FACTORS INFLUENCING ADHERENCE TO PUBLIC PROCUREMENT PRINCIPLES AND ITS IMPACT ON PERFORMANCE: EVIDENCE FROM BANGLADESH

BY

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A dissertation submitted in fulfilment of the requirement for the degree of Doctor of Philosophy (Accounting)

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ABSTRACT

Public procurement plays a crucial role in efficiently allocating public funds but is also vulnerable to corruption due to the involvement of large sums of money. Therefore, the government must adhere to procurement principles to achieve its regulatory, commercial, and socio-economic objectives. This study investigates the level of adherence by public entities to procurement principles in Bangladesh. The study uses Oliver's institutional theory model, to examine the factors influencing this adherence and its impact on public procurement performances. Furthermore, the study explores the mediating role of adherence to public procurement principles in the relationship between institutional factors and procurement performances. A self-administered questionnaire survey targeted public procurement officers in procurement agencies, yielding 398 valid responses. Descriptive analysis was conducted using SPSS, while partial least squares structural equation modelling was employed to test the hypotheses. The findings suggest a high adherence to Bangladeshi public procurement principles by the procurement agencies. Notably, the equality principle demonstrates the highest level of compliance, while the competition principle exhibits the lowest. Regarding factors influencing compliance, the results show that four out of eight institutional factors—dependence on rule setters, policy compatibility, professional discretion, and coercive power—significantly impact adherence to procurement principles. Additionally, the study reveals a positive relationship between adherence to procurement principles and various public procurement performances, including cost savings, improved quality, time efficiency, innovation, flexibility, and sustainability. Adherence to procurement principles is also identified as a significant mediator in the relationship between institutional factors and procurement performances. Specifically, it fully mediates the relationship between dependence on rule setters and coercive power and partially mediates the relationship between policy compatibility and professional discretion with procurement performances. The study contributes theoretically by operationalizing Oliver's model to understand the influence of institutional factors on adherence to procurement principles and associated performances. This framework enhances our understanding of public procurement dynamics and their alignment with established principles. Additionally, the study offers valuable insights for policymakers and practitioners, highlighting areas for improvement and intervention. Ultimately, it aims to enhance the integrity, efficiency, and effectiveness of public procurement practices in Bangladesh, driving more effective transformations in the sector.

ARABIC ABSTRACT

تلعب المشتريات العامة دورًا حاسمًا في تخصيص الأموال العامة بكفاءة، ولكنها أيضًا عرضة للفساد بسبب تورط مبالغ كبيرة من المال. لذلك، يجب على الحكومة الالتزام بمبادئ المشتريات لتحقيق أهدافها التنظيمية، والتجارية، والاجتماعية، والاقتصادية. تبحث هذه الدراسة في مستوى التزام المؤسسات العامة بمبادئ المشتريات في بنغلاديش. تستخدم الدراسة نموذج نظرية أوليفر المؤسسية، لفحص العوامل التي تؤثر على هذا الالتزام وتأثيرها على أداء المشتريات العامة. علاوة على ذلك، تستكشف الدراسة الدور الوسيط للالتزام بمبادئ المشتريات العامة في العلاقة بين العوامل المؤسسية وأداء المشتريات. استهدف استطلاع استبانة ذاتية للإدارة لدى مسؤولي المشتريات العامة في وكالات المشتريات، وأسفر عن 398 إجابة صالحة. تم إجراء التحليل الوصفي باستخدام برنامج SPSS، في حين تم استخدام نمذجة المعادلات الهيكلية الجزئية للمربعات الصغرى لاختبار الفرضيات. تشير النتائج إلى التزام كبير بمبادئ المشتريات العامة في بنغلاديش من قبل وكالات المشتريات. والجدير بالذكر أن مبدأ المساواة يوضح أعلى مستوى من الامتثال، في حين يُظهر مبدأ المنافسة أدنى مستوى. وفيما يتعلق بالعوامل المؤثرة على الامتثال، تظهر النتائج أن أربعة من أصل ثمانية عوامل مؤسسية -الاعتماد على واضعي القواعد، وتوافق السياسات، والتقدير المهني، والقوة القسرية- تؤثر بشكل كبير على الالتزام بمبادئ المشتريات. بالإضافة إلى ذلك، تكشف الدراسة عن علاقة إيجابية بين الالتزام بمبادئ المشتريات وأداء المشتريات العامة المختلفة، بما في ذلك توفير التكاليف، وتحسين الجودة، وكفاءة الوقت، والابتكار، والمرونة، والاستدامة. كما تم تحديد الالتزام بمبادئ المشتريات كوسيط مهم في العلاقة بين العوامل المؤسسية وأداء المشتريات. على وجه التحديد، يتوسط بشكل كامل العلاقة بين الاعتماد على واضعي القواعد والقوة القسرية ويتوسط جزئيًا العلاقة بين توافق السياسات والتقدير المهني مع أداء المشتريات. تساهم الدراسة نظريًا من خلال تشغيل نموذج أوليفر لفهم تأثير العوامل المؤسسية على الالتزام بمبادئ المشتريات والأداء المرتبط بها. كما يعزز هذا الإطار فهمنا لديناميكيات المشتريات العامة وتوافقها مع المبادئ الراسخة. بالإضافة إلى ذلك، تقدم الدراسة رؤى قيمة لصناع السياسات والممارسين، وتسلط الضوء على مجالات التحسين والتدخل. وفي نهاية المطاف، يهدف البرنامج إلى تعزيز نزاهة وكفاءة وفعالية ممارسات المشتريات العامة في بنغلاديش، ودفع التحولات الأكثر فعالية في هذا القطاع.

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

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Signature .... Date 09/09/2024 ....

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DEDICATION

To my loving and supportive wife, Kanij Fatema.

To my beloved sons, Azwad Zaman, and Umaer Zaman.

To my siblings, Moniruzzaman and Delwara Akter

To my parents, Md. Dewan Ali and Masuda Begum.

Thank you all for the endless support and prayers.

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In the name of Allah, the Most Merciful and Gracious. I am grateful to Allah for his love and mercy in assisting me in completing this PhD journey. Selawat to Prophet Muhammad (PBUH) and his family for the spread of Islam throughout the world.

And Allah made it not except as [a sign of] good tidings for you and to reassure your hearts thereby. And victory is not except from Allah, the Exalted in Might, the Wise. (Al-Imran: 126)

I recognize that my Ph.D. journey would have been impossible unless I faced numerous challenges. However, the Creator bestows all tests appropriate to an individual's capacity and fortifies the individual in the process for the future. The completion of this thesis was made possible by the encouragement and support of numerous people. First and foremost, I want to express my gratitude to my parents. Their dedication, patience, eternal support, and encouragement made my Ph.D. journey successful. My wife and my sons will always be appreciated for their inspiration and support. Heartfelt appreciation to my siblings and their spouses, especially Moniruzzaman, for their enormous financial and emotional support.

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LIST OF ABBREVIATION

CPI	Corruption Perception Index
CPTU	Central Procurement Technical Unit
DPM	Direct Procurement Method
e-GP	E-Government Procurement
LTM	Limited Tendering Method
NPM	New Public Management
NPD	New Product Development
OECD	Organization For Economic Cooperation And Development
OCAG	Office of the Comptroller and Auditor General
OTM	Open Tendering Method
PPA	Public Procurement Act
PMS	Performance Management Systems
PPR	Public Procurement Regulations
RFQ	Request For Quotation
SCM	Supply Chain Management
SME	Small And Medium-Sized Enterprises
TSTM	Two-Stage Tendering Method
UNECE	United Nations Children's Fund
UNDP	United Nations Development Programme
UNODC	United Nations Office on Drugs and Crime
WB	World Bank

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Globalization puts pressure on government agencies to improve service delivery. (Bertucci & Alberti, 2005; Jarrar & Schiuma, 2007). Globally, public agencies are experiencing intense pressure to "do[ing] more with less" (Schapper et al., 2006), budget constraints (Richart, 2015), and government downsizing. Moreover, the public is more vocal about the performances, forcing public agencies to improve their services (Thai, 2009). Among the many functions of the government, public procurement is considered probably one of the most indispensable elements (Krause & Tutunji, 2014) as it constitutes a significant proportion of public expenditure.

