FIRM PERFORMANCE THROUGH SUSTAINABLE PUBLIC PROCUREMENT IN POWER SECTOR OF PAKISTAN: ROLE OF MANAGEMENT SUPPORT AND REGULATORY POLICIES

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Dedication

To my **family** without whom this work would have been incomplete. In the hope that this work may in some way contribute to the field of Sustainable Public Procurement in Pakistan. I would like to dedicate this work to **Altamash Anwar; my husband,** who has been my constant source of support and encouragement throughout this journey. He has always believed in me and motivated me to pursue my academic goals. He was also patient and understanding when I had to spend long hours working on this project. I am grateful for his love, care, and companionship.

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“Then which of the Blessings of your Lord will you deny.”

(Surah Ar-Rehman)

First and foremost, to my creator, most gracious and the most beneficent, **ALLAH (S.W.T)**, I owe it all to you, Thank you! There have been many people who have stood by me through good times and bad and helped me get where I want to be. Please accept my gratitude for them.

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Abstract

As society learns to recognize the critical requirement for sustainability in current days, it is compelled to encourage responsible behaviors which achieve a balance between social equity, environmental protection, and economic competitiveness. There are numerous factors that hinder the implementation of Sustainable Practices in developing nations. Although the research on sustainable procurement acknowledges multiple factors i.e., Management Support and Regulatory Policies/guidelines as relevant, little consideration has been given to how they affect the intensity of sustainable procurement. Therefore, this study aims to investigate the role of management support in sustainable procurement and firm performance. This study is also aimed at investigating the moderating role of regulatory bodies on the relationship between management support and sustainable procurement. Data was collected from the power sector of Pakistan, specifically the National Transmission & Despatch Company (NTDC). About 300 employees were approached through a questionnaire, however, 234 responses were collected successfully. Data was analyzed by using SPSS & SmartPLS 4.0. It was found that management support has a positive impact on the implementation of Sustainable public procurement (SPP) practices and ultimately improving the firm's economic, environmental and social performance. However, this study found that because of absence of substantial regulatory policies regarding SPP in Pakistan, there is no significant moderation impact of regulatory policies on implementation of SPP in Power Sector. This study adds value to the knowledge on sustainable public procurement practices implementation in Pakistan power sector by highlighting the role of management support and regulatory policies.

Keywords – Sustainable Procurement, Management Support, Firm Performance, Regulatory policies, Pakistan Power Sector, Pakistan Public Procurement

Table of Contents

List of Figures

List of Tables

List of Abbreviations

ADB	Asian Development Bank
AFD	Agence Française de Développement (AFD)
BPS	Basic Pay Scale
DISCO	Distribution Company
ESIA	Environmental & Social Impact Assessment
EU	European Union
FP	Firm's Performance
GDP	Gross Domestic Product
GPP	Green Public Procurement
HTMT	Heterotrait-Monotrait
ICT	Islamabad Capital Territory
JICA	Japan International Cooperation Agency
KFW	Kreditanstalt für Wiederaufbau
KPK	Khyber Pakhtoon Khwa
MS	Management Support
OECD	Organization for Economic Cooperation and Development
PEPCO	Pakistan Electric Power Company
PLS	Partial least square
PP	Public Procurement
RP	Regulator Policies
SCM	Supply Chain Management
SEM	Structural equation modelling
SP	Sustainable Procurement

SPP	Sustainable Public Procurement
SPSS	Statistical Package for Social Science
WAPDA	Water and Power Development Authority
WB	World Bank
WCED	World Commission on Environment and Development

CHAPTER 1

INTRODUCTION

1.1. Background

Many businesses, both public and private, hold "sustainability" in high regard as a philosophy and a management principle(Roman, 2017). Therefore, sustainability has become the main concern as well as a challenge for current and future generations. Sustainability; commonly defined as “development that meets the needs of current generations without compromising the ability of the future generations to meet their own needs” (Keeble, 1988, p. 20), is becoming increasingly important to the government as a means of encouraging and promoting sustainable development and optimal use of available resources. Sustainability consists of three main aspects: economic, social, and environmental (Fisk, 2010). Islam et al. (2017) have argued that Sustainable procurement (SP) techniques to be beneficial for a variety of market transformations, cost savings, enhanced financial transparency, green industry competitiveness, natural resource protection, and job creation goals, all of which contribute to sustainable development.

The definition of Sustainable Public Procurement (SPP) is that it is a purchasing process that takes into consideration the economic, environmental, social, and institutional impacts of the entity's expenditure (Zaidi et al., 2019). In other words, SPP enables governments to satisfy their needs for works, goods, services and utilities in a way that generates advantages not just for the organization, but also for the economy and society, while remaining well within environmental carrying capacity (10YFP, 2015). SPP is often defined as the procurement of goods, services, and works, with consideration for their impact on

people, the planet, and profits. It can be employed as a tool to facilitate the shift towards a sustainable economy. Over the years, sustainable procurement has gained a lot of popularity in academics and business, illustrating how a company may use its purchasing and supply chain activities to fulfill its corporate social responsibility objectives (Appolloni et al., 2014; Brammer & Walker, 2011).

Organizations are no longer solely focused on profit maximization; rather, most of them are profoundly concerned about how their activities are affecting the three Ps: People, Planet and profit (Ghosh, 2018). These are known as the three pillars of sustainable development. Although it is not universal, the tripartite model as shown in **Figure 1-1**, is frequently used to represent sustainability by depicting the intersection of three circles: society, environment, and economy. The intersection point of these three circles represents sustainability (Purvis et al., 2019a).

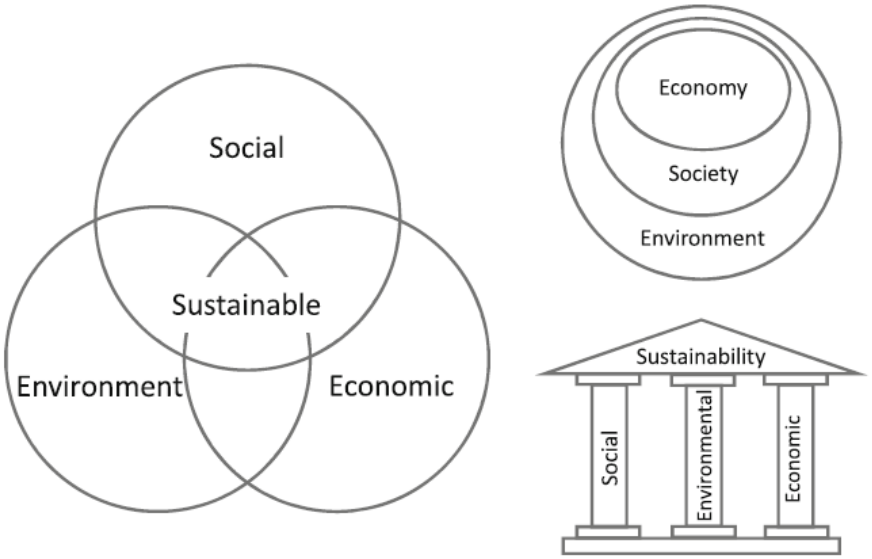

Figure 1-1*: Left: Conventional depiction of sustainability as three circles that intersect; Right: Alternative representations, including a depiction as literal pillars and a concentric circles approach (Purvis et al., 2019a).*

The degradation of the environment in recent decades has significantly heightened public awareness of environmental concerns. As a result, a company's reputation regarding environmental matters now has an increasing influence on the public's perception of the company (Drumwright, 1994). The level of a procuring organization's participation in green purchasing is directly linked to their recognition of the significance of adhering to environmental regulations (Min & Galle, 2001). Businesses can also take advantage of the

increasing environmental awareness to attract new customers by demonstrating a responsible and commendable attitude towards environmental issues. This approach can serve as a way to increase their visibility (Wycherley, 1999).

Islam et al. (2017) demonstrated that SP practices contribute to the financial performance of organizations through the mediation of non-financial performance processes. Consequently, in addition to being the most important ethical and moral concern in business circles, sustainability has grown into a crucial aspect in competitive advantage strategy and organizational plans. This is primarily due to the fact that the triple bottom line perspective is gaining increasing attention in both national and international economies (Blome & Paulraj, 2013; Carroll & Shabana, 2010). However, for many companies, it is becoming increasingly difficult to identify win-win scenarios, indicating a potential conflict between profitability and sustainability (Hussain, 1999).

After conducting a survey of program managers, Delmonico et al. (2018)'s primary suggestion is to categorize the impediments to sustainable procurement into five groups: organizational culture, market factors, motivation, operations and economic uncertainty. Although sustainability has gained significant attention in the media, it remains inadequately defined, and there is limited knowledge about the specific factors that motivate or impede the adoption of environmentally sustainable practices by organizations. This is particularly evident in the context of purchasing and supply management, where the implementation of sustainable practices is not well understood (Giunipero et al., 2012, p. 258).

To procure in a sustainable manner, it is necessary to consider the long-term consequences of each project and procurement and not just focus on short-term needs. Organizations that implement SPP do not base their decisions on a private cost-benefit analysis but instead strive to maximize overall benefits for both themselves and the broader society. This involves taking into account the impacts on the environment, society, and economy (ADB-SPP, 2021).

Sustainable procurement is viewed as a crucial aspect of sustainable supply chains in developing countries (Mathivathanan et al., 2018). Literature shows that over 70% of developed country budgets are allocated to public procurement (Punjab, 2015). The public procurement sector possesses significant purchasing power, accounting for approximately 12% of gross domestic product (GDP) in Organization for Economic Co-operation and

Development (OECD) countries, and up to 30% of GDP in several developing nations (OECD, 2023). Approximately 60 billion Euro is spent annually on public procurement in the Netherlands, with 10 billion Euro being expended by the central government and 50 billion Euro by decentralized governments (van Weert et al., 2016). In the European Union, this percentage is approximately 16 percent of GDP, while in the United Kingdom and Japan, it is 14 percent and 20 percent, respectively and developing countries are likely to have higher percentages (Perera et al., 2007).

Utilizing this purchasing power through encouraging SPP methods and directing that spending towards more environmentally friendly products and services, which are consistent with national priorities and policies can influence markets to favour innovation and sustainability, facilitating the shift to an economy based on sustainability (ADB-SPP, 2021). Public procurement is carried out across several sectors, ranging from construction, education, and health to energy, food, transportation, and defense (Mont & Leire, 2009).

In Pakistan, electricity generation, transmission and dispatch are among the most important areas of public procurement. The electricity industry uses a considerable percentage of the national budget. In the Budget for 2022-23, PRK 7.953 billion has been allocated for Power division Development expenses (Budget, 2022).

The reason being that electricity can serve as an indication of a nation's modern development. Due to recent increases in actual economic activity and energy consumption, Pakistan has a major lack of generation capacity, and few recent attempts to enhance power generation capacity have been successful. Therefore, increasing investment in generation capacity is crucial for overall economic growth of the Country and electricity conservation in every industry should be prioritized for the nation's sustainable economic growth to ensure that it is available for usage in profitable ways (Jamil & Ahmad, 2010).

Considering the importance and demand for sustainability, now the electricity companies also adopt and state publicly their goals for utilization of sustainable sources like wind, hydropower and solar for generation of power (Mollenkamp, 2022). Consequently, implementing SP procedures in the power sector is of the highest significance, particularly for developing nations such as Pakistan.

1.2. Literature Gap

Recent developments have reinforced the strategic significance of procurement and supply as a tool for promoting sustainable development. Sustainable Development (SD) has gained significant importance on a global scale and was established as an "overarching policy goal" by governments at the Earth Summit on Development and Environment (Sourani & Sohail, 2011). As the concept has gained more recognition, there are now over 200 definitions of sustainable development. Nowadays, companies must embrace sustainability measures to gain a competitive edge while also avoiding any trade-offs with sustainability considerations (Smith & Ball, 2012).

Moreover, environmental and social concerns are gaining significance in all facets of corporate management due to the growing consciousness of societal and political leaders. These changes have assisted the development of SP practices, which are today seen as an essential part of corporate management that may enable businesses to achieve their stated objectives (Islam et al., 2017). However, demonstrating and justifying the benefits of implementing SPP, particularly in terms of quantifying the impacts on health, social conditions, and the environment, can present challenges (ADB-SPP, 2021).

The majority of literature on sustainable procurement practices commonly reveals a greater number of drivers than barriers (Delmonico et al., 2018). This may be attributed to the fact that scholars in this domain tend to focus on researching and presenting the positive aspects of the field, rather than the barriers that hinder sustainable procurement practices (Grandia et al., 2014). Another explanation could be that there is a social desirability bias among organizational participants in research, leading them to emphasize drivers over barriers (Walker et al., 2008).

Most of the literature studies the determinants of public procurement differently in developing and developed countries. Some of the investigations into the implementation of SPP in developing nations indicated that additional incentives, such as enhanced organizational efficiency, direct inducements, and stakeholder pressure, are necessary to promote adoption of SPP in these countries (Cheng et al., 2018; Delmonico et al., 2018). Despite various studies on practice implementation from diverse angles, no research has focused on identifying the primary practices and the mutual influences among those practices

within a leading sector in a developing country (Mathivathanan et al., 2018). However, the existing literature mainly covers the developed economies and investigated the factors for developed countries (Zaidi et al., 2019).

The effects of SP practices on economic performance of business have not been well studied, particularly for Middle Eastern nations (Islam et al., 2017). Further, recent findings indicate that relatively little research on SP practice in developing or underdeveloped nations, particularly the south Asian area, has been published (Mansi, 2015). Specifically, there are numerous factors that hinder the implementation of SP in developing nations like Pakistan (Zaidi et al., 2019). Another point worth noting is that certain drivers that are recognized can also function as obstacles. For instance, regulations can either facilitate or impede sustainable procurement practices, serving as a motivator for proactive companies or being viewed as a restriction by others (Porter & Linde, 1995).

Further, recent investigation endeavors have tried to identify the influence of SP on financial, fiscal, environmental, social, and request-related outcomes (Ghosh, 2018). Although the tremendous increase of study in the subject of SP is commendable, there are still substantial research gaps, as shown above, that must be addressed (Islam et al., 2017). Few empirical studies have examined the influence of sustainable procurement strategies on the economic performance of firms, according to academics (Yook et al., 2018). The reason for the absence of prior empirical research on these aspects could be that these have not been explored yet in detail. Therefore, this study aims to investigate the relation of sustainable procurement on economic performance along with the social and environmental performance of the organizations.

1.3. Problem Statement

The strategic approach of SPP advocates for the integration of the key aspects of sustainable development, including economic and social development, environmental protection, and high-quality institutional governance (ADB-SPP, 2021). Globally, business and government organizations' awareness in SP (McMurray et al., 2014), ethical procurement (Wild & Zhou, 2011), green purchasing (Carter & Jennings, 2004), lean techniques (Karim &

Arif-Uz-Zaman, 2013) and e-procurement (Angeles & Nath, 2007) has risen significantly in recent years. Despite this growing interest, there is currently little indication of organizational performance in applying SP methods (Islam et al., 2017).

The key stakeholders for any company to implement sustainable procurement include (1) the government, which establishes standards, rules, and regulations; (2) society, whose demand for goods drives production and who ultimately serve as end consumers; and (3) internal stakeholders and managers who determine the organization's actions and despite divergent perspectives, the fundamental principle of sustainability is a shared factor used to evaluate the actual circumstances by these stakeholders (Mathivathanan et al., 2018).

