of a change of relationship direction.

**H2 (a): There is a significant moderating impact of Environmental Uncertainty on the relationship between the political factor and sustainable PPP performance.**

In this study, the moderating impact of the EU has been explored and result appeared significant. This significant result has proved that the EU has moderated the relationship whereas the –ve beta value proves that the relationship direction has changed. Thus moderation of the EU gets confirmed. The result of this study the findings of Agbejule (2005) and Hussain et al (2021) who have established that the EU has moderating impact on project success/ performance.

**H2 (b): There is a significant moderating impact of Environmental Uncertainty on the relationship between the technical factor and sustainable PPP performance.**

In this study, the moderating impact of the EU has been explored and result appeared significant. This significant result has proved that the EU has moderated the relationship whereas the –ve beta value proves that the relationship direction has changed. Thus moderation of the EU gets confirmed. The result of this study the findings of Agbejule (2005) and Hussain et al (2021) who have established that the EU has moderating impact on project success/ performance.

**H2 (c): There is a significant moderating impact of Environmental Uncertainty on the relationship between the legal factor and sustainable PPP performance.**

In this study, the moderating impact of the EU has been explored and result appeared significant. This significant result has proved that the EU has moderated the relationship whereas the –ve beta value proves that the relationship direction has changed. Thus moderation of the EU gets confirmed. The result of this study the findings of Agbejule (2005) and Hussain et al (2021) who have established that the EU has moderating impact on project success/ performance.

**H2 (d): There is a significant moderating impact of Environmental Uncertainty on the relationship between finance factors and sustainable PPP performance.**

In this study, the moderating impact of the EU has been explored and result appeared significant. This significant result has proved that the EU has moderated the relationship whereas the –ve beta value proves that the relationship direction has changed. Thus moderation of the EU gets confirmed. The result of this study the findings of Agbejule (2005) and Hussain et al (2021) who have established that the EU has moderating impact on project success/ performance.

**H2 (e): There is a significant moderating impact of Environmental Uncertainty on the relationship between the economic factor and sustainable PPP performance.**

In this study, the moderating impact of the EU has been explored and result appeared significant. This significant result has proved that the EU has moderated the relationship whereas the –ve beta value proves that the relationship direction has changed. Thus moderation of the EU gets confirmed. The result of this study the findings of Agbejule (2005) and Hussain et al (2021) who have established that the EU has moderating impact on project success/ performance.

**H2 (f): There is a significant moderating impact of Environmental Uncertainty on the relationship between procurement factor and sustainable PPP performance.**

In this study, the moderating impact of the EU has been explored and result appeared significant. This significant result has proved that the EU has moderated the relationship whereas the –ve beta value proves that the relationship direction has changed. Thus moderation of the EU gets confirmed. The result of this study the findings of Agbejule (2005) and Hussain et al (2021) who have established that the EU has moderating impact on project success/ performance.

**H2 (g): There is a significant moderating impact of Environmental Uncertainty on the relationship between the regulation factor and sustainable PPP performance.i**

In this study, the moderating impact of the EU has been explored and result appeared significant. This significant result has proved that the EU has moderated the relationship whereas the –ve beta value proves that the relationship direction has changed. Thus moderation of the EU gets confirmed. The result of this study the findings of Agbejule (2005) and Hussain et al (2021) who have established that the EU has moderating impact on project success/ performance.

**H2 (h): There is a significant moderating impact of Environmental Uncertainty on the relationship between market maturity and sustainable PPP performance.**

In this study, the moderating impact of the EU has been explored and result appeared significant. This significant result has proved that the EU has moderated the relationship whereas the –ve beta value proves that the relationship direction has changed. Thus moderation of the EU gets confirmed. The result of this study the findings of Agbejule (2005) and Hussain et al (2021) who have established that the EU has moderating impact on project success/ performance.

**H3: Joint Risk Management (JRM) will have a significant moderating impact on moderated impact (i-e moderated moderation) created by Environmental Uncertainty on the relationship between CSFs for PPP and sustainable PPP performance.**

In this study, the moderated impact of the EU on the significant relationship between CSF and sustainable PPP performance has been investigated which appeared significant. We know that the EU demands speedy and responsive decisions as well as action (Huber, Miller, & Glick, 1990: Mintzberg, 1978). Therefore we placed joint risk management in action and to testify the moderated moderation (three-way interaction/ cascaded moderation), we have investigated the moderating effect of joint risk management on the moderated outcome. The findings confirmed the three-way interaction between CSF, EU, and JRM i.e joint risk management can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then joint risk management can restore or enhance the disturbing performance.

The finding regarding moderating role of JRM to diminish the impact of the EU aligns with the finding of Singh (2020) who has established the moderating effect of JRM to counter the effect of Environmental Uncertainty. The findings also align with the results of Burke & Demirag (2019) who identified the mechanism of JRM in global PPP markets to address the uncertainties in PPP project success. This outcome has answered the concern of various researchers like including Hodge, Greve, and Biygautane (2018) regarding implication of JRM to deal the negative impact of uncertainty in projects. Bopp et al., (2019) also investigated the impact of risk management to deal with uncertainty and found it significant, Keers & van Fenema (2018) who validated the role of joint risk management for successful PPP projects by dealing different risks/ uncertainties in PPP projects, Osipova (2015) who investigated the impact of joint risk management to make the project performance better. Li et al., (2015) has also emphasized the role of joint risk management towards the success of projects by mitigating different risks/ uncertainty from the perspective of agency theory. In past, Hartman et al. (1997) introduced the “dynamic risk management” term for the management of risk which has been used in literature frequently.

The result of this study shows that Environmental Uncertainty will harm the sustainable public-private partnership project performance which was achievable by the correct utilization/ implementation of critical success factors. The change in performance can be tackled by the joint risk management system/ criteria placed by both the partners involved in the project. Thus we can say that joint risk management is a system that is essential for sustainable public-private partnership performance in any developing country and therefore must be included in the planning as well as policies of such projects..

**H3 (a): Joint Risk Management(JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Political Factor (PF) and sustainable PPP performance (SPPPP).**

In this study, the moderated impact of the EU on the significant relationship between PF and sustainable PPP performance has been investigated which appeared significant, than to testify to the moderated moderation (three-way interaction/ cascaded moderation), we have investigated the moderating effect of joint risk

management on the moderated outcome. The findings confirmed the three-way interaction between PF, EU, and JRM i.e joint risk management can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then joint risk management can restore or enhance the disturbing performance.

The finding regarding moderating role of JRM to diminish the impact of the EU aligns with the finding of Singh (2020) who has established the moderating effect of JRM to counter the effect of Environmental Uncertainty. The findings also align with the results of Burke &Demirag (2019) who identified the mechanism of JRM in global PPP markets to address the uncertainties in PPP project success. This outcome has answered the concern of various researchers like including Hodge, Greve, and Biygautane (2018) regarding implication of JRM to deal the negative impact of uncertainty in projects. Bopp et al., (2019) also nvestigated the impact of risk management to deal with uncertainty and found it significant, Keers& van Fenema (2018) who validated the role of joint risk management for successful PPP projects by dealing different risks/ uncertainties in PPP projects, Osipova (2015) who investigated the impact of joint risk management to make the project performance better. Li et al., (2015) has also emphasized the role of joint risk management towards the success of projects by mitigating different risks/ uncertainty from the perspective of agency theory. In past, Hartman et al. (1997) introduced the “dynamic risk management” term for the management of risk which has been used in literature frequently.

The result of this study shows that Environmental Uncertainty will harm the sustainable public-private partnership project performance which was achievable by the correct utilization/ implementation of critical success factors. The change in performance can be tackled by the joint risk management system/ criteria placed by both the partners involved in the project. Thus we can say that JRM is a system that is essential for sustainable public-private partnership performance in any developing country and therefore must be included in the planning as well as policies of such projects.

**H3 (b): Joint risk management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty**

**(EU) on the relationship between Technical Factor (TF) and sustainable PPP performance (SPPPP).**

In this study, the moderated impact of the EU on the significant relationship between TF and sustainable PPP performance has been investigated which appeared significant, then to testify to the moderated moderation (three-way interaction/ cascaded moderation), we have investigated the moderating effect of joint risk management on the moderated outcome. The findings confirmed the three-way interaction between TF, EU, and JRM i.e joint risk management can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then joint risk management can restore or enhance the disturbing performance.

The finding regarding moderating role of JRM to diminish the impact of the EU aligns with the finding of Singh (2020) who has established the moderating effect of JRM to counter the effect of Environmental Uncertainty. The findings also align with the results of Burke &Demirag (2019) who identified the mechanism of JRM in global PPP markets to address the uncertainties in PPP project success. This outcome has answered the concern of various researchers like including Hodge, Greve, and Biygautane (2018) regarding implication of JRM to deal the negative impact of uncertainty in projects. Bopp et al., (2019) also nvestigated the impact of risk management to deal with uncertainty and found it significant, Keers& van Fenema (2018) who validated the role of joint risk management for successful PPP projects by dealing different risks/ uncertainties in PPP projects, Osipova (2015) who investigated the impact of joint risk management to make the project performance better. Li et al., (2015) has also emphasized the role of joint risk management towards the success of projects by mitigating different risks/ uncertainty from the perspective of agency theory. In past, Hartman et al. (1997) introduced the “dynamic risk management” term for the management of risk which has been used in literature frequently.

The result of this study shows that Environmental Uncertaintywill harm the sustainable public-private partnership project performance which was achievable by the correct utilization/ implementation of critical success factors. The change in performance can be tackled by the joint risk management system/ criteria placed by both the partners involved in the project. Thus we can say that joint risk management is



a system that is essential for sustainable public-private partnership performance in any developing country and therefore must be included in the planning as well as policies of such projects.