The term "public procurement" can be defined as the "activity of acquiring goods, civil works, and services, which include all functions, from the identification of needs, selection, and solicitation of sources, preparation, and award of contract, and all phases of contract administration, through to the end of a service' contract or the useful life of an asset (UNDP, 2010)". Every year, the public sector acquires a considerable amount of public procurement to assist government operations (Ramkumar, 2008). Public procurement accounts for around 13% to 20% of the gross domestic product (GDP), and global expenditure in procurement was estimated at nearly USD 9.5 trillion (World Bank, 2020b). Hence, the Government uses public procurement as a strategic tool to realize regulatory, commercial, and socio-economic objectives. Public procurement processes and procedures help achieve efficiency, promote competition among tenders, ensure equal treatment to tenders, endorse fairness in the process, and improve the business climate and transparency of regulations (Public Procurement Rules, 2008).

Many governments and donor organizations set public procurement principles like transparency, accountability, fairness, economy, efficiency, and improved value for money (CPTU, 2022). Likewise, Transparency International (2006) has identified five principles of sound public procurement: integrity, transparency, accountability, fairness, and efficiency. World Bank (2017) also suggested seven principles of good public procurement: (i) value for money, (ii) economy, (iii) integrity, (iv) fit for purpose, (v) efficiency, (vi) transparency, and (vii) fairness. In line with the World Bank procurement principles, Bangladesh has also pronounced the public procurement principles in the Public Procurement Act (PPA) - 2006: (i) transparency, (ii) accountability, (iii) equality of treatment, and (iv) competition. These public procurement principles of Bangladesh are aligned with the Public Procurement ACT (2006), the Public Procurement Rules (2008), and Bangladesh E-GP Guideline (2006).

Despite the existence of these principles, public procurement is often connected with unwarranted and concealed procurement planning, absence of monitoring and control mechanisms, lack of transparency and accountability, and lack of professionalism among the procurement officers (Neupane et al., 2012; Ware et al., 2012). These drawbacks of public procurement provide considerable opportunities to divert public funds for private gain. The losses in procurement expenditure due to its inefficiencies amount to between

10% to 20% of the public procurement budget in the European Union (Abdou et al., 2022). Moreover, numerous studies have revealed the adverse effects of malpractices in public procurement and have concluded that the inefficiency of public procurement leads to a reduction in the value for money achieved by the government (Lengwiler & Wolfstetter, 2006).

Ways of exploitation or inefficiencies in government procurement are frequently similar in "form, shape, nature, and anatomical structure worldwide" (Ware, 2012); such as bribes and kickbacks (Rose-Ackerman, 1999), political pressure, conflicts of interest, and fronting (Basheka, 2009; Ware et al., 2012; Williams-Elegbe, 2013, 2015), bid-rigging (Anderson et al., 2011; McAffe & McMillan, 2018; Spagnolo et al., 2006), sale of contract papers (Williams et al., 2018), contract splitting (Williams et al., 2018), contractual variations (Williams et al., 2018), intentional poor contract management (Aguilar et al., 2000), and poor planning, and inflating prices (Obuah, 2010; Okonjo-Iweala, 2014).

Worldwide, the malpractices of public procurement have become so widespread that they have challenged the initiatives, policies, and principles established to govern and ensure the smooth execution of public procurement activities in achieving various governmental responsibilities or goals to serve the public. The inefficiency of public procurement is somewhat associated with a lack of adherence to public procurement principles despite their existence (Abul Hassan et al., 2021; Mahmood, 2010; Shakya, 2015). Hence, more research is needed in this area (Islam, 2007a; Karjalainen et al., 2009; Mahmood, 2006). Therefore, the current study uses the predictive model of Oliver (1991), informed by institutional theory, to assess the extent to which public agencies in

Bangladesh have adhered to public procurement principles of accountability, transparency, equality, and fair competition, as well as the impact of adherence to public procurement principles in ensuring positive performances of public procurement activities.

1.2 MOTIVATION OF THE STUDY

Bangladesh has enjoyed relatively fast and sustained growth, as well as rapid poverty reduction over the last two decades. According to official figures, since 2000, the annual GDP growth has been about 6%, and it increased to over 8% in 2019. In 1991, the poverty rate was 44.2%, but it dropped to 18.7% by 2023 (Bangladesh Shangbad Sangstha, 2023). Bangladesh advanced into middle-income country status in 2021, with a per capita gross national income of USD1,954 and an annual GDP growth of 7.3% (International Monetary Fund, 2022).

The current five-year plan of Bangladesh (2020 to 2025) emphasizes sustainable development goals and elimination of extreme poverty. Ensuring good governance and achieving an environmentally sustainable and socially inclusive development process are also essential aspects of the plan. In the year 2022, the country's public procurement expenditure was USD25 billion, accounting for 40% of the annual budget and 8% of GDP (The World Bank, 2023). Thus, any change made to public procurement activities is likely to have a significant effect on the economy, environment, and society. The above information has motivated the study to embark on research related to public procurement in Bangladesh.

Bangladesh has spent the last two decades lately working tirelessly to modernize the country's public procurement activities. Moreover, the World Bank has financially and technically supported the initiatives for improving public procurement processes, including procurement regulations, ancillary laws, and related standard bidding documents. The most notable effort of the Bangladeshi Government was to establish "The Central Procurement Technical Unit (CPTU)" in 2002 to carry out procurement monitoring, coordination and management, and performance evaluation. Between 2008 and 2021, the CPTU formalized a comprehensive capacity development program, namely "Procurement Management Training", principally for procurement officers and bidders (World Bank, 2020). The entire procurement process is now available online, aided by an e-GP portal. Moreover, since 2009, the government has made a number of reforms to its procurement policy and procedure. Despite the extensive efforts to improve the procedures of public procurement in Bangladesh in order to achieve a positive impact, inefficiency in public procurement remains evident (Daud, 2013), which makes the present research important and timely.

Although developed countries have brought many public procurement issues - strategy, goals, processes, tools, procedures, organization, environment, performance, and so forth - into research focus (Petrucci et al., 2017), developing countries lag behind in this area. Moreover, studies on public procurement in Bangladesh are minimal except for a few attempts, for example, Islam (2007), Mahmood (2006), and Shakya et al. (2015). Among the different research issues of public procurement mentioned above, adherence to procurement principles by public agencies has been less researched. A few studies have been attempted, such as Ahmad et al. (2021) and Abul Hassan et al. (2021) in the Malaysian context. Different regulations and public procurement practices in different countries may have unique and significant insights on the issue. Hence, it is important to investigate further issues related to compliance with public procurement principles in Bangladesh.

1.3 PROBLEM STATEMENT

Public procurement activities in the public sector are well known to be prone to corruption (OECD, 2016). This area is vulnerable to corruption, mainly involving large sums of money, information asymmetry, and bureaucratic decision-making, hence presenting opportunities for exploitation (Williams et al., 2018). Even the United Nations Office on Drugs and Crime (UNODC, 2013) urges governments to maintain a proper public procurement procedure. Despite global anti-corruption campaigns, public procurement contracts are still very susceptible to corruption. This corruption significantly impacts public funds through stunted or inflated expenses and inferior standards of goods and services (OECD, 2018). It is assumed that globally, a publicly funded project suffers between 20% - 30% of its value due to corruption (Wells, 2014).

Although malpractices in public procurement are observed worldwide, in developing countries, they are more widespread (Dawkins et al., 2019). This widespread corruption in government procurement in developing countries is largely due to institutional weaknesses, a lack of enforced accountability mechanisms, and a culture of silence about the public sector (Williams-Elegbe, 2018). In the context of Bangladesh, public procurement is also vulnerable to corruption. Even the Prime Minister of Bangladesh, Sheikh Hasina, has asserted that "the Government has given huge fiscal budget and taken massive development programs. But 'termites' [are] eating up development funds (The Daily Star, 2019)".

The World Bank's (2020) assessment of Bangladesh's public procurement activities has exposed the following key findings:

> (1) In the national Open Tendering Method (OTM), large bidders monopolize the procurement sector, while small bidders are marginalized, as the total number of participants per procurement package has declined from 4.2 to 2. Also, single tenders in OTM packages have increased from 20% to 50%.
>
> (2) Despite the introduction of the e-GP portal, bidders are not widely included in public consultations for legislative changes. Also, meaningful procurement and contract management data are not easily accessible to the general citizens; Citizens' engagement in contract implementation monitoring is not yet included in the procurement laws despite its implementation in 48 sub-districts.
>
> (3) Some bidders have unlawfully managed to collect the works' confidential estimated cost, giving rise to the possibility of corruption. The estimated cost is widely known even though it is not disclosed officially, and in some cases, such information is collected through unfair means.
>
> (4) About 31% of surveyed bidders admitted that they had offered gifts of more than USD300 to public entities (PE) officers or other persons for making procurement decisions in their favour.