Accordingly, Grandia et al. (2014), states that the obstacles for implementation of SP Practices stem from three organizational factors: dedication, support from senior management, and competence. To create secure, prosperous, and fair societies while minimizing environmental and social risks, it is imperative for government organizations to set an example by taking the lead in the public sector (Perera et al., 2007). Further, legitimacy and guaranteed follow up on SPP may be achieved by implementation of procurement regulatory infrastructure introducing sustainability and environmental concerns (Benchekroun et al., 2019).

Islam et al. (2017) established that SP techniques unquestionably assisted firms in achieving greater performance by enhancing their internal quality and operating procedures, proactiveness, efficiency, accountability, and social and environmental responsiveness. Although the research on sustainable procurement acknowledges these factors i.e. Management Support and Regulatory Policies/guidelines as relevant, little consideration has been given to how they affect the intensity of sustainable procurement (Grandia et al., 2014). SPP implementation studies have paid little attention to public sector organizations. Thus, future research is required to devote more attention to the public sector (Walker et al., 2008).

Considering the preceding discussion, this study will examine the effect of managerial support and the moderating effects of regulations on the adaptation and implementation of SP practices and their influence on the environmental, social, and economic performance of an organization. It is evident from the existing literature that SPP in the power sector of Pakistan is crucial for achieving the country's sustainable development goals and mitigating the

environmental impacts of the energy sector. Therefore, this study will be conducted on SPP in developing economies such as Pakistan, and its findings may be extrapolated to other developing nations because their economic systems are comparable (Zaidi et al., 2019). Consequently, this research is focusing on the procurement methods and regulatory rules now in place for the deployment of SPP in the power industry of a developing economy, namely Pakistan.

1.3.1. Research Objectives

Based on the aforementioned debate and the literary gap in the subject of SPP implementation in Pakistan, we propose the following main objectives of this study are:

- To investigate the extent of impact and involvement of management support in adoption of SPP practices.
- To investigate the impact of regulations and policies on adoption and implementation of SPP practices.
- To examine the direct effect of adopting SPP practice on the organization's performance (economic, social and environmental).

Understanding the factors that enable or impede the implementation of SPP, as perceived by organizations, can be able to aid in achieving successful adoption of SPP.

1.3.2. Research Questions

Based on the research objectives described above, research questions that will be addressed by this study are as follows:

RQ1: What is the impact of Management Support on implementation of SPP practices?

RQ2: What is the mediation impact of SPP practices on the relationship between management support and firm's performance?

RQ3: to what extent regulatory policies moderate the relationship between management support and SPP practices?

1.4. Significance

This study intends to determine the extent to which management support influences the adoption and implementation of sustainable procurement in businesses within the Power Sector. The role of regulatory frameworks in moderating the connection between management support and sustainable procurement is also going to be investigated. Finally, the mediating role of SPP practices between management support and the organization's performance will be investigated. Scholars have argued that the quality of research in operations management gets improved by repeating the previous studies in distinct setting and utilizing new and different data sets (Singhal et al., 2008).

This study aims to define 'sustainability' as the beneficial impacts on society, environment, and economy resulting from government purchasing practices. By gaining a deeper comprehension of how management and regulations relate to SPP implementation in an organization, it is possible to enhance the efficacy of SPP as a tool for promoting sustainable market development. Additionally, such an understanding may yield valuable insights on how to effectively incorporate sustainability goals into procurement projects, contributing to the professionalization of the procurement field.

This study will contribute to the body of literature regarding the implementation of SP within Pakistan's public sector by identifying the significance of management support and the presence of regulatory policies facilitating effective SP in the public sector, particularly the power sector, in order to enhance organization's performance and reduce adverse effects on society and the planet in general. Main motivation is to add value to the knowledge regarding sustainable procurement practices in Pakistan.

CHAPTER 2

LITERATURE REVIEW

2.1. Theoretical Background

Academic and practitioner literature is increasingly addressing the numerous challenges associated with development, including climate change, environmental degradation, resource depletion, and fair trade. The rise in the number of published papers on sustainable supply and procurement management in recent years reflects this trend (Walker & Brammer, 2012). Most of the theoretical background for sustainable public procurement is based on the principles of sustainable development, the triple bottom line, and responsible and ethical sourcing. By taking these concepts into account, public procurement can play a critical role in promoting sustainability and creating a more sustainable future for all.

In this chapter, the concepts of sustainability, sustainable procurement, public procurement, sustainable public procurement will be explained in the context of existing literature and the practices of public procurement in Pakistan Power sector will be discussed in the light of the existing regulations and policies for public procurement.

2.1.1. Sustainability

“Sustainability refers to the ability to maintain or support a process continuously over time. In business and policy contexts, sustainability seeks to prevent the depletion of natural

or physical resources, so that they will remain available for the long term" (MOLLENKAMP, 2022). Over the literature, it has been observed that academicians and practitioners debate diversly regarding the repercussions of sustainability (Abbasi, 2012). Regardless of the fact that the concept of sustainability is easily tracked back in philosophical and economical literature (Harding, 1968; Linton et al., 2007), however, management literature adopted it in beginning of 1990's (Linton et al., 2007).

Over the time, various issues/barriers like policies, cooperate citizenship, social practices, political systems, international trade, economic growth and environmental concerns have been raised and highlighted which hinder the sustainable development (Vachon & Mao, 2008). Organizations achieve equilibrium among their economic, social, and environmental objectives through sustainability practices (Mathivathanan et al., 2018).

Abbasi (2012) exposed that "environmental pressure" is a major driver of the shift toward sustainable practices. His study further showed that in Pakistan, organizations are in different stages of adopting & implementing sustainable practice.

Researchers debate that the three-pillar conception of sustainability including environment, society, economy; did not arise from a single source. Rather, it gradually emerged with the studies and research on the topic. Additionally, the United Nations' effort to reconcile economic growth with social and ecological issues also played a role in its development (Purvis et al., 2019a).

2.1.2. Sustainable Procurement

Sustainable procurement is defined as "a process whereby organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst minimizing damage to the environment" (APCC, 2007). Sustainable buying is commonly used to mitigate negative environmental consequences associated to both consumption and production (Grandia et al., 2014). Accordingly, Walker and Brammer (2009) have mentioned that sustainable development is the prime focus of the sustainable procurement. Sustainable procurement is constantly under development; it started by

including only the environmental concerns in the procurement process, however, the concept has now grown to include the economic as well as social performance criteria and institutional goals (ADB-SPP, 2021).

Benchekroun et al. (2019) have clearly mentioned that local government cooperation to include environmental, social and complete economic costs along with concerns for wellbeing of the local community in the procurement process, is the ultimate requirement of sustainable development. To incorporate sustainable development principles into procurement operations, Sustainable Procurement (SP) goes beyond traditional procurement practices. It focuses on ensuring social justice, preserving the environment, and building a strong and resilient economy (Sourani & Sohail, 2011). Sustainable procurement includes the impact areas (USM, 2022) as shown in **Figure 2-1**:

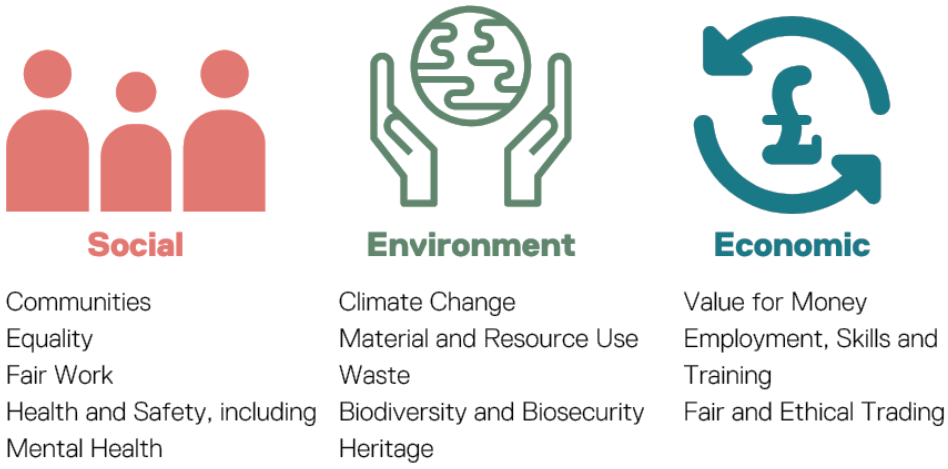

***Figure 2-1**: Sustainable Procurement Principles (USM, 2022)*

The dominant theoretical framework for defining 'sustainability' is based on the three pillars of society, environment, and economy, also known as people, planet, and profit. According to this model, these pillars represent the key components of sustainability. Nonetheless, there is currently no widely accepted theoretical framework that defines the interrelationships between the three pillars of sustainability. As a result, there exist various versions of this tripartite concept that vary depending on the specific relationships between these pillars. Due to the absence of a consistent definition and the various interpretations,

sustainability is an open-ended concept that can be understood differently in various contexts. This can create challenges when attempting to put the concept of sustainability into practice (Purvis et al., 2019a).

Globally, there is a growing focus on SPP and associated practices like Green Public Procurement, Public Procurement for Innovation, and Circular Procurement in the international context (Trindade et al., 2017). Green Public Procurement (GPP), which is a commonly referenced form of Sustainable Public Procurement in literature; is characterized by a focus on reducing the environmental impact of products or services throughout their entire lifecycle (Rainville, 2017) as compared to what would have been procured otherwise. However, the main difference between SPP and GPP lies in the fact that GPP is solely focused on the environmental aspect of sustainability, whereas SPP takes into account the social and economic pillars as well (Cheng et al., 2018). Their research also revealed that GPP has been widely embraced in numerous countries and regions, particularly within the European Union (EU).

Managing sustainability risks and opportunities should be a part of the procurement process, but it is important to ensure that the assessment, analysis, and procurement strategy are appropriate and proportionate to the size, nature, and complexity of the procurement (ADB-SPP, 2021). It is not easy to define procurement goals and objectives, which must be based on procedures for obtaining the best environmental and social alternatives. These choices are supported by life-cycle analyses and full-cost accounting, which are new to most procurers. SPP can be considered as a combination of regulations, policies, and procedures aimed at incorporating economic, social, and environmental sustainability risks into the decision-making and processes involved in public procurement (Perera et al., 2007). Walker et al. (2008) found through their research that drivers and barriers to SP practices implementation could stem from internal as well as external sources within an organization.

2.1.3. Public Procurement

The term "Procurement" applies to both government and businesses, but there are significant differences between procurement in the public sector and procurement in the

private sector. The main difference remains that public sector organizations are obligated to adhere to public procurement laws and regulations, while private sector organizations are not (New et al., 2002a). In many countries, the government/public sector is the largest and most valuable client (Benchekroun et al., 2019). Public procurement is the act of acquiring and obtaining goods, works, service by the public bodies with the use of public money (Uyarra & Flanagan, 2010). Government agencies, including ministries, schools, hospitals, and the military, are major buyers that handle significant budgets and procure large quantities of goods and services annually, known as public procurement (Bratt et al., 2013).

Public procurement objectives may be divided into two main categories: Primary Objectives & Secondary Objectives. Since tax money is the main source of funding for public procurement, therefore the primary objective is to protect public interest, achieve high quality of work/service and ensure efficiency (OECD, 2015). Whereas the secondary objective is to achieve social benefits such as sustainable economy development or fair international social conditions motivation (Rainville, 2017). Governmental organizations are typically constrained by national and international regulations in their procurement processes. For instance, some national procurement laws mandate that public organizations treat the market fairly and equitably, with transparency in the process and criteria that are proportional to the monetary value of the tender.

More pressure is faced by the public sector to resolve sustainability barriers as compared to the private sector, as the public sector has the responsibility to ensure the wellbeing of the society (Benchekroun et al., 2019). Incorporating strategic patterns in the process of public procurement can result in cost-effectiveness of public resources and a reduction in corruption during procurement operations (Guarnieri & Gomes, 2019). The complexity of sustainable procurement has increased due to various factors that have influenced the evolution of modern procurement, particularly in the public procurement sector (Panayiotou et al., 2004). Zhu et al. (2013) performed an investigation into the connection between motivators and sustainable practices within the domain of public procurement.

Most research studies on initiatives related to the environmental aspect of SPP have focused on the private sector. This is lamentable, considering that the public sector's focus on societal development and well-being could make it an ideal environment for such projects.

However, it is unclear whether the lack of attention given to the public sector in these studies reflects a lack of environmental supply practices in the public sector or simply a lack of research in this area (Walker et al., 2008).

2.1.4. Sustainable Public Procurement

Sustainable Public Procurement refers to refers to procurement of works, goods and services keeping in view the economic, social and environmental concerns and ensuring the best value for money without any harm to the environment (Roman, 2017; Walker & Brammer, 2012). SPP brings innovation and value for money to the organization's purchase (Zaidi et al., 2019). ADB-SPP (2021) mentions that throughout the procurement cycle, sustainable public procurement concerns are encountered at various stages. Further, the ADB guidelines also mention that the best approach to achieve SPP is to design a fit-for-purpose procurement process managing the sustainability risks and opportunities throughout the process.

The key internal and external factors that drive the adoption of SPP practices have been identified in a literature review by Walker et al. (2008). These factors encompass organizational aspects, regulations, customer demands, competition, and societal expectations. Notably, the literature review does not indicate that suppliers play a significant role in driving SPP practices. The main obstacles to adoption include internal factors such as costs and legitimacy concerns, as well as external factors such as regulatory issues, lack of supplier commitment, and industry-specific challenges (Walker et al., 2008).

Sustainability is typically broken down into three parts: society, environment, and economics (people, planet, profit). However, there is no specific academic description available to describe the three pillars and the relation among them. Accordingly, due to absence of any explicit description and variable models regarding the relation of the three pillars, sustainability is considered to be an open concept with various interpretations and understandings. Therefore, Purvis et al. (2019b) state that is it difficult to operationalize sustainability. Specific standard guidelines for sustainable procurement should be established by the specific industries councils and industry representatives, which require close

coordination and collaboration between the industry and the government in order to bring awareness regarding sustainable procurement (Wong et al., 2016).

2.1.5. Public Procurement in Pakistan

In Pakistan, the public procurement is regulated and monitored by Public Procurement Regulatory Authority (PPRA) Rules (PPRA, 2002). The latest version of PPRA Rules was published in 2021. PPRA's objective is to ensure value for money, accountability, efficiency, good governance, transparency, and fair competition. PPRA has federal and provincial versions to be followed by public organizations falling in federal or provincial territory. However, PPRA Rules have so far not introduced framework and rules for sustainable procurement. Once the rules for SPP are introduced by PPRA, the organizations would feel more pressure to follow the same and be inclined toward SPP.

International Financing Institutes (IFI) like World Bank (WB), Asian Development Bank (ADB), Japan International Cooperation Agency (JICA), United States Agency for International Development (USAID), etc., have well established sustainable procurement guidelines. IFIs providing funding for public sector development (PSDP) projects in Pakistan, required compliance to their SP guidelines in true sense and ensure the same. ADB ensures the compliance to their procurement regulations and guidelines by the borrowers and the executing agencies by providing an overseeing the complete procurement process in developing countries (ADB-SPP, 2021).