**H3 (c): Joint risk management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Legal Factor (LF) and sustainable PPP performance (SPPPP).**

In this study, the moderated impact of the EU on the significant relationship between LF and sustainable PPP performance has been investigated which appeared significant, then to testify to the moderated moderation (three-way interaction/cascaded moderation), we have investigated the moderating effect of joint risk management on the moderated outcome. The findings confirmed the three-way interaction between LF, EU, and JRM i.e joint risk management can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then joint risk management can restore or enhance the disturbing performance.

The finding regarding moderating role of JRM to diminish the impact of the EU aligns with the finding of Singh (2020) who has established the moderating effect of JRM to counter the effect of Environmental Uncertainty. The findings also align with the results of Burke & Demirag (2019) who identified the mechanism of JRM in global PPP markets to address the uncertainties in PPP project success. This outcome has answered the concern of various researchers like including Hodge, Greve, and Biygautane (2018) regarding implication of JRM to deal the negative impact of uncertainty in projects. Bopp et al., (2019) also investigated the impact of risk management to deal with uncertainty and found it significant, Keers & van Fenema (2018) who validated the role of joint risk management for successful PPP projects by dealing different risks/ uncertainties in PPP projects, Osipova (2015) who investigated the impact of joint risk management to make the project performance better. Li et al., (2015) has also emphasized the role of joint risk management towards the success of projects by mitigating different risks/ uncertainty from the perspective of agency theory. In past, Hartman et al. (1997) introduced the “dynamic risk management” term for the management of risk which has been used in literature frequently.

The result of this study shows that Environmental Uncertainty will harm the sustainable public-private partnership project performance which was achievable by the correct utilization/ implementation of critical success factors. The change in performance can be tackled by the joint risk management system/ criteria placed by both the partners involved in the project. Thus we can say that joint risk management is a system that is essential for sustainable public-private partnership performance in any developing country and therefore must be included in the planning as well as policies of such projects.

**H3 (d): Joint Risk Management(JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Financing Factor (FF) and sustainable PPP performance (SPPPP).**

In this study, the moderated impact of the EU on the significant relationship between FF and sustainable PPP performance has been investigated which appeared significant, then to testify to the moderated moderation (three-way interaction/ cascaded moderation), we have investigated the moderating effect of joint risk management on the moderated outcome. The findings confirmed the three-way interaction between FF, EU, and JRM i.e joint risk management can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then joint risk management can restore or enhance the disturbing performance.

The finding regarding moderating role of JRM to diminish the impact of the EU aligns with the finding of Singh (2020) who has established the moderating effect of JRM to counter the effect of Environmental Uncertainty. The findings also align with the results of Burke & Demirag (2019) who identified the mechanism of JRM in global PPP markets to address the uncertainties in PPP project success. This outcome has answered the concern of various researchers like including Hodge, Greve, and Biygautane (2018) regarding implication of JRM to deal the negative impact of uncertainty in projects. Bopp et al., (2019) also investigated the impact of risk management to deal with uncertainty and found it significant, Keers & van Fenema (2018) who validated the role of joint risk management for successful PPP projects by dealing different risks/ uncertainties in PPP projects, Osipova (2015) who investigated

the impact of joint risk management to make the project performance better. Li et al., (2015) has also emphasized the role of joint risk management towards the success of projects by mitigating different risks/ uncertainty from the perspective of agency theory. In past, Hartman et al. (1997) introduced the “dynamic risk management” term for the management of risk which has been used in literature frequently.

The result of this study shows that Environmental Uncertainty will harm the sustainable public-private partnership project performance which was achievable by the correct utilization/ implementation of critical success factors. The change in performance can be tackled by the joint risk management system/ criteria placed by both the partners involved in the project. Thus we can say that joint risk management is a system that is essential for sustainable public-private partnership performance in any developing country and therefore must be included in the planning as well as policies of such projects.

**H3 (e): Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Economic Factor (EF) and sustainable PPP performance (SPPPP).**

In this study, the moderated impact of the EU on the significant relationship between EF and sustainable PPP performance has been investigated which appeared significant, then to testify to the moderated moderation (three-way interaction/ cascaded moderation), we have investigated the moderating effect of joint risk management on the moderated outcome. The findings confirmed the three-way interaction between EF, EU, and JRM i.e joint risk management can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then joint risk management can restore or enhance the disturbing performance.

The finding regarding moderating role of JRM to diminish the impact of the EU aligns with the finding of Singh (2020) who has established the moderating effect of JRM to counter the effect of Environmental Uncertainty. The findings also align with the results of Burke & Demirag (2019) who identified the mechanism of JRM in global PPP markets to address the uncertainties in PPP project success. This outcome has

answered the concern of various researchers like including Hodge, Greve, and Biygautane (2018) regarding implication of JRM to deal the negative impact of uncertainty in projects. Bopp et al., (2019) also investigated the impact of risk management to deal with uncertainty and found it significant, Keers& van Fenema (2018) who validated the role of joint risk management for successful PPP projects by dealing different risks/ uncertainties in PPP projects, Osipova (2015) who investigated the impact of joint risk management to make the project performance better. Li et al., (2015) has also emphasized the role of joint risk management towards the success of projects by mitigating different risks/ uncertainty from the perspective of agency theory. In past, Hartman et al. (1997) introduced the “dynamic risk management” term for the management of risk which has been used in literature frequently

The result of this study shows that Environmental Uncertainty will harm the sustainable public-private partnership project performance which was achievable by the correct utilization/ implementation of critical success factors. The change in performance can be tackled by the joint risk management system/ criteria placed by both the partners involved in the project. Thus we can say that joint risk management is a system that is essential for sustainable public-private partnership performance in any developing country and therefore must be included in the planning as well as policies of such projects..

**H3 (f): Joint Risk Management(JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Procurement Factor (PrF) and sustainable PPP performance (SPPPP).**

In this study, the moderated impact of the EU on the significant relationship between PrF and sustainable PPP performance has been investigated which appeared significant, then to testify the moderated moderation (three-way interaction/ cascaded moderation), we have investigated the moderating effect of joint risk management on the moderated outcome. The findings confirmed the three-way interaction between PrF, EU, and JRM i.e joint risk management can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then joint risk management can restore or enhance the disturbing performance.

The finding regarding moderating role of JRM to diminish the impact of the EU aligns with the finding of Singh (2020) who has established the moderating effect of JRM to counter the effect of Environmental Uncertainty. The findings also align with the results of Burke & Demirag (2019) who identified the mechanism of JRM in global PPP markets to address the uncertainties in PPP project success. This outcome has answered the concern of various researchers like including Hodge, Greve, and Biygautane (2018) regarding implication of JRM to deal the negative impact of uncertainty in projects. Bopp et al., (2019) also investigated the impact of risk management to deal with uncertainty and found it significant, Keers & van Fenema (2018) who validated the role of joint risk management for successful PPP projects by dealing different risks/ uncertainties in PPP projects, Osipova (2015) who investigated the impact of joint risk management to make the project performance better. Li et al., (2015) has also emphasized the role of joint risk management towards the success of projects by mitigating different risks/ uncertainty from the perspective of agency theory. In past, Hartman et al. (1997) introduced the “dynamic risk management” term for the management of risk which has been used in literature frequently.

The result of this study shows that Environmental Uncertainty will harm the sustainable public-private partnership project performance which was achievable by the correct utilization/ implementation of critical success factors. The change in performance can be tackled by the joint risk management system/ criteria placed by both the partners involved in the project. Thus we can say that joint risk management is a system that is essential for sustainable public-private partnership performance in any developing country and therefore must be included in the planning as well as policies of such projects.

**H3 (g): Joint Risk Management (JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty (EU) on the relationship between Regulation Factor (RF) and sustainable PPP performance (SPPPP).**

In this study, the moderated impact of the EU on the significant relationship between RF and sustainable PPP performance has been investigated which appeared significant, then to testify to the moderated moderation (three-way interaction/ cascaded moderation), we have investigated the moderating effect of joint risk

management on the moderated outcome. The findings confirmed the three-way interaction between RF, EU, and JRM i.e joint risk management can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then joint risk management can restore or enhance the disturbing performance.

The finding regarding moderating role of JRM to diminish the impact of the EU aligns with the finding of Singh (2020) who has established the moderating effect of JRM to counter the effect of Environmental Uncertainty. The findings also align with the results of Burke &Demirag (2019) who identified the mechanism of JRM in global PPP markets to address the uncertainties in PPP project success. This outcome has answered the concern of various researchers like including Hodge, Greve, and Biygautane (2018) regarding implication of JRM to deal the negative impact of uncertainty in projects. Bopp et al., (2019) also nvestigated the impact of risk management to deal with uncertainty and found it significant, Keers& van Fenema (2018) who validated the role of joint risk management for successful PPP projects by dealing different risks/ uncertainties in PPP projects, Osipova (2015) who investigated the impact of joint risk management to make the project performance better. Li et al., (2015) has also emphasized the role of joint risk management towards the success of projects by mitigating different risks/ uncertainty from the perspective of agency theory. In past, Hartman et al. (1997) introduced the “dynamic risk management” term for the management of risk which has been used in literature frequently.

The result of this study shows that Environmental Uncertaintywill harm the sustainable public-private partnership project performance which was achievable by the correct utilization/ implementation of critical success factors. The change in performance can be tackled by the joint risk management system/ criteria placed by both the partners involved in the project. Thus we can say that joint risk management is a system that is essential for sustainable public-private partnership performance in any developing country and therefore must be included in the planning as well as policies of such projects.

**H3 (h): Joint Risk Management(JRM) will have a significant moderating impact on moderated outcome (i.e. moderated moderation) of Environmental Uncertainty**

**(EU) on the relationship between Market Maturity (MM) and sustainable PPP performance (SPPPP).**

In this study, the moderated impact of EU on the significant relationship between MM and sustainable PPP performance has been investigated which appeared significant, then to testify to the moderated moderation (three-way interaction/cascaded moderation), we have investigated the moderating effect of joint risk management on the moderated outcome. The findings confirmed the three-way interaction between MM, EU, and JRM i.e joint risk management can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then joint risk management can restore or enhance the disturbing performance.