The above findings prove the inefficiencies in public procurement activities and also infer non-compliance with procurement principles. Furthermore, the public procurement process in Bangladesh has severe other related weaknesses, such as insufficient advertisements, inadequate specifications, concealment of selection criteria, political pressure, contractual variations, poor negotiation with all bidders, bid rigging, rebidding without adequate grounds, conflicts of interest and fronting, price increases, poor planning, intentional poor contract management, and inflating prices (Mahmood, 2010; World Bank, 2002). Due to this non-compliance by the procuring agencies, the Government has incurred a massive loss of public funds, as revealed in the "Compliance Audit Report" of the Office of the Comptroller and Auditor General (OCAG), the Supreme Audit Institution (SAI) of Bangladesh. A recent example, as highlighted in the audit report for the year 2020, is on the procurement related to the COVID-19 emergency response and pandemic preparedness project, which, due to the malpractices, had caused losses of approximately USD 18 million (OCAG, 2023). Earlier, the Finance Minister of Bangladesh, Abu Hena Mohammed Mustafa Kamal, revealed that 40% to 50% of the procurement amount has gone to inappropriate procurement contract activities (The Daily Star, 2010).

This exploitation of government procurement may have resulted in Bangladesh being ranked 147th out of 180 countries in the 2022 Corruption Perceptions Index (CPI). Defying the public procurement principles has resulted in high levels of corruption and inefficiency (Sandada & Kambarami, 2016). The World Bank (2020) and donor organizations are also concerned with non-compliance to procurement acts, rules and regulations, and principles among government agencies. These procurement provisions are not self-executing; rather, they depend on procurement officers of public entities/agencies. Prior studies have also suggested that the execution of laws and regulations may be in conflict with organizational practices (Matland, 1995). These assumptions are fair and valid as far as public procurement principles are concerned. The issue is that the government frames the procurement principles, but effective execution rests on procurement officers who may not have the ability or commitment to implement them (Uyarra et al., 2014). Public procurement compliance discussions and research are ongoing in many developed countries (de Boer & Telgen, 1998b; Gelderman et al., 2006a; Ntayi et al., 2011; Wanyama, 2010).

In line with the World Bank procurement principles, Bangladesh has also pronounced its public procurement principles with 4 main components: (i) transparency; (ii) accountability; (iii) equality of treatment; and (iv) competition. These public procurement principles of Bangladesh are aligned with the Public Procurement Act (2006), the Public Procurement Rules (2008), and the Bangladesh E-GP Guideline (2006). Despite the existence of these principles, there are limited studies about the level of extent procurement agencies adhere to public procurement principles. In addition, using the predictive model of Oliver (1991) informed by institutional theory, the present study aims to examine factors influencing the adherence to public procurement principles. Moreover, prior studies have identified various performance areas— cost, quality, time, compliance, innovation, sustainability, delivery, flexibility, compliance, and risk (Caniato et al., 2014; Klevensparr, 2016; Nair et al., 2015; OECD, 2013; Patrucco et al., 2016, 2017) and the issues of operationalization and the measurement of public procurement performance and the contingency relationships between adherence to public procurement principles and public procurement performances (Patrucco et al., 2017). This is something that the government has ignored for far too long (The Daily Star, 2020). However, there is limited evidence in terms of published empirical work from emerging economies, and so it is even more limited in the context of Bangladesh.

1.4 OBJECTIVES OF THE STUDY

Based on issues highlighted in the problem statement section, this study has the following objectives:

1. To examine the extent of adherence to the public procurement principles by public procurement agencies in Bangladesh.
2. To investigate the institutional factors influencing the adherence to public procurement principles among public procurement agencies in Bangladesh.
3. To examine the performances of adherence to public procurement principles in the public procurement agencies in Bangladesh.
4. To examine the mediating role of adherence to public procurement principles in the relationship between institutional factors and procurement performances of procurement agencies in Bangladesh.

1.5 RESEARCH QUESTIONS

The study's objectives help develop the research questions (White, 2009). Accordingly, the following are the research questions to be answered:

1. To what extent are public procurement principles adhered to by the public procurement agencies in Bangladesh?
2. How do institutional factors influence the public procurement agencies' adherence to public procurement principles in Bangladesh?
3. What are the performances of adherence to public procurement principles by the public procurement agencies of Bangladesh?
4. Is there a mediating role of adherence to public procurement principles in the relationship between institutional factors and public procurement performances of procurement agencies in Bangladesh?

1.6 SIGNIFICANCE OF THE STUDY

This study extended public procurement research by concentrating on the much-discussed yet little-studied public procurement principles. The study contributes to two distinct areas: theory and practice.

Theoretically, the findings of the current research contribute to studies on the application of institutional theory (DiMaggio & Powell, 1983a). Very few prior studies have taken an institutional view of adherence to procurement principles and used a survey approach to operationalize a theory on adherence to procurement principles. The institutional theory supports understanding of the public sector as it has been underused from a procurement perspective by relevant agencies. In particular, the current study operationalizes the institutional theory to explain the factors that influence adherence to procurement principles. In addition, the study also shows the impact of compliance on public procurement performances. Besides that, this study is also unique in presenting the mediating role of public procurement principles in the relationships between predicting factors of procurement principles and its performances.

In terms of the significance of practice, this study provides a compelling empirical conclusion on which predictive factors impact policy compliance from the standpoint of Bangladesh. This evidence might assist policymakers in developing and implementing successful procurement policies. Furthermore, this study relates to the performances of policy compliance. The designated authority may use this conclusion to improve public procurement performance by recommending best practices and highlighting relevant legislative and regulatory changes. Furthermore, these findings may be applicable and beneficial to other developing nations facing comparable issues in public procurement. Public procurement is an underdeveloped research area in Bangladesh, and very few studies have covered these vital issues. Hence, the empirical findings of the current study on adherence, predictive factors, and potential adherence performances may provide insights for the Government to improve the existing policies related to public procurement.

1.7 ORGANIZATION OF THE THESIS

This thesis is structured into six chapters. The first chapter gives context to the phenomena of public procurement. This introductory chapter addresses the motivation, problem statement, research objectives, and research questions, as well as the scope and significance of the study and the structure of the remaining chapters.

The second chapter of the literature review provides an evaluation of public procurement in Bangladesh. This chapter also describes the principles and performances of public procurement. In addition, this chapter briefly discusses prior research on public procurement with special reference to performances and policy compliance of public procurement. This chapter concludes by identifying the gaps in prior research on public procurement adherence and proposes the integration of Oliver's (1991) model and the performance model of Caniato et al.'s (2014), together with the incorporation of the institutional theory, to bridge the gaps.

The third chapter gives an overview of the theoretical framework and the development of hypotheses. The study framework is given diagrammatically in accordance with the institutional theory, with the addition of selected variables based on Oliver's (1991) four-factor model and the performances model of Caniato et al.'s (2014).

Chapter four explains the study process, including the philosophy of the thesis, research design, research approach, population and sample of the study, questionnaire design, pilot testing, quantitative data collection, and statistical analysis. This chapter elaborates on the target respondents' adherence to public procurement principles in Bangladesh, who are public sector procurement officers. This chapter outlines the PLS-SEM technique used to analyze the quantitative data.

Chapter Five first focuses on the preliminary analyses of the response rate and non-responses and the common method bias test. Chapter Five also provides descriptive statistics and evaluates the measurement and structural models to assess the hypothesis testing. Chapter Five includes quantitative findings regarding institutional factors, public procurement principles, and performances.

Chapter Six provides a summary of the survey results and the contributions of this study. This chapter concludes with a discussion of the study's shortcomings and suggestions for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter contains information on public procurement and a review of relevant literature. In particular, there are two main parts; the first part discusses the definition, evaluation, methods, process, forces, principles, and performances of public procurement, particular to the context of Bangladesh. In the subsequent part, the chapter reviews past research on public procurement and compliance with procurement policy and public procurement performances. This chapter focuses on the gaps in the literature on adherence to public procurement principles. Finally, it ends with a summary.