Most of the literature studies the determinants of public procurement differently in developing and developed countries. However, the existing literature mainly covers the developed economies and investigated the factors for developed countries (Zaidi et al., 2019). The purpose of this research is to examine public procurement in developing nations like Pakistan, however, the findings should still be transferable to other developing nations with comparable economic systems (Zaidi et al., 2019).

2.2. Hypotheses Development

2.2.1. Management Support & SP

A variety of drivers related to SPP implementation are associated with organizations. Previous research indicates that managerial support is crucial for any firm to achieve its sustainability objectives. Zsidisin and Siferd (2001) mentioned that procurement managers have a crucial role in pushing corporations to be more attentive to the necessities of the plant. Management support influences favorably the connection with customers and suppliers in sustainable supply chain, and management seems to have a direct effect on the success of the business (Lee & Joo, 2020). Blome and Paulraj (2013) also contended that top management commitment is a significant driver for adoption of SP Practices. Further, Ashenbaum (2008) asserted that adoption or postponement of the SPP implementation is subject to the management's commitment and design of the organizations process and structure. If leaders or senior management place more importance on actions related to sustainability, the deficiencies in attitudes and organizational culture will ameliorate (Delmonico et al., 2018).

The findings of the research of Mathivathanan et al. (2018) demonstrate that commitment of the management toward sustainability and adopting the triple bottom line approach in strategic decision-making are the most impactful methods for implementing sustainable procurement. Their research serves as a basis for industrial managers to comprehend the interrelationships among these practices and enhance the likelihood of successful implementation of sustainable procurement practices.

It is important to create specialized training programs aimed at enhancing the skills of public sector procurement officials and the management in integrating product and performance-related criteria in the procurement process. The training should focus on evaluating procurement requirements, establishing specifications and award criteria, drafting and supervising contracts, as well as assessing outcomes. These stages of the procurement process are crucial for achieving sustainability objectives and are the most practical aspects to address (Perera et al., 2007).

The commitment of top management, including a dedication to overall ambitions and support, as well as the provision of a financial budget; is crucial in facilitating the integration

of sustainability via organizational change (Ageron et al., 2012). Top management may send a strong strategic message by allocating greater resources to proactive environmental activities (Blome & Paulraj, 2013). They further claimed that absence of management's commitment turns out to be a foremost barrier for application of sustainable procurement in public sector. However, according to Maignan et al. (2002), despite acknowledging the significance of corporate social responsibility, several procurement managers are uncertain about the practical and structured methods to incorporate social issues into their purchasing decisions. For a solution to this issue, numerous researchers have suggested that training can serve as a powerful remedy against "environmental illiteracy" in order to alter the mindsets of the concerned (Bowen et al., 2001; Carter & Dresner, 2001). Zaidi et al. (2019) mentions that implementing sustainable procurement is not possible if the management and the purchasing officers consider it ineffective.

Based on this literature discussion, we hypothesize that management support impacts the firm's performance as well as the adoption and implementation of SP practices in the firm.

- *H1: Management support impacts the firm's social, economic and environmental performance.*
- *H2: Management support impacts the adoption and implementation of sustainable public procurement practices in firms.*

2.2.2. Regulatory Policies for SP Implementation

The fundamental prerequisites for SPP are established by national laws and regulations. SPP will not legitimately be the focus of strategies and action plans that are implemented across the whole public sector without such a framework (Perera et al., 2007). The acceptance of sustainable procurement methods in organizations is largely contingent on regulatory rules. Etse et al. (2022) have mentioned that the clear influence of regulatory policies on SP practices helps to demonstrate the connection between specific regulatory policies and related practices, however it is inadequate to provide a thorough understanding of the complete effect of regulatory policies on sustainable procurement practices. Initiatives aimed at environmental regulation that are taken proactively are more likely to promote successful SPP initiatives (Bowen et al., 2006).

Nevertheless, the degree of conformity or opposition to regulatory policies is contingent on a number of organizational characteristics, including managerial support and commitment to the adoption of sustainable regulatory rules. The mere existence of regulatory procedures is insufficient to assure an organization's compliance and adherence with these requirements (Etse et al., 2022). Governments shall declare some sustainable procurement rules and practices to be mandatory to be followed by procuring organizations (Barrero, 2010). Adoption of sustainable procurement principles may also be encouraged through rewards in shape of some sort of tax rebates or price subsidies (Zhu et al., 2013).

SPP proponents also contend that an organization-wide (and perhaps national government-wide) effort in environmental management and social responsibility is necessary to integrate SPP into procurement practices (Perera et al., 2007). Benchekroun et al. (2019) mentioned that Governments may use their buying capacities to make significant advancements in sustainable development principles through public procurement by means of legislation, policy guidelines, technological innovation, and consumer demand. It is emphasized that SPP and whole-life costing's full potential can only be realized if they are supported by the proper legal environment (Perera et al., 2007). Another point worth noting is that regulations can either facilitate or impede SPP implementation, serving as a motivator for proactive companies or being viewed as a restriction by others (Porter & Linde, 1995). When, the regulations are very stringent and act as barriers, Innovation may be impeded by environmental legislation and regulation that mandates the utilization of best available practices and imposes impractical timelines (Porter & Linde, 1995).

Conclusively, external regulations and laws seem to be a significant motivator for companies to undertake SPP initiatives, particularly if the companies are proactive and creative in their efforts to comply with regulations (Walker et al., 2008). The preceding discussion serves as the foundation for the following hypotheses:

- *H4: Existence of regulatory policies moderates the relationship between management support and sustainable public procurement practices.*

However, there are studies which shed light on the existence of absence of regulations for sustainability in Pakistan. The absence of regulatory policies for sustainable procurement in Pakistan has been identified as a significant challenge, hindering the implementation of

environmentally responsible practices in supply chains (Noor et al., 2012). Further, the lack of regulatory frameworks addressing sustainable procurement also hampers Pakistan's ability to meet international sustainability standards and commitments (Zaidi et al., 2019). In light of these studies, H4 will be examined in the context of Pakistan Power sector.

2.2.3. SP & Firm's Performance

Based on the analysis of relevant literature, this research proposes that a company's performance (environmental, social and economic) will benefit from management's adherence to previously established regulations and government policies/guidelines for sustainable procurement implementation. (Blome & Paulraj, 2013) found that adoption of sustainable procurement positively impacts the firm's economic and environmental performance.

According to Gadenne et al. (2012), a company's improved performance on one or more SP areas is correlated with a greater emphasis on its unique SP implementation practices. SP methods significantly aided businesses in obtaining higher performance by boosting their internal quality and operations, proactivity, efficiency, responsibility, and sensitivity to the social and environmental surroundings (Islam et al., 2017). Patrucco et al. (2017) have concluded that since the operations of SPP are the primary determinants of ultimate firm performance, reinforcing or inhibiting decisions at the policy level, the SPP mechanism serves as the central component of the procurement system in public organizations.

According to a study by the (OECD, 2023), the implementation of life-cycle costing and accrual accounting in certain countries has facilitated the broader adoption of sustainable public procurement (SPP) in the public sector, particularly in the medium and long term, resulting in ultimate economic benefits for the organizations. Encouraging sustainable procurement practices can also serve as a signal to the economy that there is a consistent need for sustainable goods and services, thereby providing an incentive for sustainable enterprises to thrive (Perera et al., 2007).

The literature study reveals that limited research studies have been carried out to assess the direct environmental, social, and economic effect of sustainable procurement on the organization's performance. Accordingly, we hypothesize the following:

- *H3: Sustainable Public Procurement practices impacts the firm's environmental, social and economic performance.*
- *H5: Sustainable public Procurement practices mediates the relationship between management support and firm's social, economic, and environmental performance.*

2.2.4. Hypothesized Research Model

A hypothesis-driven research model provides a framework for systematically testing and exploring the relationships between variables, aiming to validate or reject a proposed hypothesis. It guides researchers in formulating predictions, designing experiments, and drawing conclusions, fostering a structured and evidence-based approach to scientific inquiry. It serves as the foundation for empirical investigations, offering a clear and focused direction for scientific inquiry. It helps researchers formulate testable predictions, design experiments or studies, and analyze the data to draw meaningful conclusions.

Based on the above discussed literature review of the existing study and the hypothesis development, figure 2 below shows the theoretical research model to be investigated through this study:

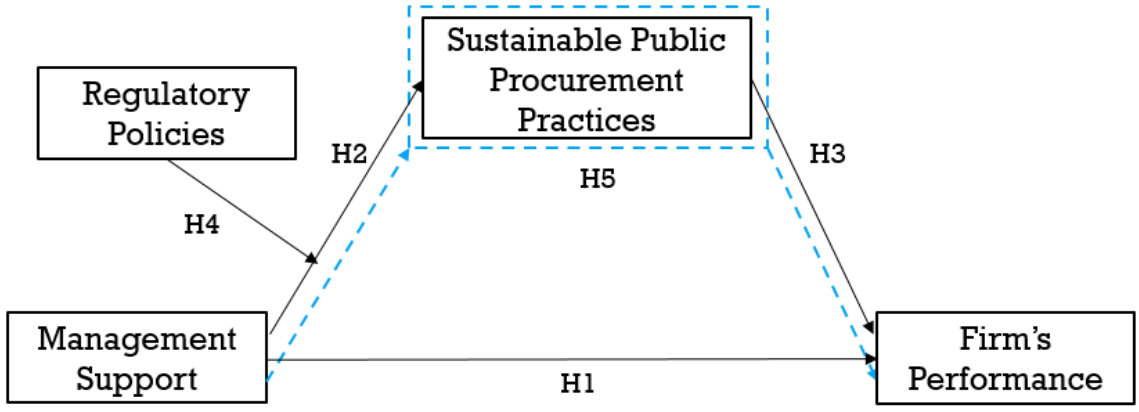

***Figure 2-2**: Hypothesized Research Framework*

CHAPTER 3

RESEARCH METHODOLOGY

This section explains the research methodology that serves as the guiding framework that outlines the systematic approach employed to gather, analyze, and interpret data in a study. It will establish the foundation for reliable and valid research outcomes, ensuring rigor and credibility under this study. By delineating the methods and techniques employed, this section illuminates the path through which the research objectives will be achieved.

3.1. Population

The target population for this research is the power sector of Pakistan, specifically the National Transmission & Despatch Company (NTDC). Most of the procurement in the Power Sector is handled by NTDC, approximately Rs 56 billion was invested under this area in FY2021 (Tahir Basharat Cheema, 2022).

NTDC was established on November 6, 1998, and began commercial operations on December 24, 1998. It was established to assume ownership of all the rights, obligations, assets, properties, and liabilities of 220 KV and 500KV Grid Stations and Transmission Lines/Network in the ownership of Pakistan Water and Power Development Authority (WAPDA). NTDC connects Power Generation Units to the Load Centers spread all over the Country (including Karachi) and hence creates and operates one of the biggest interlinked networks.

NTDC is a very big organization employing over 10,000 employees working under BPS 1 to 20 structure. NTDC is involved in procurement of specialized equipment, software, works, consultancies for construction and maintenance of Transmission line and Grid Stations as well as general equipment like IT equipment, Furniture, and stationery for office use. The details of NTDC major procurement items are given in **Figure 3-1**. NTDC spends almost 55 Billion per annum on PSDP project, which consists of almost equal portion of NTDC own resources and IFI Loans/Grants (NTDC, 2022). Major financing sources for NTDC projects are shown in **Figure 3-2**. Therefore, this study will focus on the procurement practices being utilized by NTDC.

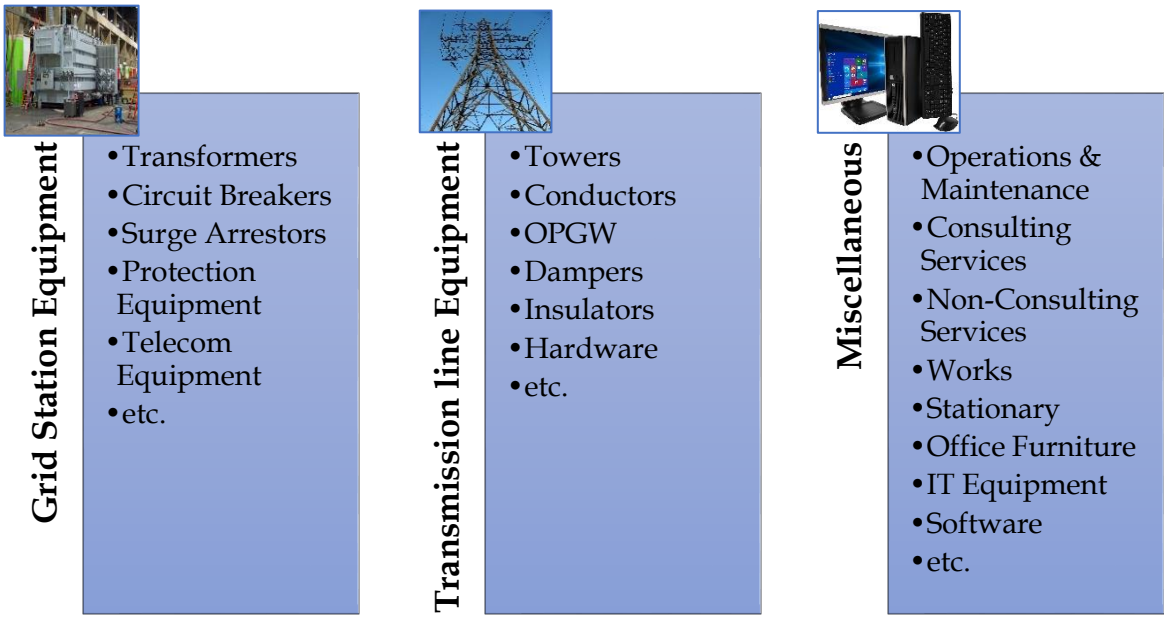

***Figure 3-1**: NTDC Major Procurement Categories*

Out of total 10,000 employees; for this study, NTDC employees directly or indirectly linked with PSDP projects and Operations & Maintenance procurement/purchasing are taken as the target population. These employees range from key position holders i.e., General Managers, Chief Engineers, Procurement Manager, Project Managers, Procurement staff. BPS 17 to 20 employees fall under this categorization which are almost 1500 employees. These employees are posted all over Pakistan. Accordingly, out of total population of 1500, the respondents were selected as per the proposed sampling technique to participate in this research.