The finding regarding moderating role of JRM to diminish the impact of the EU aligns with the finding of Singh (2020) who has established the moderating effect of JRM to counter the effect of Environmental Uncertainty. The findings also align with the results of Burke &Demirag (2019) who identified the mechanism of JRM in global PPP markets to address the uncertainties in PPP project success. This outcome has answered the concern of various researchers like including Hodge, Greve, and Biygautane (2018) regarding implication of JRM to deal the negative impact of uncertainty in projects. Bopp et al., (2019) also nvestigated the impact of risk management to deal with uncertainty and found it significant, Keers& van Fenema (2018) who validated the role of joint risk management for successful PPP projects by dealing different risks/ uncertainties in PPP projects, Osipova (2015) who investigated the impact of joint risk management to make the project performance better. Li et al., (2015) has also emphasized the role of joint risk management towards the success of projects by mitigating different risks/ uncertainty from the perspective of agency theory. In past, Hartman et al. (1997) introduced the “dynamic risk management” term for the management of risk which has been used in literature frequently.

The result of this study shows that Environmental Uncertaintywill harm the sustainable public-private partnership project performance which was achievable by the correct utilization/ implementation of critical success factors. The change in performance can be tackled by the joint risk management system/ criteria placed by both the partners involved in the project. Thus we can say that joint risk management is

a system that is essential for sustainable public-private partnership performance in any developing country and therefore must be included in the planning as well as policies of such projects.

**H4: Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between CSFs for PPP and sustainable PPP performance.**

In this study, the moderated impact of the EU has been investigated which appeared significant. According to Huber, Miller, and Glick (1990) and Mintzberg (1978) EU requires a speedy and responsive decision. Therefore, to cater to the negative impact of the EU, Trust has been utilized as a moderator to perform the task of moderated moderation (i.e. three-way interaction/ cascaded moderation). The findings confirmed the three-way interaction between CSF, EU, and Trust i.e trust can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then Trust can restore or enhance the disturbing performance.

This finding validated the hypothesis that Trust will have a moderated moderation impact on the moderated outcome of Environmental Uncertainty on the relationship between CSFs and sustainable PPP project performance. The finding aligns the results of Wei, Wong, and Lai (2012) who also mentioned that Trust plays an important moderating role to counter Environmental Uncertainty to improve performance. Lu et al. (2016) have also highlighted that external uncertainty can pose threat to a project. The impact of Environmental Uncertainty creates challenges for project management to maintain project performance. Therefore, project managers to make more efforts to develop Trust amongst the stakeholders to decrease the negative impact of Environmental Uncertainty.

Hodge, Greve & Biygautane (2018) also established that Trust is very important to obtain desirable results in PPP projects. They also concluded that Trust can enhance the cooperation between partners to deal with any eventuality posed by the external environment, in this way sustainable PPP performance can be maintained in any PPP project. According Warsen et al. (2018) Trust compensates for uncertainty and enhances performance. Khosravi, Rezvani & Ashkanasy (2020) has worked out the



moderating role of Trust and claimed that Trust among partners can play in any conflict to mitigate the negative outcome of uncertainty.

The findings in line with other researchers' results validate the moderating role of Trust and confirm that Trust plays an important role to counter the negative impact of Environmental Uncertainty. In PPP projects we know that the performance of projects gets disturbed due to Environmental Uncertainty and in this scenario, Trust will play a role in restoring the performance, and in this way we will achieve a sustainable PPP project performance.

**H4 (a): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between Political factor and sustainable PPP performance.**

In this study, the moderated impact of the EU has been investigated which appeared significant. According to Huber, Miller, and Glick (1990) and Mintzberg (1978) EU requires a speedy and responsive decision. Therefore, to cater to the negative impact of the EU, Trust has been utilized as a moderator to perform the task of moderated moderation (i.e. three-way interaction/ cascaded moderation). The findings confirmed the three-way interaction between PF, EU, and Trust i.e. trust can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then Trust can restore or enhance the disturbing performance.

This finding validated the hypothesis that Trust will have a moderated moderation impact on the moderated outcome of Environmental Uncertainty on the relationship between PF and sustainable PPP project performance. The finding aligns the results of Wei, Wong, and Lai (2012) who also mentioned that Trust plays an important moderating role to counter Environmental Uncertainty to improve performance. Lu et al. (2016) have also highlighted that external uncertainty can pose threat to a project. The impact of Environmental Uncertainty creates challenges for project management to maintain project performance. Therefore, project managers to make more efforts to develop trust amongst the stakeholders to decrease the negative impact of Environmental Uncertainty.

Hodge, Greve&Biygautane (2018) also established that Trust is very important to obtain desirable results in PPP projects. They also concluded that Trust can enhance the cooperation between partners to deal with any eventuality posed by the external environment, in this way sustainable PPP performance can be maintained in any PPP project. According Warsen et al. (2018) Trust compensates for uncertainty and enhances performance. Khosravi, Rezvani&Ashkanasy (2020) has worked out the moderating role of Trust and claimed that Trust among partners can play in any conflict to mitigate the negative outcome of uncertainty.

The findings in line with other researchers' results validate the moderating role of Trust and confirm that Trust plays an important role to counter the negative impact of Environmental Uncertainty. In PPP projects we know that the performance of projects gets disturbed due to Environmental Uncertainty and in this scenario, Trust will play a role in restoring the performance, and in this way we will achieve a sustainable PPP project performance.

**H4 (b): Trust will have a significant moderating impact on moderated impact (i.e moderated moderation) created by Environmental Uncertainty on the relationship between the technical factor and sustainable PPP performance.**

In this study, the moderated impact of the EU has been investigated which appeared significant. According to Huber, Miller, and Glick (1990) and Mintzberg (1978) EU requires a speedy and responsive decision. Therefore, to cater to the negative impact of the EU, Trust has been utilized as a moderator to perform the task of moderated moderation (i.e. three-way interaction/ cascaded moderation). The findings confirmed the three-way interaction between TF, EU, and Trust i.e Trust can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then Trust can restore or enhance the disturbing performance.

This finding validated the hypothesis that Trust will have a moderated moderation impact on the moderated outcome of Environmental Uncertainty on the relationship between TF and sustainable PPP project performance. The finding aligns the results of Wei, Wong, and Lai (2012) who also mentioned that Trust plays an important moderating role to counter Environmental Uncertainty to improve performance. Lu et al. (2016) have also highlighted that external uncertainty can pose threat to a project.

The impact of Environmental Uncertainty creates challenges for project management to maintain project performance. Therefore, project managers to make more efforts to develop Trust amongst the stakeholders to decrease the negative impact of Environmental Uncertainty.

Hodge, Greve & Biygautane (2018) also established that Trust is very important to obtain desirable results in PPP projects. They also concluded that Trust can enhance the cooperation between partners to deal with any eventuality posed by the external environment, in this way sustainable PPP performance can be maintained in any PPP project. According to Warsen et al. (2018) Trust compensates for uncertainty and enhances performance. Khosravi, Rezvani & Ashkanasy (2020) has worked out the moderating role of Trust and claimed that Trust among partners can play in any conflict to mitigate the negative outcome of uncertainty.

The findings in line with other researchers' results validate the moderating role of Trust and confirm that Trust plays an important role to counter the negative impact of Environmental Uncertainty. In PPP projects we know that the performance of projects gets disturbed due to Environmental Uncertainty and in this scenario, Trust will play a role in restoring the performance, and in this way we will achieve a sustainable PPP project performance

**H4 (c): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between the legal factor and sustainable PPP performance.**

In this study, the moderated impact of the EU has been investigated which appeared significant. According to Huber, Miller and Glick (1990) and Mintzberg (1978) EU requires a speedy and responsive decision. Therefore, to cater to the negative impact of the EU, Trust has been utilized as a moderator to perform the task of moderated moderation (i.e. three-way interaction/ cascaded moderation). The findings confirmed the three-way interaction between LF, EU, and Trust i.e. Trust can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then Trust can restore or enhance the disturbing performance.

This finding validated the hypothesis that Trust will have a moderated moderation impact on the moderated outcome of Environmental Uncertainty on the

relationship between LF and sustainable PPP project performance. The finding aligns the results of Wei, Wong, and Lai (2012) who also mentioned that Trust plays an important moderating role to counter Environmental Uncertainty to improve performance. Lu et al. (2016) have also highlighted that external uncertainty can pose threat to a project. The impact of Environmental Uncertainty creates challenges for project management to maintain project performance. Therefore, project managers to make more efforts to develop Trust amongst the stakeholders to decrease the negative impact of Environmental Uncertainty.

Hodge, Greve & Biygautane (2018) also established that Trust is very important to obtain desirable results in PPP projects. They also concluded that Trust can enhance the cooperation between partners to deal with any eventuality posed by the external environment, in this way sustainable PPP performance can be maintained in any PPP project. According Warsen et al. (2018) Trust compensates for uncertainty and enhances performance. Khosravi, Rezvani & Ashkanasy (2020) has worked out the moderating role of Trust and claimed that Trust among partners can play in any conflict to mitigate the negative outcome of uncertainty.

The findings in line with other researchers' results validate the moderating role of Trust and confirm that Trust plays an important role to counter the negative impact of Environmental Uncertainty. In PPP projects we know that the performance of projects gets disturbed due to Environmental Uncertainty and in this scenario, Trust will play a role in restoring the performance, and in this way we will achieve a sustainable PPP project performance.

**H4 (d): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between financing factor and sustainable PPP performance.**

In this study, the moderated impact of the EU has been investigated which appeared significant. According to Huber, Miller and Glick (1990) and Mintzberg (1978) EU requires a speedy and responsive decision. Therefore, to cater to the negative impact of the EU, Trust has been utilized as a moderator to perform the task of moderated moderation (i.e. three-way interaction/ cascaded moderation). The findings confirmed the three-way interaction between FF, EU, and Trust i.e Trust can be used to

moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then Trust can restore or enhance the disturbing performance.