2.2 PUBLIC PROCUREMENT

Public procurement is a highly complex government function that necessitates interdisciplinary knowledge and skills (of multiple disciplines), for instance, economics, public administration, political science, accounting, marketing, operations research, law, engineering, and architecture, to name a few (Thai, 2001). In addition, the history of public procurement is extensive. Between 2400 and 2800 B.C., the earliest known procurement order was recorded on a red clay tablet discovered in Syria. The order was for "50 jars of fragrant, smooth oil for 600 small weight in grain" (Coe, 1989). The following subsections detail the definition, evaluation, methods, processes, environmental forces, principles, and performances of public procurement with a special emphasis on Bangladesh.

2.2.1 Definition of Public Procurement

Public procurement is defined by many countries, organizations and individuals. For example, OECD (2023) described public procurement as the acquisition by state-owned enterprise and governments of products, services, and work. Similarly, the European Commission (2023) defined public procurement as a process by which public authorities, such as government departments or local authorities, purchase work, goods or services from companies. In addition, many scholars have also defined public procurement as the acquisition of supplies, services, and work (Hasan, 2016; Thai, 2001). In line with that Neupane et al., (2014) refer to public procurement as the procedure whereby public agencies procure goods and services, works and other activities from external sources. Moreover, contemporary public procurement is used as a tool to promote the quality of public service, good governance, and sustainable development (Osei-Kojo, 2017; Preuss, 2009). However, similar to the other countries, the People's Republic of Bangladesh also clearly articulated the definition of public procurement in the Public Procurement Act 2006, which states that "Public procurement means procurement using public funds, where procurement means the purchasing or hiring of goods or acquisition of goods through purchasing and the execution of works and performance of service by any contractual means (Public Procurement ACT, 2006)".

2.2.2 Evaluation of Public Procurement of Bangladesh

The official name of Bangladesh is the People's Republic of Bangladesh. It has a written Constitution following the British parliamentary system. Through the general elections, people elect 300 members of parliament, who, following due process, select the president. The President can invite a majority party leader to form the Government. The elected Members of Parliament elect the Prime Minister, the Government's Chief Executive Officer. Bangladesh practices British common law, like most Commonwealth countries, for example, India, Pakistan, and Canada.

Bangladesh gained its independence in 1971; Naturally, it followed the procurement practices of Pakistan. Over time, Bangladesh's procurement regulations were influenced by donor agencies that are the main sources of foreign aid, such as the World Bank, the Asian Development Bank, and so on. Some public agencies/entities have their procurement procedure or manual, and the rest follow the Public Works Department (PWD) code. Bangladesh changed its economic policy in the 1980s by adopting a privatization policy. Thus, government agencies started purchasing contractually, after which government procurement, such as purchasing or hiring goods or services, began to increase significantly.

The legal framework for public sector procurement in Bangladesh has been amended numerous times. Since the 2000s, Bangladesh's procurement regulations have had to deal with a variety of challenges and make innumerable changes. The reform process led to the creation of a consolidated procurement processing system, including PPR 2003, PPPA, DOFP, and standard tender documents for procurement of goods, works, and services.

Later, in 2006, Parliament passed the PPA 2006, and in 2008, a new series of PPR 2008 was issued. The PPA 2006 and PPR 2008 became effective on January 31, 2008. The results of the procurement reforms up to August 2021 are as follows:

i. “Increase in transparency: In 2007, 15 per cent of tenders used to be advertised. Presently, in e-GP, it is 100 per cent. The publication of contract award information was 15 per cent in 2007 compared to 100 per cent now.

ii. Savings of time: It would take, on average, 100 days, starting from tender invitation up to contract signing, using the open tendering method. Now, it has come down to 59 days.

iii. Increase in skills: In 2007, 10 per cent of contracts used to be awarded within the stipulated time. It is now 90 per cent.

iv. Increase in competition: In 2007, on average the competition for every tender was 4. Now it has increased to 16 (with open and limited tender together)” (CPTU,2022).

In addition, to ensure transparency, accountability, equality, and competition, PPA 2006 and PPR 2008 have been amended in 2019 as well as the Information security policy – 2019 by the finance ministry. Moreover, the national Assembly of Bangladesh passed a new act namely, Bangladesh Public Procurement Authority Act -2023, and enacted several policies, such as, Information Security Policy – 2019, Business Continuity Management System Policy - 2023, Sustainable Public Procurement (SPP) Policy, 2023.

2.2.3 Methods of Public Procurement in Bangladesh

There are many different methods of procurement available in the Public Procurement Regulation (PPR) 2008. The following methods are widely used:

a) Works / Goods procurement:

i) Open Tendering Method (OTM); ii) Limited Tendering Method (LTM), iii) Request for quotation method (RQM), iv) two-stage tendering method (TTM), v) Direct procurement method (DPM), vi) Direct procurement method (DPM).

b) Service Procurement:

i) Quality Cost Based Selection (QCBS), ii) Fixed Budget Selection (FBS), iii) Least Cost Selection, iv) Individual Consultant Selection, v) Selection based on Consultants Qualification

For the domestic procurement of goods, related services, and works, the open tender method (OTM) is prescribed as preferable (PPA 2006). However, alternative methods of procurement are also allowed with approval by the Head of the procurement entities (HOPE) or an approving authority under the delegation of financial power and technical grounds. These alternative methods are the limited tendering method (LTM), the direct procurement method (DPM), the two-stage tendering method (TTM), and the request for quotation method (RQM). There are essential conditions that need to be met before resorting to each of these alternative methods. For example, LTM applies when suppliers of goods or services are limited in number or the time and cost required to receive and evaluate tenders would outweigh the value of the contract (PPA 2006: 32/1). The direct method is allowed when only one offer is available for technical reasons, for the additional procurement of goods or services from the original supplier/contract, or for the procurement of goods, services and works of a very urgent and essential nature (PPA 2006: 32) (1) (b). The request for quotation method can be used for low-value commercial goods or physical products available in the market or for the procurement of goods for urgent repairs or maintenance PPA 2006: 32(1) (d). For complex and large projects, two-stage tendering methods can be used when full technical specifications may not be possible at one time or alternative solutions are available in rapidly evolving industries.

Similar processes (e.g. open bidding, restricted bidding, bidding method and the two-tier bidding method) and requirements for international procurement are made mandatory by the law with some key differences to maintain standards and competition (PPA, 2006: 37-39). For example, in an international procurement through open tendering method, technical specifications should be made to conform to international standards (PPA, 2006: 33). In addition, joint ventures with local partners or foreign suppliers/contractors can be promoted for international procurement, but must not be made a condition. It also stipulates that alternative dispute resolution provisions should be included in the contract (PPA, 2006)

It should be noted here that the law allows a wide scope for decisions as to whether local procurement should take place or whether international procurement should be resorted to. In addition, it is important to note that while the law provides that certain conditions must be met in order for a procurement method to comply with the law, it is ultimately up to the procurement authority's discretion whether to choose one method or the other. This requires further specification. For example, this was a prerequisite for using the restricted tender method if and only if the subjects, due to their specific nature, are only available from a limited number of local or international suppliers/contractors. It can, therefore be argued that, despite the existence of administrative control mechanisms, there are open opportunities for abuse by giving procurers the discretion to choose one method over another.

The law also provides for emergency flexible purchases. Section 68 of the PPA provides that in order to meet a national urgency or a catastrophic event, the Government in the public interest and with the recommendation of the Cabinet Committee on Economic Affairs, may procure goods/services on an urgent basis by following the direct purchase method or any other method as provided in s. 32 of the ACT. It is important to note that the Government retains the power to exempt national security and defence procurements from the application of the PPA - 2006. Although defence procurement in Bangladesh is also subject to the PPA and PPR and the Defense Services Internal Review, there is insufficient information on it in general and on large and complex defence procurement in particular.

2.2.4 Public Procurement Stages

First, the public procurement cycle in Bangladesh consists of three stages: (1) procurement preparation, (2) procurement process, and (3) procurement administration. In the procurement preparation stage, the procurement entity needs to be involved in the following activities: Need Assessment, Procurement Planning, Specification/BoQ/ToR, Official estimation of cost, and Document preparation. Next, the Public procurements process in Bangladesh is primarily handled through a four-tier process: (i) advertising the invitations for tenders/quotations, (ii) evaluation, (iii) approval, and (iv) awarding of contract. The first step for a procuring entity to take is to advertise (PPA 2006:40; PPR 2008:90). Invitations for Pre-Qualification (IFPQ), Invitations for Enlistment (IFE), Invitations for Tender (IFT) and Requests for Expressions of Interest (REI) concerning the procurement of goods, services, works and intellectual services. The advertisements, following prescribed formats and maintaining the timeframe, are to be published in at least two widely circulating daily newspapers in choosing which the entity should apply 'sound judgment' (PPR 2008:90/91). It is important to note that all invitations shall also be advertised on the procuring entity's website, if any. This means that having a website is still not mandatory.