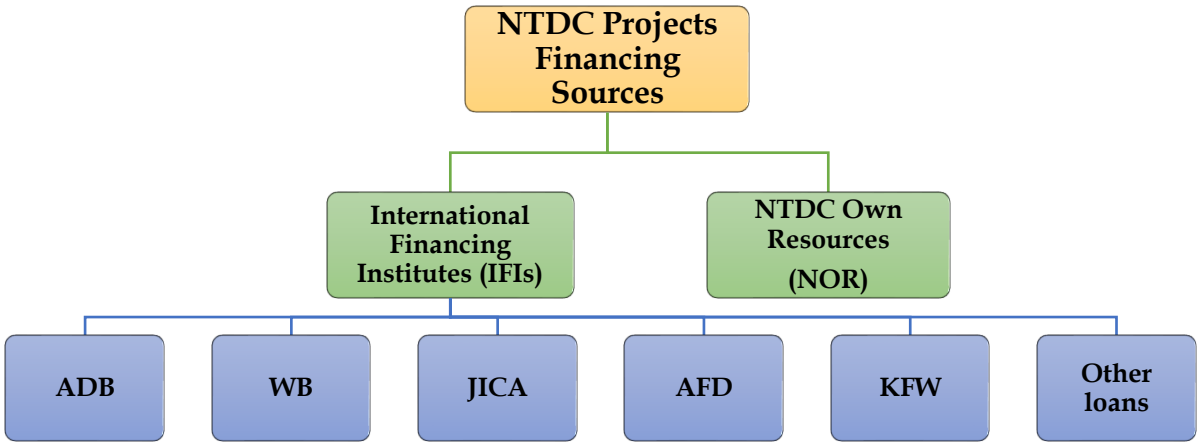

***Figure 3-2**: NTDC Financing Sources*

3.2. Sample Size and Sampling Technique

It was planned to approach at least 300 employees selected in accordance with the below mentioned sampling technique; to study the research model proposed in this research. The sample size is decided in accordance with the Krejcie and Morgan Sampling Method (Krejcie & Morgan, 1970). The samples were selected from the total proposed population which is a mix of higher management, middle management and line managers directly or indirectly involved in purchasing.

Two stage sampling procedure is used for this study. Two-stage sampling technique can be an effective way to obtain a representative sample of a population, especially when the population is large and dispersed, which is exactly the case in this study. It allows researchers to efficiently sample from a large population while maintaining a high level of accuracy and precision. The two-stage sampling technique involves selecting samples in two stages. The researcher may use various sampling techniques for each stage.

In this study the first stage was the selection of samples randomly based on the simple random sampling. The second stage was then to analyze the samples selected in the first stage and select the samples which were convenient to access for the researcher; in accordance with

convenience sampling. This selection procedure is based on the pros and cons of both the techniques and the limitations of the researcher.

Simple random sampling is one of the most basic and best sampling techniques offering the benefits of no sampling biases and effective representation of the complete population (Alvi, 2016). However, it may become costly, or time constraints may arise due to the vast demographic location of the population. Therefore, the benefits like inexpensiveness and time efficiency of using Convenient Sampling (Alvi, 2016) will be utilized for the employees at varied geographic locations.

Although the survey was conducted online to facilitate responses from respondents posted at different locations. However, easy access for the researcher was necessary for the researcher to be able to explain the research objectives in person to the respondents or on calls, if required.

3.3. Measurement and Instrumentation

The purpose of this research is to explore the relationship among the above-mentioned variables i.e., the effect of management support on the adoption of SP practices, the moderating effect of regulations/policies on this relation, and ultimately the mediating effect of SP practices of firm's environmental, social and economic performance. These inter-relationships have been discussed in detail in the literature review.

Qualitative and quantitative research are the two options to carry out the study in any field. Both have their own qualities and limitations. However, quantitative research emphasizes precise, objective and generalizable findings, unlike the objective of qualitative research (Guo, 2013). Therefore, in order to accomplish the objectives of this study, quantitative research approach was opted, and the data was collected through an online questionnaire.

The detail of the items selected to measure each of the research variables is as below:

- The scale for the measurement of the relation between management support and sustainable procurement was adopted from Carter and Jennings (2004) and few items were adapted from Ghosh (2018).

- The scale for measuring the effect of policies and regulations on adoption of SP was adopted from Etse et al. (2022), which has initially been adapted from Lin and Ho (2011). Few items were directly adopted from Etse et al. (2022).
- The scale for measuring the Sustainable Public Procurement was adopted from Meehan and Bryde (2011); (Zhu et al., 2005).
- The scale for measuring the organization's performance in terms of environment, social and economic aspects was adopted from (Saqib & Zhang, 2021) which has initially been adopted from Gadenne et al. (2012); (Sezen & Cankaya, 2013).

A total number of 17 research variables-specific questions was finalized. All the questions are measured on a Likert scale of 1 to 5 with 5 being Strongly Agree, 4 being Agree, 3 being Neutral, 2 being Dis-Agree and 1 being Strongly Dis-Agree.

The Questionnaire consisting of a general overview of the research, some general information like age, education, experience, posting location of the respondents and the research-specific questions; was standardized and circulated among the respondents through online survey.

3.4. Data Collection Procedure

In order to gather valid information, a well-structured questionnaire was designed based on the above-described measuring scales. The questionnaire is placed at Annexure-A to this thesis report. Firstly, approval from the concerned authority in NTDC was obtained to approach the employees and collect their feedback for this study. After obtaining approval, the employees selected through the above-described sampling techniques were contacted personally by the researcher and were briefed regarding the objectives, procedure and significance of this study.

The questionnaire was formed using google forms in order to ensure easy access. The selected employees were requested to fill in the questionnaire keeping in view the current practices being utilized by NTDC for Procurement/purchasing. The link to the questionnaire was sent to the respondents through WhatsApp. The questionnaire is arranged as per the items/variables being studied. The respondents were briefed in detail regarding each aspect

and the objective associated with each. Any or all queries of the respondents were addressed and responded to by the researcher to facilitate better understanding and to gather valid data.

3.5. Data Analysis Technique

The data analysis step manages the acquired data by scaling it down to an appropriate size, categorizing and tabulating it, spotting relationships between data groups, and using statistical methods. (Cooper et al., 2003). Once the empirical data is collected through the online questionnaire, the subsequent step is to analyze the data to address the research questions.

Multiple data analysis tools exist to analyze and study the data for research purpose which ensure proper data analysis for its validity, reliability. However, selecting the appropriate statistical data analysis tool assists to achieve accuracy as well as robustness so that the researcher may be able to accomplish the intended research objectives (Ong & Puteh, 2017).

Statistical Package for the Social Sciences (SPSS) was used to perform frequency analysis for demographics of the collected data through the above-mentioned questionnaire and data collection process for this research. Ong and Puteh (2017) have suggested that SPSS is good statistical tool to analyze the data if research involves a set of independent and dependent variables and the objective is to examine the causal and effect relationship. They have mentioned that SPSS provides the benefits of basic checking the missing values in the data, checking the data distribution etc. during the preliminary data analysis for research purpose (Ong & Puteh, 2017).

Confirmatory factor analysis (CFA) and Structural Equation Modeling (SEM) were performed on Smart PLS. Two stage data analysis was performed. The first stage was to evaluate the accuracy and reliability of the data through measurement model equation. The structural model was then assessed to examine the proposed hypothesis and furnish the path coefficients.

CHAPTER 4

DATA ANALYSIS

Data analysis is a crucial component of research that involves examining, interpreting, and drawing meaningful conclusions from collected data. It employs various statistical techniques and methods to uncover patterns, relationships, and trends within the data. Data analysis aids researchers in testing hypotheses, exploring research questions, and providing evidence to support their research findings (Creswell & Creswell, 2017).

The process of data analysis encompasses the reduction of gathered data to a feasible volume, categorization and organization, identification of patterns and correlations within data clusters, and the utilization of statistical methods (Cooper et al., 2003). Upon acquiring the empirical data via questionnaires, the subsequent stage involves analyzing the data in order to address the research questions. This chapter outlines the methodology employed to scrutinize the unprocessed data, offering comprehensive insights into data preparation, content and frequency analysis, as well as descriptive statistical analysis.

4.1. Data Preparation

The data was collected from an online google survey form. The link to questionnaire was conveyed to the selected respondents on their official WhatsApp number with request to provide as relevant feedback as possible regarding implementation of SPP practices at NTDC.

A total of 236 responses were received from the respondents. Excel file was exported from the google database and the strings were converted to numeric in order to facilitate data

analysis. Proper data preparation enhances the accuracy and reliability of research findings and facilitates subsequent statistical analyses (Pallant, 2013).

4.2. Frequency Analysis

Frequency analysis is a valuable tool in research for understanding the distribution and occurrence of variables within a dataset. It involves counting the frequency of each unique value or category and presenting it in a tabular or graphical format. This analysis aids researchers in identifying common or rare occurrences, assessing the prevalence of specific phenomena, and gaining insights into the overall pattern of data. Frequency analysis is particularly useful in descriptive studies, survey research, and exploratory data analysis (Babbie, 2020; Creswell & Creswell, 2017).

After conversion of the data to numeric values, it was observed that two responses were blank, therefore, they were discarded and a total of 234 responses were subjected to further analysis and testing. Frequency analysis was performed on the demographic information of the respondents through SPSS as shown the **Table 4-1** .

It is evident from the demographics that most of the respondents were male (77.4%) which is very valid as the NTDC is an Engineering Company and most of the employees are males. However, a good number of female employees (53 out of 234) also submitted their valuable feedback to support this study.

The respondents were from diverse age groups as most of the respondents were under the age group 26-35 years (48.3%), 12% were below 25 years, 28.2% were under the age group 36-45 years, 8.5% were under the age group 46-55 years, in addition to 3% being above the age of 55 years. This accordingly implies the working experience pf the employees.

One positive aspect of the NTDC employees which is also commendable is that most of the employees are highly educated with 29.9% being bachelor’s degree holders, 67.5% being master’s degree holders and 1.7% being PhD Degree holders.

Out of the total 234 respondents, 89.9% are working on regular posts; however, 11.1% are currently working on Contract basis. The frequency analysis shows that from these respondents, 45.7% are working on BPS-17, 37.6% are working on BPS-18, 12.8% are working on BPS-19 and 3.8% are working on BPS-20.

Table 4-1: *Demographic Distribution of Data*

Gender			
	Frequency	Percent	Cumulative Percent
Male	181	77.4	77.4
Female	53	22.6	100.0
Total	234	100.0	
Age Group			
	Frequency	Percent	Cumulative Percent
Below 25	28	12.0	12.0
26-35	113	48.3	60.3
36-45	66	28.2	88.5
46-55	20	8.5	97.0
Above 55	7	3.0	100.0
Total	234	100.0	
Qualification			
	Frequency	Percent	Cumulative Percent
Bachelors	70	29.9	29.9
Masters	158	67.5	97.4
Post Doc.	4	1.7	99.1
Others	2	.9	100.0
Total	234	100.0	
Employment Type			
	Frequency	Percent	Cumulative Percent
Regular	208	88.9	88.9
Contractual	26	11.1	100.0
Total	234	100.0	
Basic Pay Scale-BPS			
	Frequency	Percent	Cumulative Percent
BPS-17	107	45.7	45.7
BPS-18	88	37.6	83.3
BPS-19	30	12.8	96.2
BPS-20	9	3.8	100.0
Total	234	100.0	
Experience level			
	Frequency	Percent	Cumulative Percent
Below 5 years	49	20.9	20.9
5 to 10 years	65	27.8	48.7
10 to 20 years	94	40.2	88.9
20 to 30 years	22	9.4	98.3
More than 30 years	4	1.7	100.0
Total	234	100.0	
Province of Posting			
	Frequency	Percent	Cumulative Percent
KPK	36	15.4	15.4
Punjab	137	58.5	73.9
Baluchistan	19	8.1	82.1
Sindh	35	15.0	97.0
ICT	7	3.0	100.0
Total	234	100.0	

Table 4-2: Descriptive Statistics of Research Items

	N		Min	Max	Mean	Median	Mode	Std. Deviation	Skewness	Kurtosis
	Valid	Missing								
SPP1	234	0	1	5	3.85	4.00	4	.819	-1.077	1.135
SPP2	234	0	1	5	3.81	4.00	4	.927	-.878	.272
SPP3	234	0	1	5	3.91	4.00	4	.828	-1.056	1.385
SPP4	234	0	1	5	4.08	4.00	4	.846	-1.092	1.241
SPP5	234	0	1	5	4.00	4.00	4	.903	-.988	.762
MS1	234	0	1	5	3.47	4.00	4	.913	-.764	.011
MS2	234	0	1	5	3.51	4.00	4	.845	-.844	.278
MS3	234	0	1	5	3.54	4.00	4	.860	-.877	.300
RP1	234	0	1	5	2.94	3.50	4	1.300	-.282	-1.394
RP2	234	0	1	5	3.87	4.00	4	1.073	-1.046	.460
RP3	234	0	1	5	3.67	4.00	4	1.179	-.658	-.601
RP4	234	0	1	5	2.70	3.00	2	1.178	.059	-1.217
FP1	234	0	1	5	3.55	4.00	4	.884	-1.023	.569
FP2	234	0	1	5	3.08	3.00	4	1.022	-.091	-1.334
FP3	234	0	1	5	4.05	4.00	4	1.016	-1.185	.945
FP4	234	0	1	5	3.77	4.00	4	1.111	-.821	-.218
FP5	234	0	1	5	3.75	4.00	4	.980	-1.004	.854

The demographics also show that the data has been collected from a diverse range of experienced employees with experience upto more than 30 years. Out of 234 valid responses, 20.9% responses were from employees having less than 5 years' experience, 27.8% response were from employees having 5 to 10 years' experience, 40.2% response were from employees having 10 to 20 years' experience, 9.4% response were from employees having 20 to 30 years' experience and 1,7% response were from employees having more than 30 years' experience.

Out of the 234 respondents, 15.4% respondents were from the KPK province, 58.5% respondents were from the Punjab province, reason being the head quarter of the company is based in Lahore accommodating more than 3 to 4 thousand employees, 8.1% respondents were from the Baluchistan province, 15% respondents were from the Sindh province and 3% respondents were from the ICT.

4.3. Descriptive Analysis

Descriptive data analysis plays a fundamental role in research, providing researchers with valuable insights into their data. It involves summarizing and presenting data in a meaningful way, allowing researchers to gain a deeper understanding of their variables of interest. Descriptive analysis helps in identifying patterns, trends, and distributions within the data, enabling researchers to make informed decisions about further analyses and interpretation. This analysis is essential for generating accurate and reliable research findings (Creswell & Creswell, 2017; Hair, Black, et al., 2019).

The descriptive data analysis to see the basic statistics of the research items i.e., Minimum, Maximum, Mean, Median, Mode, Standard Deviation, Skewness, Kurtoses etc., was also performed on the SPSS too as shown in **Table 4-2** in detail containing data regarding all the items under analysis.

4.4. PLS-SEM Model and Data

Figure 4-1shows the illustrative partial least square structural equation modelling (PLS-SEM) model that was developed in Smart PLS based on the hypothesis developed in section two of this report in order to do the hypothesis testing by calculating the p-values. This

model has four latent variables: Management Support (MS) - Independent variable, Regulatory Policies (RP) - Moderator, Sustainable Public Procurement (SPP) - Mediator and Firm Performance (FP) - Dependent Variable.

Management Support (MS) measures the degree to which the management provides support and resources for implementation of SPP in the firm's procurement process. This exogenous or independent latent variable in the model is the only independent variable in this study. The firm's overall performance, represented as firm performance (FP), serves as the main endogenous or dependent latent variable in the model, capturing the firm's adaptation of sustainable public procurement practices as a measure of its overall performance.