This finding validated the hypothesis that Trust will have a moderated moderation impact on the moderated outcome of Environmental Uncertainty on the relationship between FF and sustainable PPP project performance. The finding aligns the results of Wei, Wong, and Lai (2012) who also mentioned that Trust plays an important moderating role to counter Environmental Uncertainty to improve performance. Lu et al. (2016) have also highlighted that external uncertainty can pose threat to a project. The impact of Environmental Uncertainty creates challenges for project management to maintain project performance. Therefore, project managers to make more efforts to develop Trust amongst the stakeholders to decrease the negative impact of Environmental Uncertainty.

Hodge, Greve & Biygautane (2018) also established that Trust is very important to obtain desirable results in PPP projects. They also concluded that Trust can enhance the cooperation between partners to deal with any eventuality posed by the external environment, in this way sustainable PPP performance can be maintained in any PPP project. According Warsen et al. (2018) Trust compensates for uncertainty and enhances performance. Khosravi, Rezvani & Ashkanasy (2020) has worked out the moderating role of Trust and claimed that Trust among partners can play in any conflict to mitigate the negative outcome of uncertainty.

The findings in line with other researchers' results validate the moderating role of Trust and confirm that Trust plays an important role to counter the negative impact of Environmental Uncertainty. In PPP projects we know that the performance of projects gets disturbed due to Environmental Uncertainty and in this scenario, Trust will play a role in restoring the performance, and in this way we will achieve a sustainable PPP project performance.

**H4 (e): Trust will have a significant moderating impact on moderated impact (i.e moderated moderation) created by Environmental Uncertainty on the relationship between the economic factor and sustainable PPP performance.**

In this study, the moderated impact of the EU has been investigated which appeared significant. According to Huber, Miller and Glick (1990) and Mintzberg (1978) EU requires a speedy and responsive decision. Therefore, to cater to the negative impact of the EU, Trust has been utilized as a moderator to perform the task of moderated moderation (i.e. three-way interaction/ cascaded moderation). The findings confirmed the three-way interaction between EF, EU, and Trust i.e Trust can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then Trust can restore or enhance the disturbing performance.

This finding validated the hypothesis that Trust will have a moderated moderation impact on the moderated outcome of Environmental Uncertainty on the relationship between EF and sustainable PPP project performance. The finding aligns the results of Wei, Wong, and Lai (2012) who also mentioned that Trust plays an important moderating role to counter Environmental Uncertainty to improve performance. Lu et al. (2016) have also highlighted that external uncertainty can pose threat to a project. The impact of Environmental Uncertainty creates challenges for project management to maintain project performance. Therefore, project managers to make more efforts to develop Trust amongst the stakeholders to decrease the negative impact of Environmental Uncertainty.

Hodge, Greve & Biygautane (2018) also established that Trust is very important to obtain desirable results in PPP projects. They also concluded that Trust can enhance the cooperation between partners to deal with any eventuality posed by the external environment, in this way sustainable PPP performance can be maintained in any PPP project. According Warsen et al. (2018) Trust compensates for uncertainty and enhances performance. Khosravi, Rezvani & Ashkanasy (2020) has worked out the moderating role of Trust and claimed that Trust among partners can play in any conflict to mitigate the negative outcome of uncertainty.

The findings in line with other researchers' results validate the moderating role of Trust and confirm that Trust plays an important role to counter the negative impact of Environmental Uncertainty. In PPP projects we know that the performance of projects gets disturbed due to Environmental Uncertainty and in this scenario, Trust will

play a role in restoring the performance, and in this way we will achieve a sustainable PPP project performance.

**H4 (f): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between procurement factor and sustainable PPP performance.**

In this study, the moderated impact of the EU has been investigated which appeared significant. According to Huber, Miller and Glick (1990) and Mintzberg (1978) EU requires a speedy and responsive decision. Therefore, to cater to the negative impact of the EU, Trust has been utilized as a moderator to perform the task of moderated moderation (i.e. three-way interaction/ cascaded moderation). The findings confirmed the three-way interaction between EF, EU, and Trust i.e Trust can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then Trust can restore or enhance the disturbing performance.

This finding validated the hypothesis that Trust will have a moderated moderation impact on the moderated outcome of Environmental Uncertainty on the relationship between EF and sustainable PPP project performance. The finding aligns the results of Wei, Wong, and Lai (2012) who also mentioned that Trust plays an important moderating role to counter Environmental Uncertainty to improve performance. Lu et al. (2016) have also highlighted that external uncertainty can pose threat to a project. The impact of Environmental Uncertainty creates challenges for project management to maintain project performance. Therefore, project managers to make more efforts to develop Trust amongst the stakeholders to decrease the negative impact of Environmental Uncertainty.

Hodge, Greve & Biygautane (2018) also established that Trust is very important to obtain desirable results in PPP projects. They also concluded that Trust can enhance the cooperation between partners to deal with any eventuality posed by the external environment, in this way sustainable PPP performance can be maintained in any PPP project. According Warsen et al. (2018) Trust compensates for uncertainty and enhances performance. Khosravi, Rezvani & Ashkanasy (2020) has worked out the moderating role of Trust and claimed that Trust among partners can play in any conflict to mitigate the negative outcome of uncertainty.

The findings in line with other researchers' results validate the moderating role of Trust and confirm that Trust plays an important role to counter the negative impact of Environmental Uncertainty. In PPP projects we know that the performance of projects gets disturbed due to Environmental Uncertainty and in this scenario, Trust will play a role in restoring the performance, and in this way we will achieve a sustainable PPP project performance.

**H4 (g): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between the regulation factor and sustainable PPP performance.**

In this study, the moderated impact of the EU has been investigated which appeared significant. According to Huber, Miller and Glick (1990) and Mintzberg (1978) EU requires a speedy and responsive decision. Therefore, to cater to the negative impact of the EU, Trust has been utilized as a moderator to perform the task of moderated moderation (i.e. three-way interaction/ cascaded moderation). The findings confirmed the three-way interaction between RF, EU, and Trust i.e Trust can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then Trust can restore or enhance the disturbing performance.

This finding validated the hypothesis that Trust will have a moderated moderation impact on the moderated outcome of Environmental Uncertainty on the relationship between RF and sustainable PPP project performance. The finding aligns the results of Wei, Wong, and Lai (2012) who also mentioned that Trust plays an important moderating role to counter Environmental Uncertainty to improve performance. Lu et al. (2016) have also highlighted that external uncertainty can pose threat to a project. The impact of Environmental Uncertainty creates challenges for project management to maintain project performance. Therefore, project managers to make more efforts to develop Trust amongst the stakeholders to decrease the negative impact of Environmental Uncertainty.

Hodge, Greve & Biygautane (2018) also established that Trust is very important to obtain desirable results in PPP projects. They also concluded that Trust can enhance the cooperation between partners to deal with any eventuality posed by the external environment, in this way sustainable PPP performance can be maintained in any PPP



project. According Warsen et al. (2018) Trust compensates for uncertainty and enhances performance. Khosravi, Rezvani & Ashkanasy (2020) has worked out the moderating role of Trust and claimed that Trust among partners can play in any conflict to mitigate the negative outcome of uncertainty.

The findings in line with other researchers' results validate the moderating role of Trust and confirm that Trust plays an important role to counter the negative impact of Environmental Uncertainty. In PPP projects we know that the performance of projects gets disturbed due to Environmental Uncertainty and in this scenario, Trust will play a role in restoring the performance, and in this way we will achieve a sustainable PPP project performance.

**H4 (h): Trust will have a significant moderating impact on moderated impact (i.e. moderated moderation) created by Environmental Uncertainty on the relationship between market maturity and sustainable PPP performance.**

In this study, the moderated impact of the EU has been investigated which appeared significant. According to Huber, Miller and Glick (1990) and Mintzberg (1978) EU requires a speedy and responsive decision. Therefore, to cater to the negative impact of the EU, Trust has been utilized as a moderator to perform the task of moderated moderation (i.e. three-way interaction/ cascaded moderation). The findings confirmed the three-way interaction between MM, EU, and Trust i.e Trust can be used to moderate the effect of the EU. This result proved that once the performance has been disturbed by the EU then Trust can restore or enhance the disturbing performance.

This finding validated the hypothesis that Trust will have a moderated moderation impact on the moderated outcome of EU on the relationship between MM and sustainable PPP project performance. The finding aligns the results of Wei, Wong, and Lai (2012) who also mentioned that Trust plays an important moderating role to counter Environmental Uncertainty to improve performance. Lu et al. (2016) have also highlighted that external uncertainty can pose threat to a project. The impact of Environmental Uncertainty creates challenges for project management to maintain project performance. Therefore, project managers to make more efforts to develop Trust amongst the stakeholders to decrease the negative impact of Environmental Uncertainty.

Hodge, Greve&Biygautane (2018) also established that Trust is very important to obtain desirable results in PPP projects. They also concluded that Trust can enhance the cooperation between partners to deal with any eventuality posed by the external environment, in this way sustainable PPP performance can be maintained in any PPP project. According Warsen et al. (2018) Trust compensates for uncertainty and enhances performance. Khosravi, Rezvani&Ashkanasy (2020) has worked out the moderating role of Trust and claimed that Trust among partners can play in any conflict to mitigate the negative outcome of uncertainty.

The findings in line with other researchers' results validate the moderating role of Trust and confirm that Trust plays an important role to counter the negative impact of Environmental Uncertainty. In PPP projects we know that the performance of projects gets disturbed due to Environmental Uncertaintyand in this scenario, Trust will play a role in restoring the performance, and in this way we will achieve a sustainable PPP project performance

## Chapter 5:

### DISCUSSION AND CONCLUSION

Public-private partnership projects are considered the most important and viable arrangement to enhance the economic position of any country. Its successful implementation is a major debate. Project success is the main requirement to organize any project because the project outcome will yield the desired impact on anticipated social need/ requirement (Maletič, 2018). The sustainable achievement has forced people to think about the “Big Picture” and overall comprehensive longer period. Measuring and managing the sustainable performance of any PPP project is an important concern for research. The sustainability concept needs attention for Public-private partnership projects as it is not a much-researched linkage (Dolla & Laishram, 2020).