Second, the procuring entity may choose to invite only pre-qualified applicants, in which case a list of such applicants is created using the prescribed rule. Pre-qualification may be conducted by a procuring entity for a number of large and complex procurements (PPR, 2008: 91), such as construction, maintenance, design and development of infrastructure, and so on. However, before commencing the Pre-Qualification process for the procurement of goods or services, a procurement agency must carefully assess the benefits and drawbacks of pre-qualification. Tender Opening Committee (TOC) opens PQ applications, which are subsequently examined by the Tender Evaluation Committee (TEC), which may be assisted by a Technical Sub-committee formed by the Head of the procuring entity (PPR, 2008: 91/9).

The opening of tenders is the next phase. Each procuring entity has a tender/proposal opening committee. Following the tender submission deadline, the procuring entity holds a meeting to open the tenders. Tenders must be opened promptly and publicly at the time and location specified in the IFT (PPR, 2008:97). Following that, the procuring entity's evaluation committee examines the tenders based on pre-disclosed criteria and technical specificities, as well as the procurement laws and principles (PPR, 2008: 98/2). The members of the evaluation committee, which must be formed fairly/transparently, must sign a declaration of impartiality, and the committee must attest that the evaluation was conducted in compliance with the Act's criteria (PPR, 2008:8-9). The TEC provides its report and recommendations to the Approving Authority, and the Approving Authority decides who gets the contract (PPA, 2006: 8). As a general rule, the lowest evaluated tender becomes the successful tender if it does not materially alter or diverge from the technical requirements, characteristics, and commercial terms and conditions of the Tender Document (PPR, 2008: 98/2). Within one week following the Approving Authority's approval of the award, the successful tender receives a notification of award, which includes the contract with complete terms and conditions (PPR, 2008: 102). Approving authorities' power is limited by contract value, limiting the procurement of works, commodities, and services. Legislative documents, known as delegations of financial powers, specify which authority can sanction procurement by which value and method. The final stage of the public procurement cycle is procurement administration, where the procurement entity needs to be involved in the following activities: Contract Management, Payment, Warranty/Defect Liability Period, and Contract Closing.

Table 2.1: **PROCUREMENT STAGES/CYCLE**

PROCUREMENT STAGES/CYCLE					
	Stage 1: Preparation		**Stage 2: Procurement Process**		**Stage 3: Implementation**
1	Need assessment	7	Submission	13	Contract management
2	Procurement Plan	8	Opening	14	Payment
3	Specification/ Bill of Quantities (BoQ)/ Terms of Reference (ToR)	9	Evaluation	15	Warranty/Defect liability period
4	Official estimated cost	10	Approval as per DoFP	16	Contract closing
5	Documentation preparation	11	Notification of award		
6	Advertisement	12	Contract Signing		

2.2.5 Public Procurement Administrations

The key players in Bangladesh's public procurement financial administration system include the Ministry of Finance (MOF), the Ministry of Planning, the Office of the Controller General of Accounts (CGA), the Office of the Comptroller and Auditor General (CAG), and Bangladesh Bank. The Ministry of Finance (MOF) holds a pivotal role in overseeing government finance operations, ensuring the stewardship of public finances. The Economic Relations Division (ERD) of the MOF is primarily responsible for managing external aid, including grants and loans. Specifically, the ERD's Foreign Aid Budget and Accounts (FABA) Wing handles external debt management and budgeting for foreign aid.

The Ministry of Planning is responsible for socioeconomic planning, statistical management, and oversight of government financial policies. It is divided into three divisions: the Planning Division, the Statistics and Informatics Division, and the Implementation, Monitoring, and Evaluation Division (IMED). IMED monitors and evaluates public sector development projects. It provides support to all ministries and divisions by managing project data through its central management information system. This system helps gather, organize, and evaluate project data, offering feedback on issues and obstacles encountered during project execution. IMED also updates the National Economic Council and its executive committee, led by the prime minister, on the status of public sector development initiatives. Additionally, IMED addresses matters related to the Public Procurement Act (2006) and the Public Procurement Rules (2008), including making necessary revisions to align with global best practices and lessons learned from public procurement in Bangladesh. The division also provides guidance and instructions on the interpretation and application of these regulations.

The Office of the Controller General of Accounts (CGA) plays a significant role in ensuring expenditure control through pre-audit, which was traditionally overseen by the Office of the Comptroller and Auditor General (CAG). The CGA operates autonomously within established guidelines across all treasury functions, accounting principles, and procedures. Its responsibilities include pre-scrutinizing government payments, compiling and consolidating government accounts, and accounting for all grants and loans received by executing agencies from external sources.

The Comptroller and Auditor General (CAG) is Bangladesh's supreme auditing institution. Articles 127–132 of the Constitution outline the appointment, tenure, privileges, audit mandates, and reporting obligations of the CAG. The Constitution mandates that the CAG must operate independently, stating, "In the performance of his duties, the Comptroller and Auditor General shall not be subject to the direction or control of any other person or authority." However, despite this constitutional provision, the CAG's ability to fully execute its mandate can sometimes be constrained, as certain administrative and personnel matters require approval from the Finance Division. The CAG is tasked with auditing government receipts and public expenditures to ensure that funds are properly received and spent in accordance with relevant regulations. The CAG (Additional Functions) Act (1974) further mandates the office to uphold fiscal propriety. Through its audits, the CAG provides the government with limited insight into whether expenditures in government agencies, public bodies, and statutory organizations have delivered value for money. The CAG comprises several directorates responsible for auditing public sector projects and government offices.

2.2.6 Procedures for Public Procurement Fund Allocation and Disbursement

According to the Constitution, all government revenues, loan proceeds, and other financial assets are consolidated into the Consolidated Fund. Additionally, any other public funds received or managed by the government on its behalf must be credited to the public accounts. Consequently, all government receipts—including grants, loans, and tax and non-tax income—are credited to the Consolidated Fund, from which all expenses are deducted.

Parliament-approved ministry budgets encompass all forms of foreign assistance received by the government. The Controller General of Accounts (CGA) records all external aid related to the development budget as receipts in the Consolidated Fund. Each year on July 9, the Finance Division distributes budget books and documents to administrative ministries and their respective chief accounts officers (CAOs) to notify them of the approved budget allocations. As the primary accounting officers of their respective ministries, the secretaries of line ministries are responsible for arranging the necessary allocation of authorized funds among the controlling and disbursing officers under their supervision. Funds must be released by ministries and divisions strictly according to the budgetary allotment and in accordance with the *Guidelines for Fund Release and Use for Development Projects*. Disbursements from external funds that exceed the annual budget allocation require proper reporting by the administrative ministry and approval from the Ministry of Finance.

A release order from the Finance Division is not required for government departments and offices that have budget allocations under the "Detailed Demand for Grants" heading. Instead, a fund placement order authorizing spending units and agencies to use the funds is issued by the administrative ministry or department head. If approval is not granted during budget allocation, lump-sum allocations for ministries, divisions, departments, directorates, autonomous or semi-autonomous bodies, and local bodies must be subsequently approved by the Finance Division. In practice, non-development budget grants-in-aid and special program funds allocated to autonomous and semi-autonomous bodies and local bodies are released in four installments, with the final installment requiring Finance Division approval.

Orders or instructions for releasing funds from the development budget allocation may be issued by the Finance Division, with the guidelines varying based on the funding source for the project expenses. The following outlines the fund release procedures and associated reporting arrangements. After budget approval, administrative approval for project implementation is granted by August of the relevant fiscal year. No funds can be transferred from Bangladesh Bank's special accounts to project accounts in commercial banks without the Finance Division's approval. Development partner funds can only be received through a unique account for each project. Funds in these accounts may only be used for the designated program as outlined in the project pro forma. The Finance Division receives periodic expenditure statements, progress reports, and other mandated reports from the administrative ministry or division. Project directors must submit expenditure statements to the relevant CAO following the format specified by the CGA. The Finance Division also receives account statements from the administrative ministry or division on the 15th and 30th of each month, detailing fund releases and expenditures. Additionally, a statement of transactions for the previous year is submitted to the Finance Division and the CAO by July 15 each year.