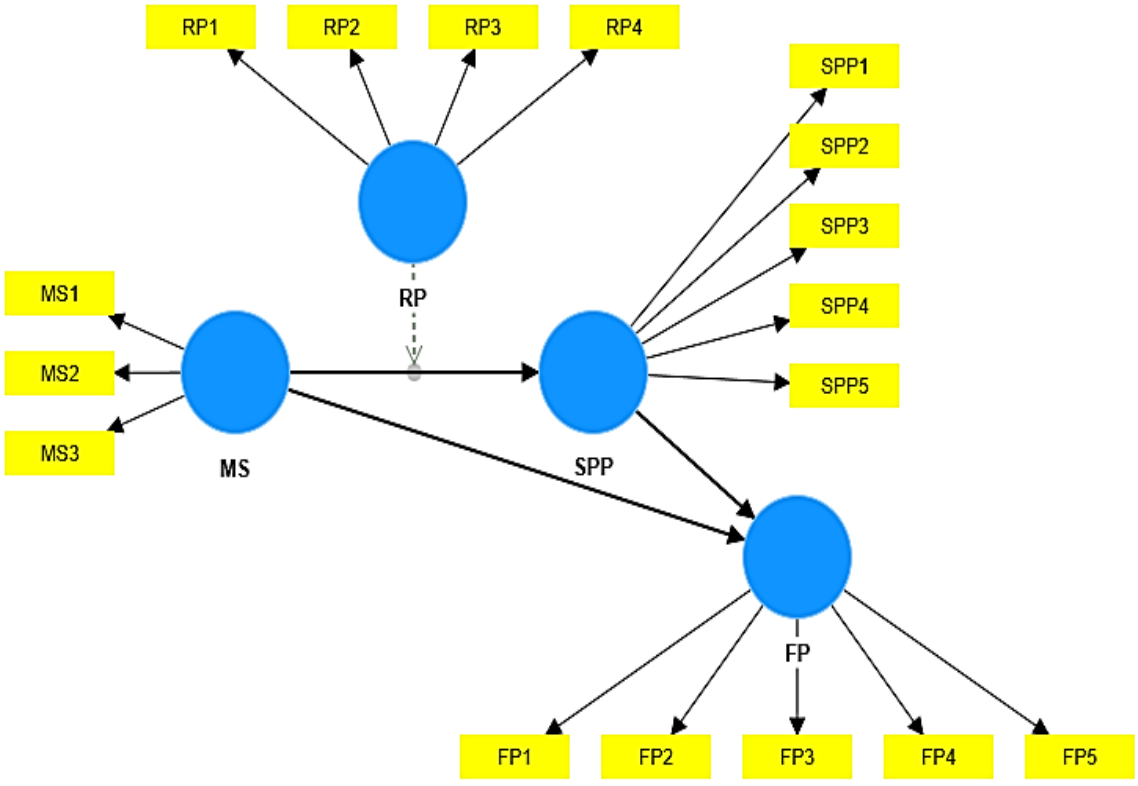

Figure 4-1: *PLS Model*

Sustainable public procurement (SPP) mediates the indirect relationship between MS & FP. Whereas the Regulatory Policies (RP) is hypothesized to moderate the relation of MS & SPP, ultimately impacting FP.

4.5. Inner Vs Outer Research Model

Research models can be understood in terms of outer research model and inner research model.

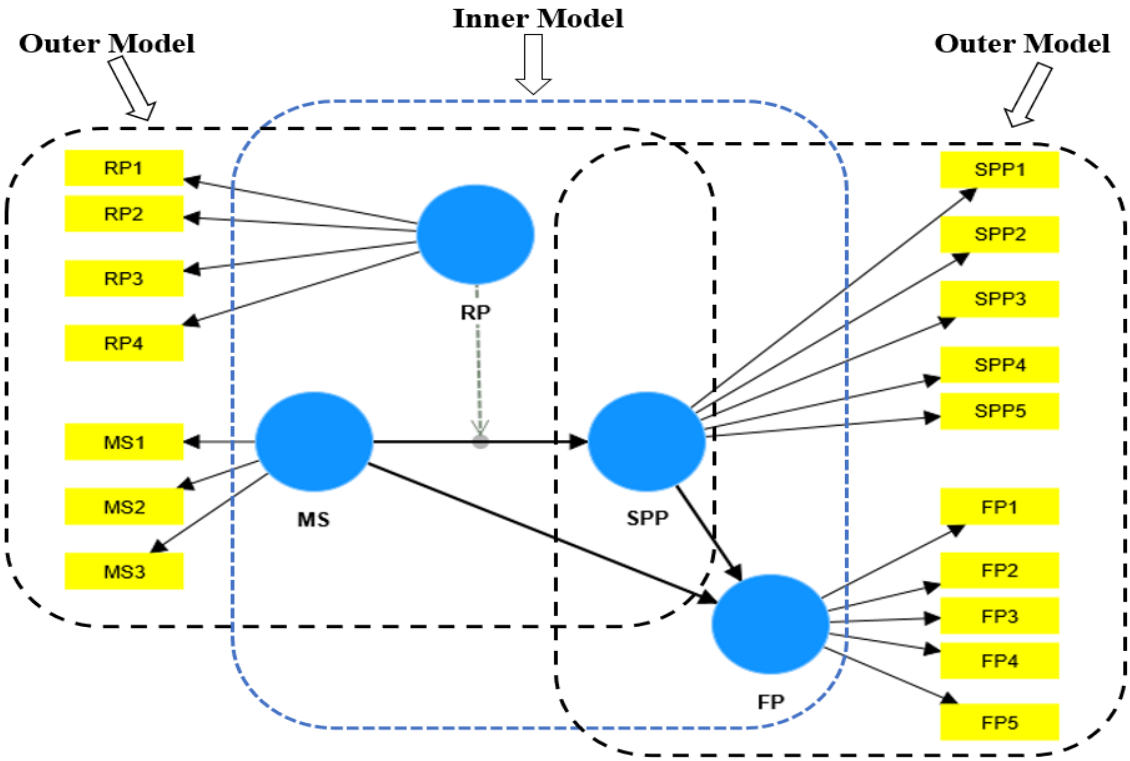

Figure 4-2: *Inner Vs Outer Model*

4.5.1. Inner Model

The inner research model, on the other hand, focuses on the specific details and techniques used within the research study. It involves the operationalization of variables, the selection of research methods and data collection techniques, and the statistical analysis or data modeling techniques employed to test the research hypotheses or answer the research questions. The inner research model provides the specific steps and procedures used to gather and analyze data within the broader framework of the outer research model. For this study, the inner model consists of the main research variables i.e., MS: Management Support-Independent variable, RP: Regulatory Policies-Moderator, SPP: Sustainable Public

Procurement-Mediator and FP: Firm Performance-Dependent Variable and the relationship among them as shown in **Figure 4-2**.

4.5.2. Outer Model

The outer research model refers to the overall framework or conceptual model that guides the research study. It represents the broader theoretical or conceptual framework within which the research is conducted. The outer research model typically includes the main constructs or variables of interest, their relationships, and the research hypotheses or research questions being investigated. For this research the outer model contains the constructs/items of each research variable and their relationship with the research variables i.e., MS: Management Support-Independent Variable is measured with the help of three items MS1, MS2, MS3; RP: Regulatory Policies-Moderator is measured in terms of four items RP1, RP2, RP3, RP4; SPP: Sustainable Public Procurement-Mediator is measured in terms of five items SPP1, SPP2, SPP3, SPP4, SPP5 and FP: Firm Performance-Dependent Variable is measured through five items FP1, FP2, FP3, FP4, FP5 as shown in **Figure 4-2**.

CHAPTER 5

RESEARCH RESULTS

This section presents and discusses the results and findings from the data analysis of the research variables performed on Smart PLS, describing the details of the illustration model, the inner vs. outer research model. Providing the results for reliability test, validity tests performed through measurement model on PLS and the hypothesis testing by calculating the p-value through the structural model analysis.

5.1. Measurement Model

Ensuring the authenticity and trustworthiness of research findings relies heavily on the crucial elements of validity and reliability within the survey questionnaire (Brodsky & Given, 2008), which are assessed by the measurement model in the Smart PLS. The measurement model in Smart-PLS helps researchers evaluate the reflective and formative indicators of their constructs, estimate factor loadings, assess convergent and discriminant validity, and calculate reliability measures such as Cronbach's alpha and composite reliability (Sarstedt et al., 2021). This model provides researchers with valuable insights into the measurement properties of their research instruments. **Table 5-1** lists down the thresholds to be met for acceptability of the measurement model, which are explained in the subsequent sections.

5.1.1. Validity Test

Construct validity pertains to the degree to which the items within a scale effectively capture the abstract or theoretical construct. The assessment of construct validity focuses on

determining the significant loading of an item on the factor it intends to measure (Brodsky & Given, 2008).

***Table 5-1**: Thresholds for Measurement & Structural model*

	Criterion	Indicator	Thresh-holds	Source
Measurement Model	Internal Consistency / Reliability	Cronbach's alpha (α)	$\alpha > 0.7$	(Pallant, 2013)
		Composite Reliability (CR)	CR > 0.7	
	Indicator Reliability	Factor Loadings	Factor Loading > 0.7	
	Convergent Validity	Average Variance Extracted (AVE)	AVE > 0.50	
		Hetrotrait - Monotrait Ratio (HTMT)	HTMT < 0.85	(Gefen et al., 2000; Henseler et al., 2015)
	Discriminant Validity	Fornell and Lacker	Square root of AVE for each construct must be more than correlations between constructs.	(Fornell & Larcker, 1981)
		Cross Loadings	Item's loading of each factor is highest for its designated construct	
Structural Model	P-Value	Significance level	p-value < 0.05	(Gefen et al., 2000; Hair et al., 2011)
	T-Value	T-statistic	t-statistic > 1.96	
	Coefficient of Determination	R-Square	The higher the better: $0 < R^2 < 0.25$ => low $0.25 < R^2 < 0.5$ => moderate $0.5 < R^2 < 0.75$ => High $0.75 < R^2$ => High	(Hair et al., 2011; Kleijnen & Sargent, 2000)

5.1.1.1. Convergent Validity

To establish convergent validity, the provided data goes through additional analysis, focusing on evaluating the extent to which the indicators of a construct accurately converge on their respective construct (Qureshi et al., 2021). For this study, the convergent validity is measured as average variance extracted (AVE) through PLS measurement model. Academics have emphasized the significance of obtaining an average variance extracted (AVE) value greater than 0.50 for reflective constructs. In the present study, all the constructs demonstrate AVE values exceeding the threshold of 0.5, providing evidence of the convergent validity of the collected data as shown in **Table 5-4**. The AVE of the construct MS is 0.736, of the construct FP is 0.527, of the construct RP is 0.803 and of the construct SPP is 0.638. the results are shown in the **Table 5-4**.

5.1.1.2. Discriminant Validity

Discriminant validity is also a critical concept in research that refers to the extent to which different constructs measure distinct concepts. It ensures that the measures used in a study are not overlapping or redundant. to evaluate discriminant validity. By demonstrating that their measures are distinct, researchers establish the validity and reliability of their constructs, enhancing the credibility of their findings (Fornell & Larcker, 1981; Hair, Risher, et al., 2019).

This study provides the results of the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio for evaluating the discriminant validity of the data. The results of the Fornell-Larcker are shown in **Table 5-4**. The results suggest that the constructs explain more variance with its own indicators than with other constructs in the model (Fornell & Larcker, 1981).

The HTMT ratio compares the correlation between constructs with the correlations between constructs and their indicators. A value below 0.85 indicates good discriminant validity, suggesting that the constructs are distinct from each other. The HTMT ratio can be used to evaluate the uniqueness and non-redundancy of the constructs, ensuring that they measure distinct latent variables (Gefen et al., 2000; Henseler et al., 2015). HTMT ratios for

this study variables are well within the threshold, establishing that the research variables are distinct from each other. The results of HTMT are shown in **Table 5-2**.

Table 5-2: *Discriminant Validity - Hetrotrait - Monotrait Ratio (HTMT)*

	FP	**MS**	**RP**	**SPP**	**RP x MS**
FP					
MS	0.470				
RP	0.380	0.475			
SPP	0.579	0.571	0.457		
RP x MS	0.085	0.367	0.379	0.231	

Table 5-3 shows the cross loadings for verifications of discriminant validity, which satisfy the criterion mentioned in the **Table 5-1** i.e., the factor loading should be maximum for its relevant construct.

Table 5-3*: Cross Loadings of items*

	FP	**MS**	**RP**	**SPP**
FP1	**0.985**	0.512	0.349	0.581
FP3	**0.592**	0.234	0.313	0.388
FP4	**0.647**	0.331	0.197	0.384
FP5	**0.6**	0.307	0.261	0.357
MS1	0.394	**0.87**	0.433	0.529
MS2	0.433	**0.847**	0.391	0.475
MS3	0.45	**0.857**	0.399	0.47
RP2	0.286	0.412	**0.889**	0.407
RP3	0.408	0.44	**0.903**	0.413
SPP1	0.426	0.506	0.427	**0.808**
SPP2	0.489	0.48	0.398	**0.831**
SPP3	0.446	0.39	0.329	**0.715**
SPP4	0.478	0.46	0.353	**0.793**
SPP5	0.562	0.448	0.318	**0.84**

5.1.2. Reliability Test

The reliability of a measurement, referred to as consistency, is assessed by conducting a reliability test to ascertain the degree to which a research tool generates dependable and uniform results (Brodsky & Given, 2008). A Cronbach's alpha (α) coefficient of 0.70 or greater indicates that the collected data possess a high level of internal consistency, thus ensuring their reliability as already mentioned in **Table 5-1**. Consequently, these data can be generalized to represent the viewpoints of all participants within the target population (Pallant, 2013).

The reliability test has been performed on smart PLS and the results are shown in **Table 5-4**. It is evident from the table that the independent variable MS has Cronbach's alpha of α=0.893, FP has Cronbach's alpha of α=0.826, RP has Cronbach's alpha of α=0.891 and SPP has Cronbach's alpha of α=0.898. Thus, all the variables have Cronbach's alpha greater than 0.7, Which shows that all the scales in this study are robust and reliable, and the results of the data can easily be generalized over the complete target population.

Besides evaluating the internal consistency of the overall factors, the objective of this study was to improve the reliability analysis by validating the theoretical dimensions or components linked to the constructs. The subsequent section will provide an overview of these validation efforts.

Table 5-4: *Cronbach's alpha (α), Composite Reliability (CR), AVE and Discriminant Validity*

	Cronbach's alpha (α)	**Composite reliability (CR)**	**Average variance extracted (AVE)**	**Discriminant Validity**			
				FP	**MS**	**RP**	**SPP**
FP	0.826	0.858	0.525	**0.724**			
MS	0.893	0.893	0.736	0.496	**0.858**		
RP	0.891	0.891	0.803	0.387	0.475	**0.896**	
SPP	0.898	0.9	0.638	0.602	0.573	0.457	**0.799**

5.1.3. Factor Analysis

The examination of construct validity focuses on determining the extent to which an item demonstrates a significant loading on the factor it intends to measure (Brodsky & Given, 2008). A factor refers to a latent dimension that explains multiple observed variables (Kothari, 2004).