Public-private partnership projects are prone to different types of challenges due to their nature and period. Many uncertain factors can affect the implementation of PPP projects like Environmental Uncertainty (Bai et al., 2017). In the past, uncertainty has been explored very little due to which very less measures have been evolved to tackle it for the achievement of sustainable PPP projects (Smith, Umans, & Thomasson, 2018). In any business environment, uncertainty can be tackled by Joint Risk Management and Trust (Ngowi, 2007).

Many factors dictate the partnership arrangement in public-private partnership projects leading to success vis-à-vis sustainable project success and accordingly many theories address this arrangement. In this study, the agency theory lens has been used considering all-encompassing facets of this particular study. There was very little discussion on the agency problems in the PPP relationship especially the uncertainty aspect (Smith, Umans, & Thomasson, 2018). Moreover, T

rust (Zwikael&Smyrk, 2015) and project risk management (Chang, 2014) were required to be seen through the lens of the principal-agent model in PPP arrangement (Niwabiine, 2019) to have Sustainable PPP Project Performance by tackling the agency

problems. There was a requirement to evaluate the problem to provide the solution to the application problem by keeping in mind the agency theory (Cheng et al., 2021).

PPP is a need of Pakistan like other developing countries, therefore there was a great requirement to explore the impediments/ hindrances which affect the performance of Public-Private partnership (PPP) adversely (Maryam & Sohail, 2018) and there was a dire need to conduct PPP specific research in Pakistan (Hashmi, 2020).

Considering all the aspects mentioned above this study was carried out with the foremost idea to formulate a comprehensive framework for Sustainable Public-Private Partnership Projects by tackling Environmental Uncertainty (i.e agency problems) with the help of Trust and Joint Risk Management (i.e stakeholder measures).

This research took the case from Critical Success Factors as critical success factors (CSF) are considered important enablers to have success in any project. There are plenty of CSFs in the literature that behaves differently in different countries as per the country's dynamics (Babatunde et al., 2016). Comprehensive literature review by PRISMA was conducted, CSFs were shortlisted and these shortlisted CSFs were verified by citation references. In the end most cited CSFs were identified and then these CSFs were validated by officials of Pakistan PPPA, academicians and employees of companies undertaking PPP projects in Pakistan. The CSFs were Political Factor, Technical Factor, Legal Factor, Regulation Factor, Market Maturity, Finance Factor, Economic Factor, and Procurement Factor. These factors were the same as used by Opawale et al. (2019) in Malaysia. Most of the studies like Opawale et al. (2019) and Sehgal (2019) have worked to prioritize the impact of CSF on PPP projects. The first hypothesis was to establish the relationship between CSFs and sustainable PPP performance. The finding on this provided the validation of the significant correlation between CSF and Sustainable PPP Project Performance as well as the correlation of all the CSFs individually with Sustainable PPP Project Performance.

To validate main objective and concept that Environmental Uncertainty (EU) will harm Sustainable PPP Project Performance, the moderation technique was used as it can describe the impact of any variable on the relationship of other variables. The results mentioned in chapter 4 described that Environmental Uncertainty has negatively impacted the relationship between CSF and Sustainable PPP Project Performance in a

significant way. This outcome has proved hypothesis H2 and also validated the claim of Smith, Umans, & Thomasson (2018) who have termed it an agency problem and declared a factor to disturb the PPP project's success as well as PPP relationship.

Later on, the most important part of this research was to investigate the mechanism to challenge the impact of Environmental Uncertainty. Osipova (2015) has highlighted that the Principal-agency theory is highly relevant to several problems that may arise in relationships between project participants. Keeping in view the scope of the study, literature review was conducted and two factors i.e. Joint Risk Management and Trust were used to address the Environmental Uncertainty issue. Researchers have highlighted the importance/ role of Joint Risk Management and Trust in project success but at the same very time researchers have emphasized the need to investigate their role in PPP projects to limit agency problems. Thus aligning the existing gap and theoretical support, Joint Risk Management and Trust have been used to mitigate the negative impact of Environmental Uncertainty. The technique used for this purpose was moderated-moderation and Hayes model 3 in process macro file was used to analyse the problem and to obtain empirical evidence about the solution. The findings explained that Joint Risk Management and Trust have a significant moderated moderation impact on the moderated outcome of Environmental Uncertainty on the relationship between CSF and Sustainable PPP Project Performance. This finding addressed the concern of Niwabiine (2019) who has highlighted that Joint Risk Management and Trust may be used to tackle the agency problem for project success. In this study, JRM and Trust have been used in PPP projects.

The study has proved that once the Environmental Uncertainty has deteriorated the project performance then the Trust and Joint Risk Management between the partners can tackle this challenge and the project may yield the requisite objectives. According to the Oxford English Dictionary, a Pillar of something can be defined as, “*a strong supporter of something, a basic part or feature of a system, organization, belief, etc*”. Keeping this definition in mind we can deduce from the behavior of Trust and JRM in the framework as the most important factor to keep the Sustainable PPP Project Performance intact. Thus we can term them “*Partnership Pillars*” in PPP projects. We have seen in research that these two factors are such pillars on which the partnership hinges and these pillars kept the PPP project intact even in the presence of impediments

i.e. Environmental Uncertainty, thus these pillars are very important to mitigate any negative impact on Sustainable PPP Project Performance. Empirical evidence has also proved that these partnership pillars have moderated or mitigated the negative impact of Environmental Uncertainty.

### **5.1 Implication of Study**

PPP is not a new concept as it has its roots in ages but the terminology was coined in the last nineties. In Pakistan, PPP has got focused in last few years and its authority i.e Pakistan Public Private Partnership Authority (PPPA) came into existence in 2019. Many PPP projects are in process but no basic framework exists in the country. This framework can provide the basics to formulate PPP arrangements in industries like defense, infrastructure, health, etc. This study has highlighted different CSFs as an enabler for PPP and their relationship with Sustainable PPP Project Performance. Then, Study highlighted the negative impact of Environmental Uncertainty on this relationship, thus explained the hinderance to Sustainable PPP Project Performance. Lastly, this study has provided the solution to the appeared hinderance i.e. incorporation of JRM and Trust between the partnership arrangement to have Sustainable PPP Project Performance. This simple framework can provide a basis to establish a PPP relationship to undertake any project.

### **5.2 Contribution to Body of Knowledge**

This study provides a great insight into agency theory by tackling the agency problems of Environmental Uncertainty through Joint Risk Management and Trust between the partners/ agents. This study provides a deeper perspective of PPP projects managements by taking on board all the partners to deal with envisaged challenges for the successful application of PPP projects. This study provides a comprehensive framework for sustainable PPP projects in developing countries and thus will set a stage for policymakers to formulate policy recommendations in PPP.

The study figures out the relationship between CSFs and Sustainable PPP Project Performance in developing countries and subsequently unfolds the moderated effect of the EU on the relationship to enlighten about factors of PPP failure. Then this

study explains the impact of Trust and JRM on the moderated impact of the EU on the relationship between CSFs and Sustainable PPP Project Performance. This study highlights the importance of PPP projects to bring sustainability to any country.

Though the existing literature has provided a beginning point in the development of this study, on the other hand, the emphasis of this study is not only different from current studies but also supplements the present knowledge base of PPP. The study provides substantial contributions to the current literature as follows: Firstly, the study finds out the relationship between CSFs and sustainable PPP performance in the context of Pakistan. Secondly, the moderation impact of EU on the relationship is studied as a new contribution. Thirdly, moderated moderation i.e. new contribution and less practiced research methodology has been used in which Trust and Joint Risk Management are incorporated to achieve Sustainable PPP Project Performance. The moderated moderation or three-way interaction has led to zoom into the PPP agency problem and means to tackle Sustainable PPP Project Performance. Lastly, this research has also presented the partnership pillars for sustainable PPP projects.

This study unfolds the relationship of CSFs (technical factors, legal factors, political factors, finance factor, market maturity, economic factor, and regulation factors) with sustainable PPP performance. This relationship will guide us to maintain a favorable environment to have successful PPP projects in the country. We can formulate a policy and framework to take measures to have more investment in projects of its kind as the requirement was highlighted.

This study also tests the agency theory by discussing and empirically testing the agency problems of uncertainty, risk, and joint risk management to bring sustainability in principal and agent relationships for better and sustainable performance.

Moreover, as highlighted in chapter one, Cui et al (2018) has emphasized the importance of research/ publication on PPP and explained linkage of research work with the investment in PPP, thus this research has tried to address this aspect by conducting research to contribute in existing knowledge for better understanding of PPP arrangement.