Cost containment is crucial for every project. It ensures that resources are allocated efficiently, and expenditures comply with national public financial management laws, regulations, financing agreements, and budgets. For control and oversight, the withdrawal, spending, and payment of external funds must adhere to established expenditure approval procedures. Any inadequacies in expenditure control are reported during audits. Heads of administrative ministries, divisions, directorates, and project directors are authorized to approve expenditures within the allocated budget through the delegation of financial authority for development projects.

2.3 PUBLIC PROCUREMENT PRINCIPLES

Public procurement principles are essential for regulating the process and establishing a code of conduct for all parties involved in the procurement process. These principles guide decision-making and ensure that performances are aligned with the goal of public procurement. Procurement officers are bound by an ethical code of conduct and are accountable for managing funds. According to the World Bank (2017), Public procurement encompasses seven fundamental principles: (1) cost-effectiveness, (2) cost-efficiency, (3) ethical conduct, (4) suitability, (5) operational effectiveness, (6) openness, and (7) impartiality. Bangladesh has implemented public procurement principles in line with the World Bank's guidelines, aiming to enhance sectoral governance and has initiated a thorough endeavour to enhance the performance of public procurement (Central Procurement Technical Unit (CPTU), 2017). These public procurement principles remain as point of reference to framing regulation and policy of public procurement of Bangladesh, such as, Public Procurement Act (PPR) 2006, Public Procurement Regulation (PPR) 2008, and Electronic Government Procurement (e-GP) Guidelines 2011. In Bangladesh, public procurement principles prioritize accountability, transparency, equality, and fair competition (Public Procurement Act, 2006). Undertaking a holistic approach to procurement principles - transparency, accountability, equality, and fair competition - may, directly or indirectly, be taken as the procurement principles for further discussion in these sections. The subsections below give more details of the procurement principles mentioned above.

2.3.1 Transparency Principle

Transparency is the paramount principle of public procurement as it empowers anyone to actively participate in the procurement process (Sołtysińska, 2021). Transparency in public procurement refers to the accessibility of laws, regulations, institutions, processes, plans, and decisions to all possible bidders and the general public (Susanne & Laura, 2014). Transparency is significant in achieving public procurement performances as the procurement process is open to the public domain and public scrutiny. In public procurement, the principle of transparency encourages fair competition and the opening of national markets. It also ensures that all economic operators are treated the same. Transparent contracting practices help fight corruption and make the best use of public money. Citizens and other interested parties, like taxpayers, have a right to expect that public procurement procedures are done correctly, and they should be able to report any possible violations of the law to the right authorities (Halonen, 2018). Society has an important role in public procurement when it comes to keeping track of how public money is spent. This is made easier when tender procedures are clear. There are three ways to look at the principle of transparency in public procurement: "Economic operators who want to take part in tenders; citizens who want public funds from the budget to be spent well and corruption to be stopped; and the internal market, which is based on fair competition (Sołtysińska, 2021)".

2.3.2 Accountability Principle

Accountability is the practice of conducting public procurement in a way that can be tracked and defended. In addition, it should be consistent and transparent in order to adequately and equitably meet stakeholder expectations and adhere to ethical norms set in the organizational and societal context to optimize the value derived from public funds (Diggs & Roman, 2012). Maintaining accountability is essential in public procurement, not only from the administrative law perspective but also from an economic viewpoint. The lack of accountability may undermine economic viewpoints in three ways: from the procurement side (additional costs, corruption, favouritism, or nepotism), from the business community side (lack of value creation, low-quality goods and services, choosing less efficient suppliers), and from the society side (affected public interest). As high sums are involved in public procurement, accountability principles must restrain procurement officers from corruption and unethical activities. In the absence of effective control mechanisms, procurement officers are likely to consider personal preferences when making procurement decisions.

2.3.3 Equality Principle

Equality is a fundamental principle in public procurement, which entails guaranteeing that all suppliers are given an equitable chance to take part in the procurement process, without any kind of discrimination based on their gender, race, ethnicity, religion, or any other distinguishing traits. Some of the key public procurement principles related to equality are:

(1) Non-Discrimination: Procurement processes should not discriminate against any supplier on the basis of their gender, race, ethnicity, religion, or any other characteristics (United Nations, 2017). This principle ensures that all suppliers are treated equally and that there is no bias or discrimination in the procurement process.

(2) Equal Access: Procurement processes should provide all suppliers with equal access to information and opportunities to participate in the procurement process (World

Bank, 2017). This principle ensures that all suppliers have an equal opportunity to compete for government contracts.

(3) Affirmative Action: Procurement processes should include measures that promote the participation of disadvantaged groups, such as women, minorities, and small and medium-sized enterprises (SMEs) (Government of Uganda, 2015). This principle ensures that disadvantaged groups have an equal opportunity to participate in the procurement process and that the government promotes diversity and inclusion in its procurement practices.

(4) Accessibility: Procurement processes should be accessible to all suppliers, including those with disabilities. This principle ensures that all suppliers can participate in the procurement process on an equal basis and that the government does not discriminate against suppliers with disabilities (European Union, 2014).

2.3.4 Competition Principle

The primary goal of the competition concept in public procurement is to guarantee fair pricing and quality, without any manipulation to favour a specific bidder. Therefore, procurement agencies have to ensure that all the qualified tenderers participate in the bidding process to increase the possibilities of good market response, leading to competitively priced contracts. Many countries have reformed the procurement procedure, but open and non-discriminatory competition has yet to be achieved (Jones, 2017). Bribery in public procurement has been restricted to form a level playing field for the suppliers. Such barriers may be preferential margins and quota restrictions - Bumiputra opportunities in Malaysia, which differentiate against foreign businesses. By using set-asides to restrict the acceptance of tenders to only domestic bidders, products, or specific categories of a domestic bidder, competition can be further shortened (Jones, 2017). Besides, barriers to competition may be the performance of an informal practice. This informal practice allows special consideration to domestic/local/state-owned enterprises or businesses with which leaders and senior procurement officers have an association themselves or via family members or cronies (Erridge, 1998). In these circumstances, the procurement method is partial or a single-sourcing and direct negotiation.

2.4 PRIOR RESEARCH ON PUBLIC PROCUREMENT

Public procurement involves huge amounts of public funds, plays a significant role in the economy and is of great importance. However, from the perspective of prior research, public procurement is not considered a mature discipline (Patrucco et al., 2017; Spina et al., 2013). In addition, it was not acknowledged as a legitimate academic field until the early 2000s when Thai (2001) first brought to attention the fact that academics have paid little attention to this research area. Since 2009, scholarly contribution to public procurement has grown significantly (Ambe, 2019; Cheng et al., 2018), and the last decade is considered the booming period in academic output (Rejeb et al., 2023). However, the bibliometric analysis of Rejeb et al. (2023) analysed the 640 journal articles listed in the Scopus database on public procurement and identified six main themes addressed in the literature on public procurement.

> "We observe that the first topic focuses mostly on green public procurement (GPP), while the second topic is related to innovation and SMEs in public procurement (PP). The third cluster deals with sustainability efforts in local government procurement practices. The fourth topic discusses public procurement (PP) contracts and describes how the public sector can implement social targets and policies by contracting with other parties through PP activities. The fifth topic concerns the menace of corruption in public procurement (PP), the need for standardization of public procurement (PP) processes, and enhanced compliance to combat this issue. Finally, the sixth topic studies several aspects of public procurement (PP) contracts, including costs, competition and prices (Rejeb et al., 2023)."

The literature review of the study first concentrated on the key articles regarding Green public procurement. In 2004, it was advocated that public procurement should be approached from a social viewpoint, emphasising the need for study on the relationship between environmentally friendly supply chains and the well-being of society. He proposed twofold roles of Government by "participating in the market as a purchaser and at the same time regulating it through the use of its purchasing power to advance conceptions of social justice." The papers examined the correlations among procurement, labour laws, and occupation. This study examined the discussion surrounding the connection between social, green and sustainable procurement. Rao and Holt (2005) investigated the impact of green supply chain efforts on the competitiveness and economic performance of procurement entities. In addition, Zhu and Sarkis (2004) asserted that green supply chain ingenuities in China contribute to the improvement of both economic and environmental performance.

Furthermore, Walker et al. (2008) investigated the factors that influence the adoption and hindrance of green supply chain procurement activities. This study categorised the drivers into two areas: internal and external. The elements considered in these divisions were "regulation, organisational factors, customers, competitors, and society." Likewise, the obstacles to implementing green supply chain procurement strategies can be categorised as either internal or external. Internal hurdles encompass factors such as high costs and a lack of legitimacy, whereas external barriers consist of weak commitment from suppliers, regulatory constraints, and industry-specific obstacles.