An approach of data reduction called factor analysis reduces a large dataset to a number of factors or elements. This method is useful for determining and evaluating the test and scale dimensions. Researchers can efficiently condense a huge number of possible variables or scale elements into a more manageable subset of dimensions or factors by using factor analysis. This procedure makes it easier to spot underlying patterns or structures among collections of closely related objects (Pallant, 2013).

Factor analysis is used in this study to extract the factors and verify whether the items in each section align with the anticipated categories. For this purpose, the factor loadings are analyzed from the PLS-SEM model measurement results. High factor loading implies a robust correlation between the variables within the construct scale.

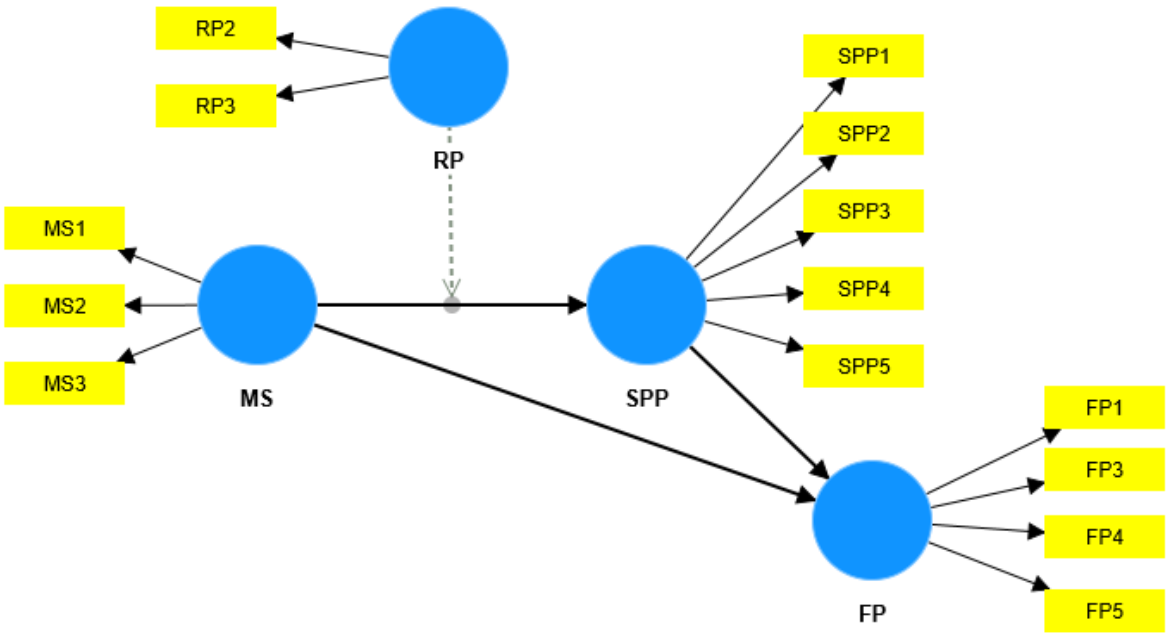

***Figure 5-1**: Final Measurement Model in Smart PLS*

From initial analysis, two items of RP scale were having very low factor loadings and therefore were discarded for not being robust. Further, one item from the scale of FP was also discarded for the same reason. The final items against each variable/scale which were used for the rest of the data analysis are shown in **Figure 5-1**. The results of factor loadings along with respective factor weights are listed in **Appendix-A**.

The outcomes of the factor analysis offer a comprehensive depiction of the factor loadings among the individual items within the constructs of SPP practices. This information provides insights into the strength of the inter-correlations among the scale items (Pallant, 2013).

5.1.4. Simple Slope Analysis

Simple slope analysis in Smart-PLS is a statistical technique used to explore the interaction effect between variables in structural equation modeling (SEM). It enables the investigation of how, at various values of a moderator variable, the interaction between an indicator and the outcome variable varies. By estimating and plotting simple slopes, researchers can assess the strength and direction of the interaction effect Positive slopes indicate a stronger positive relationship, while negative slopes indicate a stronger negative relationship between the predictor and outcome variables (Henseler et al., 2014; Sarstedt et al., 2021).

In this study, the simple slop analysis of the PLS-SEM model presents almost parallel lines as shown in **Figure 5-2**. Parallel lines refer to the absence of a significant interaction effect between the predictor and moderator variables. When the lines representing different levels of the moderator variable are parallel, it suggests that the relationship between the predictor and outcome variables remains consistent across all levels of the moderator (Sarstedt et al., 2021). Therefore, from the simple slope analysis, it may be concluded that the moderator RP is not significant in this study, which will further be clarified by the hypothesis testing results in the next section.

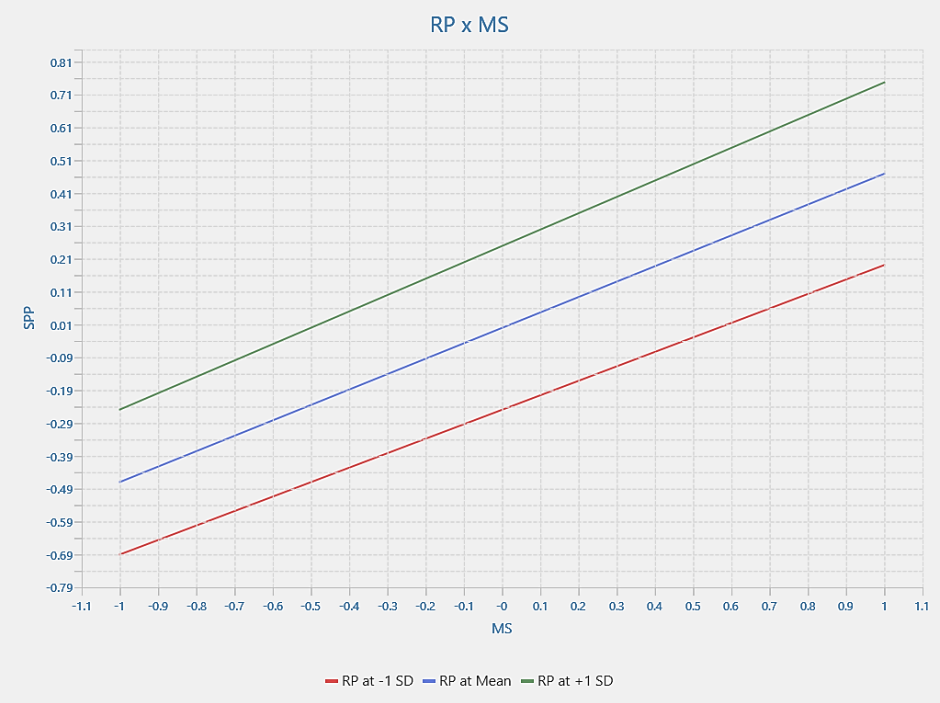

***Figure 5-2**: Simple Slope Analysis for Moderation*

5.2. Structural Model

Structural model testing in Smart-PLS is a crucial step in research that involves evaluating the fit and validity of the proposed model. Smart-PLS provides several statistical measures for model assessment, including the goodness-of-fit indices such as the R-squared values, path coefficients, and bootstrapping techniques for estimating significance levels (Henseler et al., 2015). Analyzing the importance and strength of the connections between latent constructs, assessment of the overall model fit, and validation of the theoretical framework can be done through structural model testing in smart-PLS. By conducting structural model testing in Smart-PLS, insights into the strength and significance of their hypothesized relationships can be obtained (Hair et al., 2017; Sarstedt et al., 2021). The thresholds for acceptability of structural model testing are listed in **Table 5-1**, which will be further explained in the subsequent sections in detail.

5.2.1. Path Coefficients

Path coefficients represent the strength and direction of the relationships between the predictor and outcome variables. The significance of these coefficients can be assessed to

determine the presence and magnitude of the effects. Relationships with positive coefficients are regarded to be positive, whereas those with negative coefficients are thought to be negative (Gefen et al., 2000).

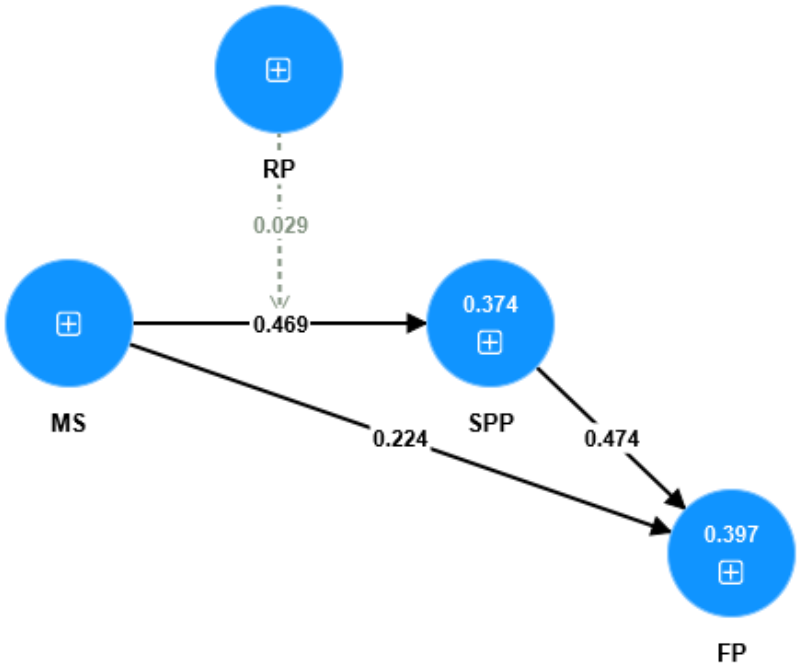

***Figure 5-3**: Structural Model (Path Coefficients)*

The structural model showing the path coefficients is shown in **Figure 5-3**. A path coefficient of 0.474 suggests a moderate positive relationship between the predictor (SPP) and outcome (FPP) variables. The coefficient indicates the strength and direction of the effect. The value of 0.474 implies that approximately 47.4% of the variation in the firm's performance can be explained by the sustainable public procurement practices being employed by the firm. Other path coefficients can also be interpreted in similar manner and all the paths are significant in this study, except for the moderation path of RP which has a path coefficient of only 0.029. This implies that currently, only 2.9% of the impact of moderation of Regulatory policies is there in NTDC. However, as all the path coefficients are positive, this suggests that all the variables are positively corelated to each other. None of the variables are impacting negatively on any of the other variables under this study.

5.2.2. R-Square & F-Square Values

R-Squared values – the coefficients of determination are listed in **Table 5-5**. FP has an R-squared (R^2) value of 0.397, which indicates that approximately 39.7% of the variance in the endogenous constructs (FP) is explained by the exogenous constructs (MS) in the model. While SPP has an R-squared (R^2) value of 0.374, which indicates that approximately 37.4% of the variance in the endogenous constructs (SPP) is explained by the exogenous constructs (MS) in the model. While these values may be considered small, it is important to interpret these within the specific research context and consider other relevant measures of model fit and significance (Henseler et al., 2014; Sarstedt et al., 2021). Typically, the model used for regression fits the observations better when the R2 value is as high as possible.

***Table 5-5**: R-square values-Coefficient of Determination*

	R-square	R-square adjusted
FP	0.397	0.391
SPP	0.374	0.366

Table 5-6 shows the F-square (f^2) values of the variables. An F-square (f^2) value of 0.250 for SPP->FP relation indicates that approximately 25.0% of the variance in the endogenous constructs (FP) is explained by the exogenous constructs (SPP) in the model. Accordingly, the rest of the values are also interpreted similarly. The f^2 value provides insights into the effect size of the relationships between the variables (Sarstedt et al., 2021).

***Table 5-6**: F-Square Values*

	FP	MS	RP	SPP
FP				
MS	0.056			0.255
RP				0.071
SPP	0.250			
RP x MS				0.002

While these values may be considered small, it is important to interpret these within the specific research context and consider other relevant measures of model fit and significance (Henseler et al., 2014; Sarstedt et al., 2021).

Results of model fit are listed in **Table 5-7** which are all well within the acceptable thresholds. Commonly used fit indices in Smart-PLS include the standardized root mean square residual (SRMR), the normed fit index (NFI), and the Tucker-Lewis index (TLI). Researchers (Gefen et al., 2000; Hair, Risher, et al., 2019) typically aim for low SRMR values, close to or below 0.08, and NFI and TLI values close to or above 0.95, indicating a good fit, which is clearly achieved in the results of this study.

***Table 5-7**: Results of Model Fit*

	Saturated model	**Estimated model**
SRMR	0.074	0.075
d_ULS	0.57	0.583
d_G	0.441	0.442
Chi-square	563.464	566.114
NFI	0.744	0.742

5.2.3. Hypothesis Testing

Hypothesis testing in this study is also done in Smart-PLS through bootstrapping. bootstrapping is a widely used resampling technique for assessing the statistical significance of path coefficients and indirect effects in structural equation modeling (Henseler et al., 2015). It involves repeatedly drawing samples from the original dataset to create bootstrap samples, from which estimates of parameters and their standard errors are obtained. Bootstrapping provides robust and reliable results. It allows researchers to generate confidence intervals and p-values, aiding in hypothesis testing and inference (Esposito Vinzi et al., 2010; Sarstedt et al., 2021).

Accordingly, hypothesis testing is performed through p-values to assess the statistical significance of the relationships between variables. P-values indicate the probability of obtaining the observed results by chance alone. Researchers typically set a predetermined significance level (e.g., 0.05) and compare the obtained p-values with this threshold (Gefen et al., 2000). If the p-value is lower than the significance level, the relationship is considered statistically significant, providing evidence to support the hypothesis. Conversely, if the p-value exceeds the threshold, the relationship is not deemed statistically significant (Gefen et

al., 2000; Sarstedt et al., 2021). The p-values for the tested model are shown in **Figure 5-4**. The same are also listed in the **Table 5-8**.

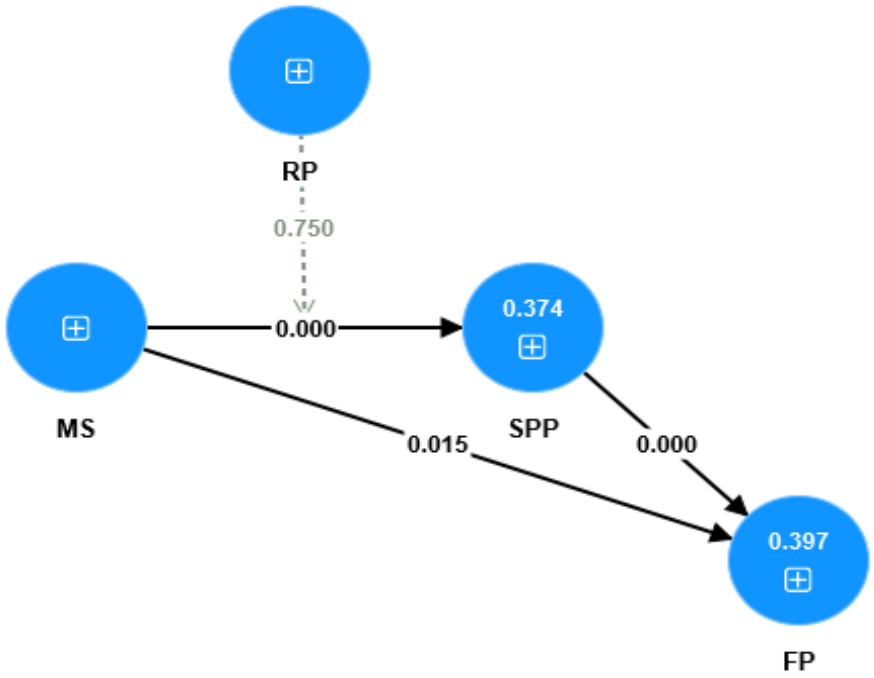

***Figure 5-4**: Hypothesis Testing (p values)*

The p-value for the hypothesis H1 is less than the threshold of 0.05 and the corresponding t-value is also greater than the threshold of 1.96, which implies that the Hypothesis H1: *Management support impacts the firm's social, economic, and environmental performance* is supported by the data analysis. The p-value for the hypothesis H2 is also less than the threshold of 0.05 and the corresponding t-value is also greater than the threshold of 1.96, which implies that the Hypothesis H2: *Management support impacts the adoption and implementation of sustainable public procurement in firms* is supported by the data analysis. The hypothesis H3: *Sustainable Public Procurement impacts the firm's environmental, social, and economic performance* also has p-value less than the threshold of 0.05 and the corresponding t-value is also greater than the threshold of 1.96, which implies that the Hypothesis H3 is also supported by the data analysis. The p-value for the hypothesis H5 is also observed to be less than the threshold of 0.05 and the corresponding t-value is also greater than the threshold of 1.96, which implies that the Hypothesis H5: *Sustainable public Procurement mediates the relationship between management support and firm's social, economic, and environmental performance* is supported by the data analysis.