Apart from the mentioned contribution in body of knowledge, this research has filled the literature gap by addressing the concerns raised by different researchers as following:



Table 5.1

## Summary of Contribution to Body of Knowledge

<b>Authors</b>	<b>Highlighted Gap</b>	<b>Contribution</b>	<b>Hypothesis</b>
Hashmi, 2020	Need to conduct PPP specific research in Pakistan	PPP specific research have been conducted	
Ullah et. al. 2018	Identify localized CSFs for PPP to have successful PPP projects	Localized CSFs for PPP in Pakistan have been identified and empirically tested	H1
Smith, Umans, & Thomasson (2018)	Lack of knowledge regarding uncertainty and risk in PPP	Environmental Uncertainty issue has been investigated in PPP	H2
Maryam &Sohail, 2018	Impediments in PPP performance	Environmental Uncertainty has been identified as an impediment in PPP performance	H2
Smith, Umans, & Thomasson, 2018	Tackling agency problem i.e. Environmental uncertainty for sustainable PPP projects	Environmental uncertainty issue has been addressed in PPP projects	H3, H4
Niwabiine (2019)	There is requirement to see trust and risk management through lens of Principal-agent Model	Trust and Joint risk management has been used in the realm of agency theory	H3, H4
Cheng et al. (2021)	Researchers to evaluate PPP phenomenon and provide an optimized solution to application problem through agency theory	Joint Risk Management and Trust has been used to address the environmental uncertainty issue in PPP Projects	H3, H4
Brogaard, 2019).	Role of Trust to enhance PPP projects is unclear especially in uncertain environment, thus needs to be explored	Trust has been incorporated as moderator to moderate the moderated outcome of Environmental Uncertainty	H4
Dolla & Laishram, 2020	Sustainability concept needed PPP project	Sustainability PPP performance has been investigated	H1, H2, H3, H4

### **5.3 Theoretical Contribution**

The most important contribution of this study is theoretical contribution in Principal-agent model or Agency Theory. It has been highlighted in the literature that application of agency theory needs to be viewed in PPP arrangement. Agency problems have been discussed very little in PPP literature and researchers have explained their concerns regarding role of Trust and JRM to enhance partnership intensity but empirical evidence supporting this perception were missing in PPP literature. Thus aligning this research gap, agency theory remained focus area of this research to investigate the PPP arrangement, negative impact of agency problem i.e. Environmental Uncertainty on Sustainable PPP Project Performance. Subsequently, JRM and Trust have been incorporated under the umbrella of Agency Theory to achieve Sustainable PPP Project Performance. Moreover, application of moderated-moderation technique to address agency problem in the realm of agency theory has also elaborated the concept of agency theory. Variables like Environmental Uncertainty, Joint Risk Management and Trust have been applied and empirically tested in the PPP basing on theoretical foundation of agency theory.

#### **5.3.1 Implication for the Practitioners**

This study would not only be significant for academicians but also give valuable insight to PPP project practitioners. The theoretical model will help the practitioners to formulate the strategy for Sustainable PPP Project Performance under the realm of Environmental Uncertainty as it persists in most developing countries. Thus, the theoretical model is an idea to have Sustainable PPP Project Performance by incorporating partnership pillars to neutralize the impact of the Environmental Uncertainty.

The outcomes of this study will be valuable regarding the formulation of policies and strategies to manage PPP projects to have better and Sustainable PPP Project Performance. Subsequently, the outcome can be used by the Public-Private Partnership Authority (PPPA) to have a policy/ strategy point in PPP projects for Sustainable PPP Project Performance.

The result of this study provides the base to the practitioners as follows:

- Localized Critical Success Factors can be utilized to gauge the importance of these factors for the attainment of the PPP project success in Pakistan. In this study, eight CSFs i.e. political factor, legal factor, technical factor, finance factor, procurement factor, economic factor, regulation factor, and market maturity have been used. These factors may be viewed with concern while planning to execute any PPP project in developing countries.
- The correlation of CSFs with Sustainable PPP Project Performance can provide visibility to achieve sustainable PPP performance in developing countries by managing identified localized CSFs. The study outcome has provided us with the relationship importance/ value of the CSFs with Sustainable PPP Project Performance. This relationship value can be used to prioritize the CSFs in any developing country for the successful implementation of PPP projects as well as to achieve Sustainable PPP Project Performance.
- Established moderation impact of Environmental Uncertainty dictates that practitioners must understand the implication of Environmental Uncertainty and accordingly plan to tackle this menace to have Sustainable PPP Project Performance. Moderation analysis of this study has established the role of Environmental Uncertainty in PPP project implementation in any country. Therefore, PPP experts must keep in mind the Environmental Uncertainty role and must remain ready for the outcome of Environmental Uncertainty i.e. deterioration in performance. If the experts will have this aspect in mind in advance then they will not get surprised by the results and subsequently they will be able to plan the countermeasures well in time.
- Moderated moderation impact of JRM has provided practitioners a way forward to diminish the negative impact of Environmental Uncertainty and provided the basis to incorporate drills and procedures for JRM in PPP projects to have Sustainable PPP Project Performance. The study results have highlighted the importance of JRM to achieve Sustainable PPP Project Performance. When the performance of a PPP project has deteriorated due to the negative effect of EU then the JRM between the

partners can play the role to revive the performance with some risk management techniques and better coordination. Thus to sustain the PPP project performance, JRM acts as a pivotal role that needs to be part of each PPP project planning for the successful outcome of PPP projects.

- Moderated moderation impact of Trust has also provided practitioners a way forward to moderate the negative effect of environmental uncertainty and provide the basis to incorporate drills and procedures for Trust in PPP projects to have sustainable PPP performance. The study results have highlighted the importance of Trust to achieve Sustainable PPP Project Performance. When the performance of a PPP project has deteriorated due to the negative influence of Environmental Uncertainty then the Trust between the partners can play a role to revive the performance with some risk management techniques and better coordination. Thus to sustain the PPP project performance, Trust acts as a pivotal role that needs to be part of each PPP project planning for the successful outcome of PPP projects.
- In this study, “Partnership Pillars” have emerged in the shape of Joint Risk Management and Trust. Practitioner must incorporate these pillars in their planning and execution to have Sustainable PPP Project Performance. Mechanism or operating procedures to incorporate the partnership pillars will definitely help practitioners to mitigate the negative impact of Environmental Uncertainty or any other hinderance.
- One of the important outcome of this research has appeared in the shape of Joint Risk Management system, this aspect may be incorporated as some unit or structural arrangement to mitigate the negative impact of Environmental Uncertainty. Practitioners must keep JRM unit in the organizational structure of PPP arrangement so any hinderance/ obstacle to achieve Sustainable PPP Project Performance can be negotiated. Thus we can say, this research has provided a fruit for thought in formulation/reshaping of organizational structure for a successful PPP.

Finally, the complete study framework for Sustainable PPP Project performance provides a basic foundation to have sustainable PPP performance in developing countries. The practitioners can incorporate the appropriate CSFs for planning PPP

projects along with the formulation of mechanisms for JRM and Trust to diminish the negative effect of Environmental Uncertainty. This framework can lead to a Sustainable PPP Project Performance in developing countries in general and particularly in Pakistan.

#### **5.4 Limitations**

The scope of study was limited to formulating a framework for Sustainable PPP Project Performance by dealing the Environmental Uncertainty and to tackle this aspect. Joint Risk Management, and Trust have been incorporated into the research model for this purpose. Although there are numerous impediments to the successful completion of any project but this study could only explore the impact of one factor i.e. Environmental Uncertainty. Joint Risk Management and Trust have been integrated to moderate the impact of Environmental Uncertainty. These two factors can be termed as partnership pillars as partnership hinges on these pillars to tackle the failure cause i.e. Environmental Uncertainty. The incorporation of just two partnership pillars is another limitation of this study as there can be more partnership pillars. This study has used cross sectional data for analysis and data does not describe single project success with time line matrix because of time constraint. It was also highlighted in study that no website provide the comprehensive data regarding companies undertaking PPP projects or details of consultants/ experts of PPP in country.

#### **5.5 Future Research Direction**

The study findings can be adopted by the future researcher through the development of further areas of own interest. It can provide the basis for upcoming studies on PPP performance and an empirical basis for Sustainable PPP Project Performance. The idea of Trust and Joint Risk Management to moderate the impact of Environmental Uncertainty will help the researcher to explore more factors for sustainable PPP performance. In this way, more partnership pillars may be added to have more sustainable PPP performance.

The researchers can also benefit from the contribution of an extensive body of knowledge in PPP studies by the mentioned relationship of CSFs and sustainable PPP

performance along with the moderation impact of environmental uncertainty and then moderated moderation of partnership pillars on that outcome.

Researcher may conduct a longitudinal study by incorporating the study variable to evaluate the specific project performance. In this regard, internal uncertainty may also be incorporated in future study and those factor supplemented this study factor may enhance understanding regarding complexity of PPP arrangement in a better way.

The findings of this study can lead a way forward to create a favorable environment for PPP projects as well as to maximize the outcome of these projects to bring sustainability to our homeland, as future projects will be dependent on the successful PPP. Moreover, PPPA may formulate data of companies undertaking PPP projects alongwith the details of consultants and experts of PPP in country to provide on website.

The research focused on an important national issue i-e PPP project practices in Pakistan. Although PPP practices remain country-specific practices and therefore the framework produced in this research is Pakistan-specific with the PPP units working in Pakistan. To implement the framework in other countries, the presented framework may need some refinement while an application to other countries but it can be assumed that the framework will remain helpful in other developing countries alike. As the research is highly contexts-specific and the generalizability of the finding is not an aim, thus the countries with similar contexts may implement whatever seems best to them.

This study is conducted to formulate a framework for sustainable Public-Private Partnership Project Performance. Critical Success Factors have been evaluated, followed by the impending challenges to any project success i.e.Environmental Uncertainty, and then partnership pillars i.eTrust and Joint Risk Management have been incorporated to obtain Sustainable PPP Project Performance. This is a basic framework and can be utilized for Sustainable PPP Project Performance and definitely can play its role in the PPP regime of any country.