Zhu et al. (2018) established a connection between understanding of environmental regulatory policies and the implementation of cooperative activities in environmental supply chains. Based on the poll, manufacturers demonstrate astuteness, attentiveness, and forethought. There is a positive correlation between the awareness of domestic regulatory policies and the practice of green purchasing among intelligent manufacturers. The level of knowledge of domestic regulatory policies and the extent of consumer participation with environmental concerns had a nonlinear association with nescient and attentive firms, with a positive effect for the former and a negative effect for the latter. Akhtar et al. (2020) established a direct correlation between government actions and environmental sustainability.

Furthermore, engaging in environmentally conscious procurement can enhance the competitiveness of an entity (Roberts, 2003), but a contrasting view has also been given by Carter and Jennings (2004). Sustainable procurement is a practice that examines the purchasing habits of consumers in order to determine their inclination towards environmentally friendly items. It emphasises the need of safeguarding the environment, engaging in ethical purchasing and sourcing, and conserving resources. Worthington et al. (2008) prove the determinants of socially responsible purchasing practices. Multiple case-study methodologies were used to examine supplier diversity programs in the UK and USA. Government influence on selecting socially responsible suppliers varies across countries, with the UK valuing public policy and law more than the US (Worthington et al. 2008). Thornton et al. (2013) survey revealed that the benefits of socially responsible purchasing are not being realized in developing countries like China and the UAE, highlighting the need for further research on this topic.

Likewise, public procurement research also provided scholarly contributions in terms of innovation. According to Amann and Essig (2015), public procurement is considered a potent tool for innovation policy. This study also examines barriers to innovation procurement from public buyers' perspectives, focusing on complexity, time consumption, and risk. Findings reveal hindrances across EU member-states and differ depending on monitoring systems for innovation-oriented performance. In addition, Bleda and Chicot (2020) investigate the role of public procurement in promoting business innovation through the creation of marketplaces for emerging products, technology, and services. It uses an evolutionary analytical framework, defining markets as dynamic systems that coordinate knowledge over time. It identifies specific tools for market development and case studies. Caloghirou et al. (2016) investigate the execution of Public Procurement for Innovation (PPI) in a trial initiative at the municipal level in Greece. The study focuses on the supply-side actors and examines the procurement process, highlighting the benefits and management challenges that led to delayed implementation and partial completion of the project. The research offers empirical evidence on PPI as a tool for promoting innovation. As a result, public procurement is critical in supporting information generation and synchronization across all stages of market expansion.

Moreover, the public-private partnership (PPP) is a commonly discussed topic in previous research on public procurement, indicating the significance of this procurement model in the field of public procurement research. In the academic literature, PPPs encompass a broad spectrum of relationships between business entities and the public sector. Almarri and Abu-Hijleh (2017) focus on identifying critical success factors (CSFs) for implementing PPPs in transitional economies, using the UAE as a case study and comparing them with the UK's results. Data from 30 UAE participants and 62 UK participants was collected. Both countries ranked nine CSFs as significant, including commitment of public and private parties, appropriate risk allocation, competent public agency, transparent procurement process, and good governance. Carbonara and Pellegrino (2020) explore the connection between PPPs and innovation, converging on the features that promote innovation and the structure of PPPs. Drawing on existing studies, a conceptual framework is developed, and hypotheses are tested using a dataset of 290 PPP projects. Findings reveal that the arrangement of PPP projects, markets, contracts, network structure, and government support can affect innovation. The findings provide managerial implications for future PPP implementation. Dolla and Laishram (2019) discuss the challenge of choosing between a public-private partnership (PPP) and unbundling the municipal solid waste management (MSWM) supply chain in municipal solid waste management projects. It suggests that network governance and organizational theories can provide a promising theoretical framework for understanding this governance-choice, based on established economics, organization, and procurement theories.

Hwang and Lim (2013) identify Critical Success Factors (CSFs) in Singapore's construction industry, categorizing them into four main groups: project characteristics, contractual arrangements, participants, and interactive processes. The analytic hierarchy process (AHP) method was used to establish a hierarchical model of CSFs' importance. Twelve industry experts surveyed experts, and the study identified CSFs addressing budget performance, schedule performance, quality performance, and overall project success. Public-private partnerships (PPPs) enhance the quality and consistency of public services by facilitating the sharing of resources and risks, minimising transaction costs, fostering collaboration, and providing clear contract specifications. Risks in PPPs can be classified into commercial, political, and legal categories. Commercial risks encompass potential challenges related to demand and supply, whereas political and legal risks encompass factors such as government policies, dispute settlement, taxation, and laws. Standard risk lists and recommended risk allocations can assist in the identification of risks, but, their intricate nature and distinctiveness necessitate thorough professional examination. Public-private partnerships (PPPs) enhance the quality and consistency of public services through increased sharing of resources and risks, decreased transaction costs, facilitated collaboration, and clarified contract specifications.

Furthermore, the scholarly research focuses on the topic of corruption and proposes methods to address this problem in the context of public procurement. Corruption is specifically characterised as the utilisation of governmental authority for personal gains, as stated by Sharma and Mitra (2019). Corruption encompasses various illicit activities such as theft, embezzlement, bribery, exploitation of conflicts, unlawful political contributions, and abuse of discretion (Neupane, Soar, & Vaidya, 2014). Del Monte and Papagni (2007) study corruption in Italian society from 1963-2001 using regional crime statistics. It finds that economic variables like government consumption and development level, as well as political and cultural influences like party concentration and absenteeism at national elections, significantly influence corruption. Therefore, it is crucial to establish accurate performance measurements for PP in order to effectively decrease corrupt practices. Neupane et al. (2014) demonstrate that the implementation of e-procurement technology can greatly diminish corruption in public procurement procedures. The study, which involved reviewing existing literature and analysing a theoretical model, discovered that there is a positive correlation between the intention to use e-procurement and the independent factors. The findings have the potential to inform developing nations on how to combat corruption in public procurement. They imply that e-procurement technology can be an effective tool for decreasing corruption in procurement procedures. Auriol (2006) examines capture and extortion in public purchase, revealing that capture results in a deadweight loss, while extortion does not. The total cost of capture is between 1.2 and 2.88 times the amount of bribes. The legal framework for large public purchases is open tender, while medium-range markets have different national legislation. Corruption susceptibility shifts from capture to extortion regimes.

Finally, the existing literature also examines the significance of small and medium enterprises (SMEs) in public procurement. Flynn & Davis (2017)propose a theoretical framework that elucidates the factors influencing small and medium-sized enterprises' involvement and achievement in public procurement. Their model is rooted in a capability-based perspective on the tendering process. A study was done among 3010 enterprises that compete with Irish public sector organisations, and the findings provide evidence in favour of the concept. The capacity to follow procedures is associated with how often tenders are conducted and the value of the contracts, whereas the ability to build relationships is not. The combination of procedural and relational qualities plays a crucial role in achieving high success rates and fostering a business focus on the public sector. Flynn (2017) examines the correlation between the size of a company, its resources and capabilities, and its participation in public procurement. A model is built using the Resource-based View (RBV) theory to establish a connection between business size, resources, capabilities, tendering activity, and performance. The model is tested using survey data collected from more than 3000 enterprises in the Irish public sector marketplace. The findings indicate that there is a positive correlation between the size of a company and its resources and capabilities for tendering. These factors, in turn, have an impact on the company's tendering activity and performance. Resources facilitate the quantity and worth of contracts put up for tender, whilst competencies are essential for securing contracts. The study emphasises the significance of tackling the disadvantage faced by small and medium-sized enterprises (SMEs), indicating that the existing policy does not adequately consider the variations within SMEs.

Saastamoinen et al. (2018) investigate the correlation between inter-organizational networks and the innovative performance of SMEs, focusing on the impact of public procurement and customer demand. It finds that networks involving other firms are associated with SMEs' performance, and public procurement of innovations leads to greater returns for new products or services. For improved products or services, networks involving other firms may improve performance when demand comes from private sector customers. The study suggests that SMEs should focus on networks with other firms when developing new products for the public sector, allowing for further development and leverage in private sector markets. As a result, micro-businesses face limited resources, less frequent tenders, and lower success rates compared to larger businesses due to their smaller size and resources.