Table 5-8: *Hypothesis Testing - Path Coefficients, T-Statistics, p-values, Decision*

		Path Coefficient	T statistics	P values	Hypothesis Decision
H1	MS -> FP	0.224	2.424	0.015	Supported
H2	MS -> SPP	0.469	4.724	0.000	Supported
H3	SPP -> FP	0.474	5.287	0.000	Supported
H4	RP x MS -> SPP	0.029	0.319	0.750	Not Supported
H5	MS -> SPP -> FP	0.222	3.249	0.001	Supported

The Hypothesis H4 has a p-value of 0.750 which is greater than the threshold for significant acceptance of hypothesis. Further the corresponding t-value is also lower than the threshold. Both observations imply that the Hypothesis H5: is not supported by data analysis. This observation has been supported by the simple slope analysis as well as the path coefficients also. A detailed discussion for rejection of the hypothesis will be provided in the next section in context of the research and the target population.

***Table 5-9**: Total Indirect Effects & Specific Indirect Effects*

Total Indirect Effects			
	Path Coefficients	**T statistics**	**P values**
MS -> FP	0.222	3.249	0.001
RP -> FP	0.118	2.189	0.029
RP x MS -> FP	0.014	0.307	0.759
Total Specific Effects			
	Path Coefficients	**T statistics**	**P values**
MS -> SPP -> FP	0.222	3.249	0.001
RP -> SPP -> FP	0.118	2.189	0.029
RP x MS -> SPP -> FP	0.014	0.307	0.759

In addition to the above, it is observed that as all the path coefficients are positive, this suggests that all the variables are positively correlated. None of the variables are impacting negatively on any of the other variables under this study. Further the **Table 5-9** shows the statistics for the total indirect effects and specific indirect effects of the research variables on other variables.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

This section presents a comprehensive summary of the research findings, followed by a set of potential implications resulting from this research and recommendations intended for implementation at both the NTDC (National Transmission and Dispatch Company) and government levels. These recommendations aim to enhance SPP practices in the power sector. Further the chapter discussed the limitations faced during this research and some suggested future directions for new scholars exploring the field of SPP are provided at the end followed by the conclusion of the study.

6.1. Discussion

This section provides a concise overview and discussion of the key outcomes obtained from the research. It highlights the main discoveries, patterns, correlations, or trends identified during the study. The significance and appropriateness of the findings are examined in this chapter in light of the objective of the study and the body of previous research. This summary of findings serves as a foundation for the subsequent conclusion and recommendations of this report.

6.1.1. Management Support, Sustainable Public Procurement & Firm Performance

The results of this study postulate that Management Support has a positive significant effect on the firm's performance (H1), this is true for the firms economic, environmental, and social performance. The results obtained from the structural model support these hypotheses.

This is completely in line with the study of Blome and Paulraj (2013), wherein they concluded that the primary driving force behind advanced sustainability initiatives is senior management decisions.

The results for hypothesis H2 are also supporting the significant impact of management support on the adaptation and implementation of SPP in firms. This is in line with the literature studies in the section 2 of this report and the studies that management support is crucial for encouragement of SPP in organizations (Bowen et al., 2001; Carter & Jennings, 2004).

All the three items which were adopted for measurement of the management support variable showed significant factor loading, implying that all the items were giving relevant measurement of the variable and forming significance for the hypotheses. These findings are in support of the previous study of Lindgreen et al. (2009) which implied that the senior management team holds a distinctive role in motivating the organization through various means. Firstly, they can effectively communicate the significance of excellence in sustainability. Secondly, they can establish and uphold environmentally friendly values within the organization. Thirdly, they have the authority to initiate sustainable programs and policies. Lastly, they can provide rewards and recognition for exceptional sustainability performance, thereby encouraging and fostering a culture of sustainability.

Management at all levels can also distinctly express the strategic importance of proactive green initiatives by giving them greater time and money. Our results clearly indicate that in order to successfully integrate sustainable procurement practices inside an organization, top management's cooperation is essential. further, management's active promotion and support of sustainable procurement results in a rise in the implementation and dissemination of sustainable practices across the whole supply chain of the organizations. Support from management gives staff the tools, direction, and motivation they need to adopt sustainable procurement practices and promote favorable environmental and social results. Management encourages an environment of sustainability and strengthens the company's commitment to ethical business practices by advocating sustainable buying (Zsidisin & Siferd, 2001).

We therefore conclude that a strategic perspective of our findings offers the theoretical groundwork for the favorable association between top management adherence to SPP and sustainable procurement, and that the supply-side sustainability efforts result in improved economical as well as environmental outcomes for the firm.

6.1.2. Regulatory Policies for Sustainable Public Procurement

The results from the structural model conclude that there is no significant moderation of Regulatory policies on the relationship of Management support and sustainable procurement practices (H4). Four items were used to measure this relation, out of which the two related to government regulations and support for implementation have very low factor loading, accordingly they had to be skipped from the analysis. The rest two items which are relevant to guidelines and regulations from IFIs showed significant factor loadings, however, still not significant enough to support the moderation hypotheses.

These finding are in contradiction with the findings of Etse et al. (2022), as discussed in literature review of this report. Their discovery was significant because of the implications it has for the employment of regulatory actions as a tactic for adopting sustainable practices and initiatives in Africa as well as other developing nations. In the research investigation of Zhu et al. (2013), the impact of legislation on SP or similar practices is also well-documented.

However, the absence of regulatory policies for sustainable procurement in Pakistan has been identified as a significant challenge, hindering the implementation of environmentally responsible practices in supply chains (Noor et al., 2012). Further, the lack of regulatory frameworks addressing sustainable procurement also hampers Pakistan's ability to meet international sustainability standards and commitments (Zaidi et al., 2019).

Therefore, the reason for insignificance of hypotheses H4 is the absence of clear regulatory policies in Pakistan to support and ensure the SPP implementation in procurement. The research findings revealed that currently, the Sustainable Public Procurement practices are not the main focus of the government regulations regulating public procurement. The study's findings also provided proof to the absence of regulatory policies in Pakistan specifically the Power Sector. The PPRA rules governing public procurement currently do not offer any outright directions regarding sustainability. The IFIs emphasis on the subject

however, it is limited to only the IFI funded projects. Hence, within this context, the moderating influence of regulatory policies tends to be negligible.

Research studies have emphasized the urgent need for robust regulatory policies in sustainable procurement to promote responsible practices in Pakistan. Procurement is an intricate process that demands innovation and a specialized set of skills and expertise. It necessitates the implementation of policies, regulations, financial mechanisms, and governance instruments to effectively address various contingencies (Noor et al., 2012). Etse et al. (2022) also mentioned that laws and regulations continue to be the primary method used by governments and other appropriate stakeholders to carry out SP activities in developing nations. Their study clarifies the possible efficacy of laws for promoting SP and associated behaviors in Africa and other situations. Conclusion of Lindgreen et al. (2009) also demonstrate that regulation, especially in situations with comparatively weaker institutional foundations, can be a useful instrument for fostering SP and other sustainability practices.

Accordingly, it is necessary to do further research that might more thoroughly examine the policy framework around procurement and how it is currently practiced in Pakistan. Conferring to our findings discussed above, it is advisable to give regulatory measures related to sustainable procurement more attention. Promoting legislative measures that give consideration to sustainability while purchasing goods, works, and services in particular can be useful.

6.1.3. Firm’s Performance through Sustainable Public Procurement

Green procurement was also anticipated to lead to superior supplier performance, following the work of scholars who advocate the relevance of supply chain activities in achieving superior economic and environmental performance of a firm. In addition to minimizing the environmental impact of the target firm's products (which are not the topic of this study), an environmentally oriented procurement approach could also assist in finding and utilizing green procurement competencies (Blome & Paulraj, 2013).

The results of this study are completely in line with the literature studies in section 2 of this report and show positive significant direct relation of SPP with the firm performance (H3). The adoption of sustainable procurement practices has been successfully linked to

improved firm performance, yielding numerous benefits to the organization in terms of social, environmental and economic dimensions.

The results of this study have also significant mediation of SPP in the relation of Management support and the firm's performance (H5). However, the results show that there is partial mediation happening in the path MS->SPP->FP. Resultantly, it is established from the results shown in the section 5, that the Management Support has a positive impact on Firm's performance (Social, Environmental & Economic) and the sustainable public procurement practices implementation further make this relation even stronger. Thus, the relationship between management support and firm's performance is partially mediated by sustainable public procurement. Partial mediation is a concept frequently examined in research, referring to a situation where a mediator variable partially explains the relationship between an independent variable and a dependent variable. It suggests that the mediator variable plays a significant role in the relationship but does not completely account for it. The existence of partial mediation implies the existence of additional factors or mechanisms impacting the interaction between both independent and dependent variables. (Bolin, 2014).

6.1.4. Summary of Findings

In summary, the relevance of the research findings with the research objectives is achieved through the data analysis and discussion or results. However, it is to be noted that these objectives and findings are strictly in context with the power sector of Pakistan specifically the organizations under study i.e., NTDC.

- This study discussed and analyzed the sustainable public procurement practices being adopted by power sector in Pakistan, specifically in NTDC; in detail.
- The study concluded that there is significant positive impact of management support in adoption and implementation of SPP practices.
- Currently, there is non-significant impact of regulations and policies on adoption and implementation of SPP and in Pakistan, there are not very clear and stringent guidelines for sustainability are being implemented.

- Ultimately, this study supports significant improvement in the organization's performance (economic, social and environmental) by adopting sustainable public procurement policies through proper management support.

Based on our findings, it is advisable to place greater emphasis on regulatory measures pertaining to sustainable procurement. Specifically, promoting regulatory initiatives that prioritize sustainability in the complete procurement process can prove beneficial. By implementing such green procurement initiatives, organizations can enhance their overall development. However, it is essential for managers to understand that their commitment to green procurement alone is insufficient to improve the firm's sustainability performance. Instead, the establishment of appropriate regulations throughout the procurement process is vital to ensure sustainability is upheld comprehensively. Moreover, sustainable procurement practices contribute to environmental conservation and social responsibility, aligning businesses with global sustainability goals. By integrating sustainable procurement into operations, firms can achieve long-term success and increase the marketability of the organization.

6.2. Research Implications

This study offers both theoretical and practical implications in the realm of sustainable public procurement within the power sector of developing economies, specifically focusing on Pakistan. It contributes to the existing literature by expanding theoretical knowledge and provides practical insights for professionals in the field.

6.2.1. Implications for Literature

By exploring the notion of sustainability within the governmental context of a developing country, this research makes a significant and noteworthy contribution to the current body of literature on sustainable procurement.

Firstly, prior research has mostly concentrated on the private sector and sustainable procurement in nations with advanced economies., this study stands out as one of the few that specifically investigates sustainable procurement practices in the governance of a developing

nation like Pakistan. Consequently, the findings of this research are expected to provide new insights and enhance the understanding of sustainable public procurement for practitioners and researchers alike.

Secondly, former research on SPP has primarily concentrated on either environmental or social issues, with comparatively less attention given to the economic aspects (Walker, 2010). Hence, this study provides a comprehensive approach, both in theory and practice, to address all practical dimensions of sustainable development.

Thirdly, this research makes a valuable contribution to the existing body of literature by combining and analyzing data acquired from procurement managers through survey questionnaires. By synthesizing previous literature and employing quantitative analysis method, this study expands the information on the Sustainable Public Procurement Practices (SPP) being employed in power sector of Pakistan.

Lastly, in this study, the focus was on investigating how management support and regulatory policies impact the establishment of SPP practices within public power organizations in Pakistan, specifically NTDC. Through this investigation, new challenges, and motivators of SPP were identified. As a result, this thesis offers deeper insights into the factors that can impact the implementation of SPP in developing countries. These findings highlight the importance placed on sustainable public procurement practices in such contexts.

Moreover, further research in sustainable public procurement can encourage international collaborations and benchmarking exercises. By comparing practices, policies, and outcomes with other countries, researchers and policymakers can identify global best practices and learn from successful international experiences. This exchange of knowledge can contribute to the adoption of international standards, the harmonization of practices, and mutual learning in sustainable procurement.

6.2.2. Implications for Practice

This research may have significant implications for practical applications as it is focused on sustainable public procurement in the power sector in Pakistan. The implications of this research encompass various aspects.

Firstly, in terms of practical implications, this study serves as an initial step towards increasing the awareness of public procurers and policies about the concept of sustainability and the practical implementation of governmental policies related to sustainability within Pakistan's public procurement.

Secondly, it can contribute to the establishment of rules and regulations tailored to sustainable public procurement practices in the power sector. Policymakers and regulatory bodies can utilize the findings of this research to design and implement effective strategies that promote environmental sustainability, social responsibility, and economic efficiency in procurement processes.

Thirdly, further research in this area can lead to improved sustainability practices within the power sector. This research concludes with successful case study of NTDC and offers practical recommendations, to guide stakeholders i.e., Management & Government Authorities; towards integrating sustainability criteria in procurement processes, supplier selection, and contract management. These recommendations may result in positive outcomes such as enhanced environmental performance, increased energy efficiency, and improved social welfare.

Additionally, this research also facilitates stakeholder collaboration and engagement within the power sector. By fostering dialogue, knowledge exchange, and understanding of sustainability challenges, research may promote alignment and cooperation among government agencies, power utilities, suppliers, civil society organizations, and consumers. This collaborative approach can accelerate progress towards achieving sustainable procurement goals.

6.3. Limitations of Research

Research on sustainable public procurement in the power sector in Pakistan faces several limitations, including but not limited to the following possible limitations.