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## APPENDIX-A

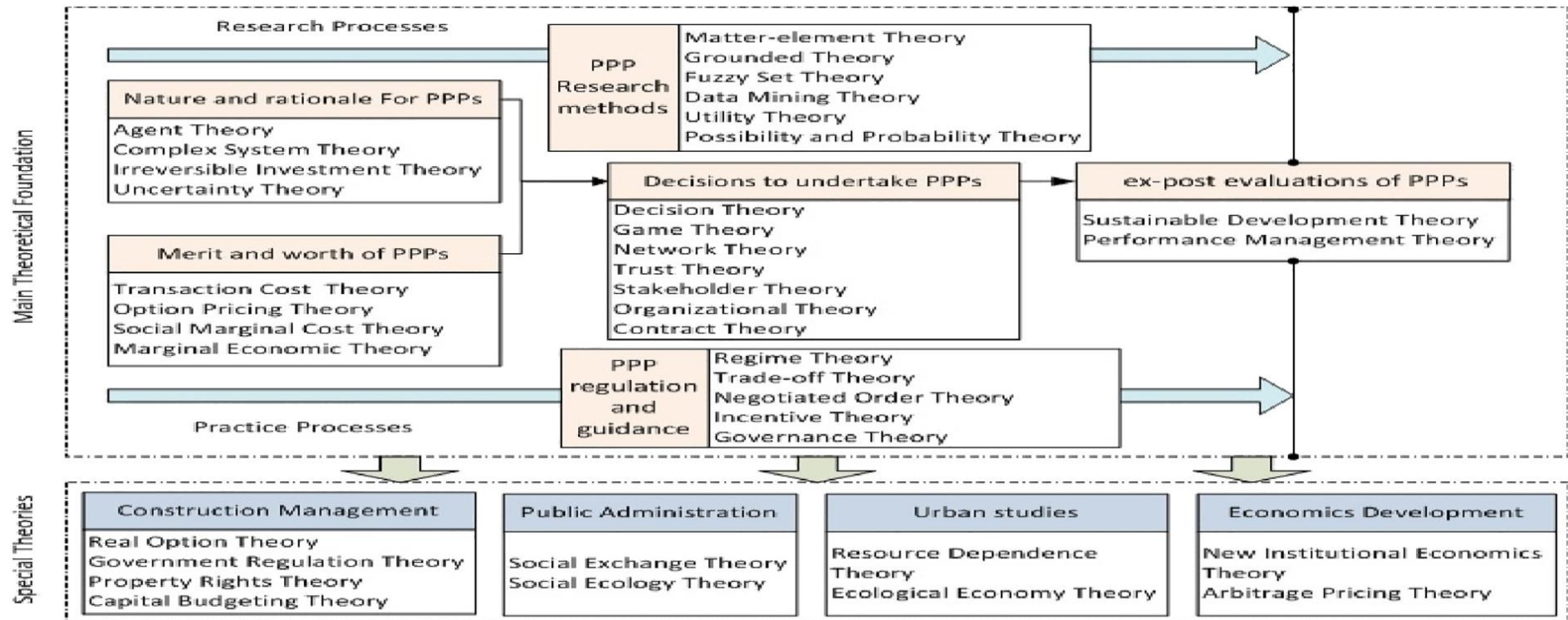
### DEFINITIONS/ TYPES OF UNCERTAINTY

Reference	Definition of Uncertainty
De Marchi (1995)	<ul style="list-style-type: none"> <li>• Scientific, legal, moral, societal, institutional, proprietary, situational</li> </ul>
Asselt (2000)	<ul style="list-style-type: none"> <li>• Uncertainty due to variability: natural randomness, value diversity, behavioral variability,</li> <li>• societal randomness, technological surprise</li> <li>• Uncertainty due to lack of knowledge: unreliability, structural uncertainty</li> </ul>
Walker et al. (2003).	<ul style="list-style-type: none"> <li>• Location of uncertainty: context (natural, technical, economic, social, political,</li> <li>• representation), model (structure, technical aspects), inputs (driving forces, system data),</li> <li>• parameters, model outcomes</li> <li>• Level of uncertainty: statistical, scenario, recognized ignorance, total ignorance</li> <li>• Nature of uncertainty: epistemic or variability</li> </ul>
Meijer (2006)	<ul style="list-style-type: none"> <li>• Nature: knowledge uncertainty, variability uncertainty</li> <li>• Level: from low to high</li> <li>• Source: technology, resources, competitors, suppliers, consumers, politics</li> </ul>
Pahl-Wostl (2007)	<ul style="list-style-type: none"> <li>• Lack of knowledge due to limited data</li> <li>• Understanding of the system</li> <li>• The unpredictability of factors in the system (randomness)</li> <li>• Diversity of rules and mental models that determine stakeholder perceptions</li> <li>• Unpredictability, incomplete knowledge, or multiple knowledge frames about the natural</li> <li>• the system, technical system, or social system</li> </ul>

- Jakeman (2008)
- Data uncertainty, model uncertainty, human uncertainty
- Ascough (2008)
- Knowledge uncertainty: process understanding, model/data uncertainty
  - Variability: natural, human, institutional, technological
  - Linguistic uncertainty: vagueness, ambiguity, under specificity
- Broekmeyer (2008).
- Data or methods/knowledge gaps, inherent to complexity/ecological systems, societal
  - interpretation of effects and values
- Knol (2009)
- Location: model structure, parameters, input data
  - Nature: epistemic, ontic (process variability, normative uncertainty)
  - Range: statistical (range + chance), scenario (range + “what if”)
  - Recognized ignorance
  - Methodological unreliability
  - Value diversity among analysts
- Kwakkel (2010)
- Location: system boundary, conceptual model, computer model (structure, parameters
  - inside the model, input parameters to model), input data, model implementation, processed
  - output data
  - Level: shallow, medium, deep, recognized ignorance
  - Nature: ambiguity, epistemology, ontology
- Maxim (2011)
- Location in a model: content, process, the context of knowledge
  - Sources: lack of knowledge, variability, expert subjectivity, communication
  - Epistemic uncertainty: data, language, system
  - Aleatory uncertainty: variability, extrapolation
  - Combined Epistemic-Aleatory: model, decision



## APPENDIX-B THEORIES USED IN PPP



Source Cui, C., Liu, Y., Hope, A., & Wang, J. (2018)

**APPENDIX-C**  
**MEASURES AND OPERATIONALIZATION OF STUDY VARIABLES**

<b>nstructs</b>	<b>Dimensions</b>	<b>Op Definition</b>	<b>Code</b>	<b>Item Description</b>	<b>Source</b>
<b>Critical Success Factors for PPP</b> (CSFs are those key areas, whose existence will guarantee the success of a project and absence will lead to project failure (Muhammad & Johar, 2019).	<b>Political Factor</b>	<i>These factors are all about how and to what degree a government intervenes in the economy or a certain industry.</i>	PF1	Consistency in government policies affects PPP project success	Opawole et. al. (2019)
			PF2	Political stability and support effects PPP Projects' success	
			PF3	Provisions for reversion of policies can impact the PPP project's success	
			PF4	A clear contract stating responsibilities and liabilities have a role in PPP project success	
	<b>Finance Factor</b>	<i>The finance factor is a determinant of the risk-sharing framework, stability in the financial as well as in the consumer market, and access to the consumer market.</i>	FF1	Availability of risk-sharing framework will affect PPP project success	
			FF2	Availability and stability of financial market influence PPP project success	
			FF3	Availability and stability of consumer market is linked with PPP project success	
			FF4	Access to foreign finance has linkage to PPP project success	
	<b>Technical Factor</b>	<i>These factors pertain to innovations in technology that may affect the operations of the industry and the market favorably or unfavorably.</i>	TF1	Effectiveness of arbitration process influence PPP project success	
			TF2	The existence of a well-organized economic regulatory authority facilitate PPP project success	
			TF3	Availability of labor is important for PPP project success	
			TF4	Availability and efficiency of supporting infrastructure are helpful for PPP project success	

		TF5	Availability of indigenous technology is necessary for PPP project success
<b>Economic Factor</b>	<i>Economic factors are determinants of a certain economy's performance. Factors include exchange rates, inflation rates etc</i>	EF1	The stability of the exchange rate can affect the PPP project's success
		EF2	PPP project success is linked with the stability of interest rate
<b>Legal Factor</b>	<i>This factor includes specific laws that companies need to know what is and what is not legal to trade successfully and ethically.</i>	LF1	Implementation of international laws/codes regarding PPP can affect the PPP project's success.
		LF2	Predictability in legal regime and enforcement facilitate PPP projects.
<b>Market Maturity</b>	<i>It refers to the stability of exchange inflation rate, human capacity index related to PPP, and Tariff control policy along with tariff framework.</i>	MM1	The stability of the exchange inflation rate is linked with the success of the PPP project.
		MM2	PPP human capacity index has a linkage with PPP project success.
		MM3	Tariff control policy and availability of tariff framework can affect the PPP project's success.
<b>Procurement Factor</b>	<i>The procurement factor encompasses a broader spectrum of contractual relationships between the public and private</i>	PF1	The level of understanding of public-private alliance transactions can facilitate PPP projects.
		PF2	Competitiveness of the bidding process has a role in PPP project success.
		PF3	Performance Guarantee can help in PPP projects.
		PF4	Political will by the public sector has linkage

		<i>sectors to produce an asset and/or deliver a service.</i>		with PPP project success.	
			PF5	Availability of guarantee and stand-by financing play role in PPP project success.	
	<b>Regulation Factor</b>	<i>This factor deals with regulation laws on investment, land acquisition, and the legal framework of the concession.</i>	RF1	The existence of clear investment laws affects PPP project success.	
			RF2	Delay in land acquisition can affect the success of PPP projects.	
			RF3	The existence and adequacy of the legal framework for concession help in PPP projects.	
<b>Sustainable PPP Performance</b> (Sustainable PPP performance involves balancing the interests of multiple stakeholders, both inside and outside, and includes principles of systems thinking, value-added partnerships, and a focus on results (Burkett,	<b>Meeting Design Goals</b>		MDG1	The project shall be delivered on schedule	Liang & Wang (2019)
			MDG2	The project shall be delivered within budget	
			MDG3	The project shall be delivered with functional requirement	
			MDG4	The project shall be delivered with technical specification	
	<b>Benefits to the end User</b>		BEU1	Project outcome shall meet the needs of end-users in terms of reasonable service charges.	
			BEU2	Project outcome shall meet the needs of end-users in terms of timely supply.	
			BEU3	Project outcome shall meet the needs of end-users in terms of quantity.	
			BEU4	Project outcome shall meet the needs of end-users in terms of quality.	
			BEU5	Project outcome shall meet the needs of end-users in terms of overall satisfaction	
	<b>Benefits to Private Sector</b>		BPtS1	Cost Management in a project is a benefit to the private sector.	
		BPtS2	Marginal Profit obtained in a project is a benefit to the private sector		