6.3.1. Lack of Data

One of the significant limitations is the availability and accessibility of data. Conducting research in the power sector requires comprehensive and reliable data related to procurement practices, available regulations for procurement, environmental impact, and vendor/supplier performance. In Pakistan, data collection and management systems are inadequate, making it challenging to gather accurate and up-to-date information. However, for this research, we got a very positive response from some of the respondents who supported the research. Whereas some of the respondents were very reluctant to provide feedback and made excuses for the non-availability of time of information.

6.3.2. Limitations of Research Variables/Items

Certain potential explanatory variables were not incorporated into the survey questionnaires used in this research. This was due to time constraints, the desire to minimize respondent burden to maintain higher response rates, and the focus on SPP practices, challenges, and drivers in the questionnaire. However, the questionnaire could have been enhanced by including explanatory variables such as organization budget, missions of public organizations, structure of the public organization's administration, as well as their area and range of tasks. The inclusion of these variables would have allowed for a more comprehensive understanding of their effects and the generation of practical and theoretical insights.

6.3.3. Limited Research Focus

Sustainable public procurement in the power sector has not received significant attention in academic or policy research in Pakistan. As a result, there is a limited amount of existing literature and studies specifically addressing this topic. This restricted the availability of relevant and contextualized information for the researcher.

6.3.4. Resource Constraints

Research on sustainable public procurement requires adequate resources, including funding, time, and expertise. Limited financial resources and competing research priorities

restrict the extent and depth of research in this area. Additionally, the availability of skilled researchers or experts with a focus on SPP practices in the power sector is also limited.

6.3.5. Implementation Gaps

Even if research identifies effective strategies for sustainable public procurement, there are implementation gaps due to various factors. Factors such as capacity constraints, resistance to change, lack of awareness, and weak enforcement mechanisms hinder the translation of research findings into practical actions and policy recommendations.

6.3.6. Dynamic Nature of the Power Sector

The power sector is constantly evolving due to technological advancements, policy changes, and market dynamics. Research findings in this field therefore have a limited shelf life, as the context and priorities change rapidly. Therefore, research on sustainable public procurement needs to be continuously updated to remain relevant and applicable to the evolving power sector landscape.

As this research is conducted purely on the data collected from the employees of NTDC, the findings are completely specific to the same. Research on the other power sector entities i.e., WAPDA, PEPCO, DICSOs may reveal slightly different results. It is important to note that these limitations are not exhaustive and may vary depending on the specific research objectives, methodology, and the prevailing context in Pakistan's power sector.

6.4. Absence of Regulatory Policies

The main limitation for this study is that there are no proper regulations or policies available from the government or authorities for implementation of SPP in Pakistan, specifically in Power sector. Accordingly, no financial or physical resources are being allocated to the power sector to implement SPP. The absence of regulations for SPP in the power sector in Pakistan can be attributed to several reasons. After having a discussion with senior management at NTDC, the researcher come up with some of the possible factors for absence of regulations for sustainable public procurement as below:

6.4.1. Limited Awareness and Understanding

The concept of SPP and its potential benefits are not widely known or understood among policymakers, government officials, and relevant stakeholders in the power sector. This lack of awareness leads to a limited requirement/demand for regulations and policies related to sustainable procurement practices.

6.4.2. Prioritization of other Issues

Pakistan faces numerous challenges in its power sector, such as energy shortages, infrastructure development, and financial sustainability. These issues often take precedence over sustainable procurement concerns. As a result, policymakers and regulators mostly allocate their limited resources and attention to more immediate and pressing matters, leaving sustainable procurement regulations on the backburner.

6.4.3. Institutional Capacity and Coordination Gaps

Effective regulation requires strong institutional capacity and coordination among different government agencies and departments. In Pakistan, there may be institutional gaps, lack of expertise, and coordination challenges among relevant authorities responsible for formulating and implementing regulations for sustainable public procurement in the power sector. This hinders the development and enforcement of such regulations.

6.4.4. Resistance to Change

Introducing regulations for sustainable procurement requires changes in existing procurement practices and processes. Resistance to change from government agencies, suppliers, or other stakeholders may hinder the establishment of regulatory frameworks. Resistance may arise due to concerns about increased costs, perceived complexities, or a lack of understanding about the benefits of sustainable procurement.

6.4.5. Legal and Enforcement Challenges

Developing effective regulations requires a clear legal framework and robust enforcement mechanisms. In Pakistan, there are legal complexities, gaps, or inconsistencies that impede the formulation and implementation of regulations for sustainable procurement. Weak enforcement capabilities and limited resources for monitoring and compliance further undermine the effectiveness of any regulations that are in place.

6.5. Recommendations

Building upon the research findings, this section presents a series of actionable recommendations to improve SPP practices implementation in power sector of Pakistan. The recommendations are directed at both the NTDC and Government entities responsible for policy formulation and implementation. The proposed suggestions aim to address the identified gaps and challenges, promote sustainability, and enhance the effectiveness of public procurement in the power sector.

6.5.1. Actions at NTDC Level

In this subsection, specific recommendations are outlined for the NTDC, focusing on internal management practices and processes. These recommendations may include measures to strengthen sustainability criteria, promoting local and small-scale suppliers, establish monitoring and evaluation frameworks, and foster internal capacity building.

6.5.1.1. Build Capacity and Awareness

By analyzing the feedback gathered from the employees, it was concluded that there is a lack of training for the employees on sustainability goals and requirements. Therefore, conducting training programs and capacity-building initiatives for procurement officials, managers, and relevant stakeholders in the power sector is very much required. Along with increasing awareness about sustainable procurement practices, their benefits, and the procedures for implementing them effectively. Encouragement for knowledge sharing and

collaboration among stakeholders to foster a culture of sustainability shall also be incorporated.

6.5.1.2. Foster Collaboration and Partnerships

Fostering collaboration among government agencies, regulatory bodies, power generation companies, and procurement departments is essential to improve the adaptability of sustainable public procurement. Facilitate partnerships with civil society organizations, industry associations, and sustainability experts to share knowledge, resources, and best practices. Collaborative efforts can accelerate the adoption of sustainable procurement and ensure its successful implementation.

6.5.1.3. Promote Local and Small-Scale Suppliers

Promote the inclusion of local and small-scale suppliers/manufacturers in public procurement processes. Encourage diversity and competition among suppliers, including those offering sustainable solutions. Support the development of local suppliers' capacity to meet sustainability criteria and participate in public procurement, fostering economic growth and social development.

NTDC is already working in this aspect for encouraging the local manufacturing industry, the only initiative now is to include sustainability goals as well.

6.5.1.4. Implement Monitoring and Evaluation Mechanisms

Create reliable monitoring and evaluation systems to keep tabs on the application and results of sustainable procurement rules. Regularly assess the performance of power sector projects in terms of sustainability criteria and make the results publicly available. This transparency and accountability can drive continuous improvement and motivate stakeholders to comply with sustainability requirements.

6.5.1.5. Encourage Green Public-Private Partnerships (PPPs)

Encourage the incorporation of sustainability criteria in public-private partnership agreements related to the power sector. Ensure that sustainability goals are embedded in the contract terms and conditions, with clear performance indicators and reporting requirements. PPPs can be an effective vehicle for implementing sustainable practices and leveraging private sector expertise.

NTDC is currently incorporating these goals in IFI's funding project procurements, the only initiative now is to start embedding these goals for other projects as well.

6.5.2. Actions at Policy Makers Level

The nation's policy, legislation, financial, and accountability instruments are currently in their infancy with regard to innovative and diverse procurement forms. They must improve continuously in order to respond to the evolving demands of the time (Noor et al., 2012). This subsection provides recommendations targeted at the government level, aimed at improving regulatory policies and frameworks related to SPP in the power sector. The recommendations may involve policy revisions, the introduction of sustainability guidelines, strengthening enforcement mechanisms, and providing resources among relevant government agencies and stakeholders.

6.5.2.1. Develop Clear and Comprehensive Sustainability Guidelines

There is a major requirement for establishing clear guidelines and standards for sustainable public procurement in the power sector. These guidelines should include environmental, social, and economic criteria for evaluating suppliers and their products or services. Ensure that the guidelines align with international best practices and sustainable development goals.

6.5.2.2. Strengthen Regulatory Frameworks

The other major requirement is to enhance the regulatory frameworks governing public procurement in the power sector. Ensure that these frameworks explicitly incorporate

sustainability considerations and provide guidance on integrating sustainability criteria into procurement processes. Strengthen enforcement mechanisms to ensure compliance with sustainability requirements.

6.5.2.3. Provide Resources

The authorities (Government and IFIs) shall focus more on allocating financial as well as physical resources towards capacity building of the stakeholder regarding sustainability goals and policies, conduct trainings, workshops to enhance awareness and ensure compliance.

6.5.2.4. Periodically Review and Update Policies

Regularly review and update management and regulatory policies related to public procurement to reflect changing sustainability trends, best practices, and emerging technologies. Conduct stakeholder consultations and engage in policy dialogues to ensure that policies remain relevant, effective, and responsive to the evolving needs of the sector.

Implementing these recommendations can help improve the role of management and regulatory policies in adapting sustainable public procurement in the Pakistan power sector, leading to positive environmental, social, and economic outcomes.

6.6. Future Research Directions

There is very little research and literature present on the sustainable public procurement in Pakistan specifically in the power sector, as already discussed in detail in the chapter 2 of this report. Therefore, there are a lot of margins for research and study in this field on different aspects of the subject. Future research directions for sustainable public procurement in the power sector in Pakistan may focus on addressing the existing gaps and exploring new avenues for knowledge development. Here are some potential research directions:

6.6.1. Other Power Sector Entities

As already discussed in the limitations of this research that this research has been conducted purely on the data and observations gather from within the NTDC, therefore future research may be conducted in other power sector entities of Pakistan i.e., WAPDA, PEPCO, DISCOS, K.Electric etc.

6.6.2. Developing SPP Frameworks and Guidelines

Future research may contribute to the development of comprehensive frameworks and guidelines specifically tailored to the power sector in Pakistan. These frameworks may provide a roadmap for integrating sustainability considerations into procurement processes, supplier selection criteria, contract management, and performance evaluation. Such guidelines may help bridge the gap between policy objectives and practical implementation.

6.6.3. Exploring Innovative Procurement Mechanisms

Investigating innovative procurement mechanisms, such as green public-private partnerships, community-based procurement, or circular economy approaches, may offer new insights for sustainable procurement in the power sector. Research may examine their feasibility, effectiveness, and potential scalability in the Pakistani context, considering factors like local market conditions, regulatory frameworks, and stakeholder engagement.

6.6.4. Examining the Role of Technology in SPP

Research can explore how emerging technologies can enhance transparency, traceability, and efficiency in sustainable procurement processes. Understanding the potential benefits and challenges of technology adoption in the power sector's procurement practices can pave the way for more effective and sustainable procurement strategies.

6.6.5. Stakeholder Engagement and Capacity Building

Further research may delve into stakeholder perceptions, motivations, and challenges related to SPP in the power sector. This includes studying the perspectives of government

agencies, power utilities, suppliers, civil society organizations, and consumers. Additionally, research may focus on capacity building initiatives and training programs to enhance awareness and understanding of SPP among relevant stakeholders.

By pursuing these research directions, scholars and practitioners may be able to contribute to the development of evidence-based policies, guidelines, and practices that promote sustainable public procurement in the power sector in Pakistan, ultimately leading to positive environmental, social, and economic outcomes.

6.7. Conclusion

Every country possesses a distinct economic, social, cultural, and political landscape, resulting in diverse challenges faced by public procurement practitioners in each respective country (Kioko & Were, 2014). The main objective of this study was to examine the application of SPP in public sector organizations operating within Pakistan's Power Sector. Additionally, it aimed to assess the various factors that impact the government's adoption of SPP.

This study, which was carried out in a developing nation, addresses an area of research and adds significant knowledge to the field of SPP, which is still mostly unexplored. (Meehan & Bryde, 2011). In Pakistan, various processes must be investigated in order to focus on efficient delivery of the finished product, particularly large mega projects, at cost, on time, with quality, and with functionality (Zaidi et al., 2019).

In the beginning, this research undertook a comprehensive investigation into the current understanding of SPP in order to establish a conceptual framework for its implementation. The main focus of the framework is to highlight SPP practices, while also identifying the unique challenges and catalysts that pertain specifically to developing nations. By expanding and validating the measurement instrument of Firm Performance through SPP based on the relation of Management support and the moderating impact of regulatory policies as explained in detail in section 3.3. of this report, this research adds to SPP's theoretical and practical aspects. This critical assessment of the sustainability determinants in public procurement enhances the understanding of SPP and its implementation.

To authenticate the framework within a practical context, a questionnaire was designed and administered to operationalize the instruments. This entire process not only improved the conceptual framework but also facilitated the identification of the relationship between management support, regulatory policies, sustainable public procurement, and firm performance.

Examining data from the survey provided valuable insights which have been discussed in section 6.1 of this report in detail. First, the Management Support is critical for implementing SPP practices in organizations. Second, existence of Regulatory Policies is crucial for enforcing and ensuring SPP practices in public sector organizations. Third and last conclusion is that SPP practices favorably improve the firm's Performance in all three aspects i.e., environments, social and economic. Despite the fact that most of the factors influencing the procurement process are ubiquitous all over the globe, it should be acknowledged that local remedies for local challenges should be sought for. In Pakistan, there is a critical need for innovation & regulation in the field of procurement in order to cater for the sustainability goals.

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Annexure-A

***Table A-1**: Research Items, Factor Loadings & Factor Weights*

		Factor Loadings	Factor Weights
FP: Firm's Performance (Gadenne et al., 2012; Sezen & Cankaya, 2013)			
FP1	My firm attains environmental certifications and audits.	0.985	0.434
FP3	My firm provides adequate transport facility from residence to the workplace.	0.600	0.261
FP4	My firm achieves effective health care delivery through medical facility.	0.647	0.285
FP5	My firm focuses on decreasing cost of materials purchasing.	0.600	0.265
MS: Management Support (Carter & Jennings, 2004)			
MS1	The involvement of our purchasing/procurement department in sustainable purchasing has been motivated by the example of senior management.	0.87	0.372
MS2	The involvement of our purchasing/procurement department in sustainable purchasing has been motivated by top-down initiatives.	0.847	0.363
MS3	The involvement of our purchasing/procurement department in sustainable purchasing has been motivated by requirements made by senior management.	0.857	0.367
RP: Regulatory Policies (Lin & Ho, 2011)			
RP2	Authorities/IFIs ensure our organizations comply with sustainable procurement regulations.	0.889	0.522
RP3	Authorities/IFIs provide financial support for adopting green practices.	0.903	0.531

		Factor Loadings	Factor Weights
SPP: Sustainable Public Procurement (Meehan & Bryde, 2011; Zhu et al., 2005)			
SPP1	My firm cooperates with Suppliers/Contractors/Sub-Contractors for environmental objectives.	0.808	0.24
SPP2	My firm evaluates the environment-friendly practices of Suppliers/Contractors/Sub-Contractors.	0.831	0.247
SPP3	My firm is providing design specifications to Suppliers/Contractors/Sub-Contractors that include environmental requirements for purchased items.	0.715	0.213
SPP4	My firm specifies sustainability criteria (environmental & social responsibilities) in its bidding/contract documents.	0.793	0.236
SPP5	My firm has integrated sustainability (environmental & social responsibilities) into its procurement process.	0.84	0.25

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