2013).			BPtS3	Investment return from a project is a benefit to the private sector		
			BPtS4	Market opportunities can be used by the private sector as a benefit.		
			BPtS5	The private sector can achieve technical advances from a project.		
			BPtS6	Experience and knowledge will be enhanced at project completion		
			BPtS7	Project completion can act as reputation Improvement of the private sector.		
			BPtS8	Competitiveness enhancement is a benefit to the private sector after Project completion		
	<b>Benefits to Public Sector</b>			BPbS1		Economic benefits are a concern of the public sector.
				BPbS2		Government reputation is linked with project success.
				BPbS3		Service quality has a linkage with public sector reputation.
				BPbS4		A timely supply of public works can improve the public sector image
	<b>Preparing for the future</b>			PPF1		Long-term contributions to economic development can be made by PPP projects.
				PPF2		Long-term contributions to technical innovation can be made by PPP projects.
				PPF3		A long-term contribution to lifestyle shifting can be made by the PPP project.
				PPF4		Long-term contributions to industrial upgrades can be made by PPP projects.
<b>Environmental Uncertainty</b>	-----	Environmental uncertainty is linked with the changes in conditions outside the	EU1	The unpredictability of market development can influence the PPP's success.	Bstieler& Gross, (2003)	
			EU2	The unpredictability of technological development can influence the PPP's success.		

		organization which are beyond control and difficult to anticipate (Krishnan, Martin & Noorderhaven, 2006).	EU3	The instability of market development can influence the PPP's success.	
			EU4	The instability of technological development can influence the PPP's success.	
			EU5	The degree of market competition has a linkage with PPP project success.	
			EU6	The intensity of R&D efforts in the industry may influence PPP project success.	
			EU7	PPP project success can be influenced by the complexity of the marketplace.	
			EU8	The complexity of the technological development exposed to a new project can affect the project's success.	
<b>Joint Risk Management</b>	-----	Joint risk management (JRM) is an effective cooperative strategy to deal with risk allocation and deal with unforeseen events.	JRM1	Efficiency in managing project risks can influence project success.	Doloi, H. (2009)
			JRM2	Advantages in relationship agreements can have successful PPP projects.	
			JRM3	Effective monitoring and successful project delivery has a linkage with PPP project success	
			JRM4	Communication between partners affects PPP project performance.	
			JRM5	The importance of trust and confidence affects PPP project's success.	
<b>Trust</b>	-----	Trust is an attitude concerning the willingness to rely upon the action or be vulnerable to other parties under a partnership or social	Tr1	The benefit of the doubt amongst partners may influence PPP performance.	Nederhand&Klijn (2019)
			Tr2	The reliability of partners can play a role in PPP project performance.	
			Tr3	The absence of opportunistic behavior can lead to successful PPP project performance.	
			Tr4	Goodwill trust of partners is an ingredient to PPP project	

		obligation (Edkin& Smith 2006)		success.	
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## APPENDIX-D

### RESEARCH PARADIGMS COMPARISON

Questions for analyzing paradigms		Research paradigms	
		Positivism	Interpretivism
<b>Ontological questions</b>	Nature of reality	<ul style="list-style-type: none"> <li>▪ An objective, true reality exists which is governed by unchangeable natural cause effect laws</li> <li>▪ Consists of stable preexisting patterns or order that can be discovered</li> <li>▪ Reality is not time- nor context-bound</li> <li>▪ Reality can be generalised</li> </ul>	<ul style="list-style-type: none"> <li>▪ The world is complex and dynamic and is constructed, interpreted and experienced by people in their interactions with each other and with wider social systems i.e. fluid definitions of a situation created by human interaction/social construction of reality</li> <li>▪ Reality is subjective. People experience reality in different ways. Subjective reality is important i.e. what people think, feel, see).</li> <li>▪ Reality can only be imperfectly grasped.</li> <li>▪ The use of language defines a particular reality</li> </ul>
	Nature of human beings	<ul style="list-style-type: none"> <li>▪ Rational.</li> <li>▪ Shaped by external factors (same cause has the same effect on everyone) i.e. mechanical model / behaviorist approach. Under certain conditions people will probably engage in a specified behavior</li> </ul>	<ul style="list-style-type: none"> <li>▪ Social beings who create meaning and who constantly make sense of their worlds.</li> <li>▪ People possess an internally experienced sense of reality</li> </ul>



**Epistemological questions (cont)**

Nature of knowledge	<ul style="list-style-type: none"> <li>▪ Knowledge can be described in a systematic way</li> <li>▪ Knowledge consists of verified hypotheses that can be regarded as facts or laws.</li> <li>▪ Probabilistic – i.e. holds true for large groups of people or occurs in many situations</li> <li>▪ Knowledge is accurate and certain</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge is based not only on observable phenomena, but also on subjective beliefs, values, reasons, and understandings</li> <li>▪ Knowledge is constructed</li> <li>▪ Knowledge is about the <i>way</i> in which people make meaning in their lives, not just <i>that</i> they make meaning, and <i>what</i> meaning they make.</li> </ul>
Role of theory	<p style="text-align: center;">Theories are:</p> <ul style="list-style-type: none"> <li>▪ Normative</li> <li>▪ Present ‘models’</li> <li>▪ General propositions explaining causal relationships between variables</li> </ul>	<p style="text-align: center;">Theories:</p> <ul style="list-style-type: none"> <li>▪ Are revisable</li> <li>▪ Approximate truth</li> <li>▪ Are sensitive to context</li> </ul>
Theory building/testing	<ul style="list-style-type: none"> <li>▪ Postulate theories that can be tested in order to confirm or reject</li> <li>▪ Prove a theory from observable phenomena/behavior</li> <li>▪ Test theories in a controlled setting, empirically supporting or falsifying hypotheses through process of experimentation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Theories are built/constructed from multiple realities – the researcher has to look at different things in order to understand a phenomenon</li> <li>▪ Theory is shaped by social and cultural context</li> </ul>
Role of research	<ul style="list-style-type: none"> <li>▪ Uncover reality i.e. natural laws</li> <li>▪ Scientifically explain/describe, predict and control phenomena</li> </ul>	<ul style="list-style-type: none"> <li>▪ Study mental, social, cultural phenomena– in an endeavor to understand why people behave in a certain way.</li> <li>▪ Grasp the ‘meaning’ of phenomena</li> <li>▪ Describe multiple realities</li> </ul>

**Epistemological questions (cont)**

Research findings are true if	<ul style="list-style-type: none"> <li>▪ Can be observed and measured</li> <li>▪ Can be replicated and are generalisable</li> </ul>	<ul style="list-style-type: none"> <li>▪ Research has been a communal process, informed by participants, and scrutinized and endorsed by others.</li> </ul>
Role of common sense	<ul style="list-style-type: none"> <li>▪ None– only deductive reasoning</li> </ul>	<ul style="list-style-type: none"> <li>▪ Common sense reflects powerful everyday theories held by ordinary people</li> <li>▪ Iterative and inductive reasoning used</li> </ul>

## APPENDIX E

### RESEARCH QUESTIONNAIRE

#### Questionnaire Survey

Dear Sir/Madam,

This letter requests your kind assistance in completing the attached Questionnaire, which I am using to collect data for my Ph.D.. research.

I am currently working on the topic of “**Sustainable Public Private Partnership Projects Performance: Moderated-Moderation of Environmental Uncertainty, Joint Risk Management and Trust**”.

Your assistance in completing this survey is completely voluntary and confidential but will be highly appreciated. Please give the most thoughtful and candid answers according to your expertise and skills in Public private partnership projects. The survey will take about 15-20 minutes to complete. All responses, once received are completely confidential and reported in summary format. If you would like to receive the result of this survey, please indicate in the end of questionnaire.

Thank you for your assistance.

If you have any questions about this survey please feel free to contact me via e-mail [waseemalitipu@gmail.com](mailto:waseemalitipu@gmail.com)

Muhammad Waseem Ali Tipu

Cell No: 0300-4122313

Ph.D.. Scholar

Supervisor: Prof. Dr Ali Imtiaz

Bahria University Islamabad Campus

**Sustainable Public Private Partnership Projects Performance: Moderated-  
Moderation of Environmental Uncertainty, Joint Risk Management and Trust**





	2)	Competitiveness of the bidding process has a role in PPP project success.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3)	Performance Guarantee can help in PPP projects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4)	Political will by the public sector has linkage with PPP project success.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5)	Availability of guarantee and stand-by financing play role in PPP project success.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>h.</b>	<b>Regulation Factor:</b> This factor deals with regulation laws on investment, land acquisition, and the legal framework of the concession.								
	1)	The existence of clear investment laws affects PPP project success.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2)	Delay in land acquisition can affect the success of PPP projects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3)	The existence and adequacy of the legal framework for concession help in PPP projects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. **Sustainable PPP Performance.** Sustainable PPP performance involves balancing the interests of multiple stakeholders, both inside and outside, and includes principles of systems thinking, value-added partnerships, and a focus on results (Burkett, 2013).

*Mention your perception of sustainable PPP performance.*

S#	Items								
a.	<b>Meeting Design Goals</b>								
	1)	The project shall be delivered on schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2)	The project shall be delivered within budget	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3)	The project shall be delivered with functional requirement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4)	The project shall be delivered with technical specification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	<b>Benefits to the end User</b>								
	1)	Project outcome shall meet the needs of end-users in terms of reasonable service charges.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2)	Project outcome shall meet the needs of end-users in terms of timely supply.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3)	Project outcome shall meet the needs of end-users in terms of quantity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4)	Project outcome shall meet the needs of end-users in terms of quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5)	Project outcome shall meet the needs of end-users in terms of overall satisfaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	<b>Benefits to Private Sector</b>								







3)	The absence of opportunistic behavior can lead to successful PPP project performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4)	Goodwill trust of partners is an ingredient to PPP project success.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*End of the questionnaire*  
*Thank you for your valuable contribution*

Other suggestions and comments:

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**Need Survey Result : Yes / No**

**If (Yes) please mention email id: \_\_\_\_\_**