2.4.1 Areas of Public Procurement Research

Despite the novelty of public procurement research, prior studies have looked into several issues of public procurement, such as the unit of analysis (public institution/purchase types) (Gordon Murray, 2009; Jones, 2002; Leśniak & Zima, 2013; Patil & Molenaar, 2011), public procurement strategy (Bergman & Lundberg, 2013; Johnson & Leenders, 2008; Kamann, 2007), public procurement goal (Bolton, 2006; Gormly, 2014; Lahdenperä, 2013), public procurement process (Angelo Mori & Doni, 2010; Dimitri, 2013; Shrestha et al., 2013), procurement tools and procedure(Carayannis & Popescu, 2005; Croom & Brandon-Jones, 2007; Dooley & Purchase, 2006; Federici, 2005; Hardy & Williams, 2008; Henriksen & Mahnke, 2005; Klein, S., & Teubner, 2000; Magrini, 2005; Moe, 2004;

Roodhooft & Van den Abbeele, 2006; Schapper et al., 2006; Vaidya et al., 2006), procurement organizations, procurement environment, procurement performance, and so on.

A unit of public procurement refers to a department or section within a government organization responsible for managing the procurement of goods, services, and works for public use or consumption. Prior research has focused on procurement institutions (central or local governments), including regulations, targets, procedures and techniques, and organizational aspects (Murray, 2009). However, the research focus has been more on those of the central government, such as for defence procurement (Jones, 2002), construction procurement (Patil & Molenaar, 2011), the effect and benefits of e-procurement, or the strategy of public-private partnerships (Verma, 2010). However, research on local government institutions has been addressed less in comparison to that of central governments. Nonetheless, a few important aspects have been examined, such as organizational procurement design (Leśniak & Zima, 2013), strategic procurement deployment (Gianakis & McCue, 2012), and general procurement practices (Qiao et al., 2009).

In addition, Patrucco et al. (2017) categorized public procurement strategy content in several ways: supply environment, political strategy, outsourcing, functional strategy, category strategy, award strategy, and process strategy. Among these strategies, procurement and environment/markets are considered exogenous factors. Prior research has also focused on endogenous factors of public procurement, such as make-or-buy decisions, organizational design strategy (Kamann, 2007), purchasing category strategy (O'Brien, 2009), process strategy, and contract awarding strategy (Bergman & Lundberg, 2013). Snider and Rendon (2008) emphasized the alignment of all these categories both horizontally (e.g., functional strategy) and vertically (e.g., political strategy) to ensure procurement goals. So far, research on the public procurement strategy has concentrated on make-or-buy decisions (Johnson & Leenders, 2008) and process strategies (Basheka, 2008), while the rest of the strategies are yet to be explored, such as the advancement of category strategies and strategy development according to the procurement market environment (Patrucco et al., 2017).

Moreover, prior research has explored the public procurement goals. Murray (2009) classified public procurement strategic goals into three categories: commercial goals, regulatory goals, and socioeconomic goals. Commercial goals include efficiency, effectiveness, and value of money, and these goals can be achieved by suitable competition and competitive tendering design, closer relationships with suppliers, longer contracts, and increased demand for integrated services (Patrucco et al., 2017). Regulatory goals include compliance factors of public procurement, such as transparency, government policy, and regulations. Finally, socio-economic goals are associated with competition, fairness, economic development, and environmental policy. Prior studies have shown that academic research is more focused on operational and strategic goals and objectives. In procurement research, commercial goals are more diffused (Lahdenperä, 2013), but a study has focused on specific aspects, such as ethics, transparency, competition enhancement risk of corruption, and sustainability (Bolton, 2006; Gormly, 2014). In addition, the impact of public procurement on social, environmental, and economic factors has also gained momentum.

Furthermore, the procurement process is considered the heart and pivotal to ensuring procurement performance and government policy. There are some similarities in the public sector's procurement process with private companies, but public agencies are subject to public procurement laws and regulations. Prior studies have shown the tendency to correlate one or more activities of the procurement process. Research on budget and demand management is relatively scarce. A few studies have mentioned supplier scouting and bid design (Shrestha et al., 2013). Prior studies have also debated operational activities, especially bid evaluation criteria, supplier selection procedures, and contract management processes. In these aspects, the studies have focused on selecting the most economical project, supplier capacity and expertise for innovation, reduction of risk associated with the selection of supplier, supplier relationship, and so on (Dimitri, 2013). Order management and vendor rating are the fields that are under-researched in the public procurement process, although some indirect contributions are available (Angelo Mori & Doni, 2010).

Finally, data mining tools (spend analysis), technical tools (e-procurement solutions), transparency tools (reporting and benchmarking), centralization tools (cooperative purchasing), relational tools (public-private partnerships), and evaluation tools are some of the tools that may be used in public procurement research (Patrucco et al., 2017). Among those tools, e-procurement technology is a key topic for public procurement. Many aspects of e-procurement have been explored, such as systems development (Federici, 2005), acceptance and usage (Dooley & Purchase, 2006; Henriksen & Mahnke, 2005; Moe, 2004; Vaidya et al., 2006), system success and evaluation (Croom & Brandon-Jones, 2007; Magrini, 2005; Moe, 2004), procurement management (Klein & Teubner, 2000; Roodhooft & Van den Abbeele, 2006; Schapper et al., 2006), and public administration, social and economic assessment (Carayannis & Popescu, 2005; Hardy & Williams, 2008). Many of the relevant tools have hardly been explored, such as spend analysis, benchmarking, and reporting activities.

2.4.2 Prior Research on Public Procurement Performances

Procurement performances in public agencies/entities are the most discussed issues in the functioning of the public procurement system. Public procurement performance can be categorized into strategic, tactical, and operational performance (Gunasekaran et al., 2001). Caniato et al. (2014) and OECD (2013) are essential in combining the main operational performance areas for public procurement, such as cost, quality, time, compliance, innovation, and sustainability. Consequently, Caniato et al. (2014) reviewed the literature on the most adopted key performance indicators at different organizational levels and purchasing categories. According to their findings, cost, quality, and time are widely used measurement indicators, while flexibility, sustainability, and innovation are newly formed indicators that are attracting significant attention among scholars.

Likewise, Nair et al. (2015) explore the impact of strategic participation in purchasing on supply management activities, specifically supplier selection and performance evaluation. The study uses survey data from US manufacturing companies to test hypotheses using a Path model. Results support the idea that procurement official's involvement in strategic planning directly influences procurement performance– (a) cost, (b) quality, (c) delivery and (d) flexibility, as well as the mediating effects of supplier selection criteria and performance evaluation. The study reveals that supplier performance evaluation on operational criteria significantly impacts the cost, quality, delivery, and flexibility dimensions of public procurement performance in US-based manufacturing companies, suggesting that monitoring these criteria significantly affects internal performance capabilities.

Similarly, Patrucco et al. (2016) explore public procurement performance measurement systems in local governments, focusing on cost, quality, time, compliance, innovation, and sustainability. They suggest that performance dimensions should extend beyond traditional cost measures and include KPIs beyond national/regional regulation. This is likely to occur when the procurement function is recognized as strategic in the public institution.

In addition, Patrucco et al. (2017) identified the key operational performance areas for public procurement, namely cost, quality, time, compliance, innovation, and sustainability, by exploring the public procurement literature published in the Journal of Public Procurement between 2001 and 2014. More so, Klevensparr (2016) identified 117 initial performance indicators of public procurement, and then these indicators were grouped into eight-dimensional performance indicators for public procurement. These are cost, quality, time, flexibility, sustainability, innovation, risk, and compliance.

Subsequently, Flynn (2018) adopted value for money as the proxy of the public procurement performance; while one bidder, no bidding for the bidder, aggregation, award criteria, and quality of the decision report were used as measurement indicators for value for money using European Commission's data. However, past research has not covered all the dimensions of performances equally. Among these performances, costs are the most studied indicators, which focus on concepts such as savings and cost reduction and their measurements. Prior research has also emphasized the performance dimension of quality and time. Compliance performance is frequently mentioned in procurement research as mandatory. A few contributions have also been observed in terms of sustainability (i.e., green public procurement, social and ethical public procurement, and public procurement for economic development). In addition, a few specific performance indicators have been cited, such as waste generation, biodiversity, creation of employment opportunities, air/water emission, social inclusion, energy and water consumption, chemical consumption, promotion of decent work, promotion of a social economy organization, promotion of SMEs, and wider voluntary adherence to corporate social responsibility (CSR) (Valkenburg & Nagelkerke, 2006).

2.4.3 Prior Research on Adherence to Public Procurement Principles

Prior research has investigated compliance in public procurement policy. The most notable aspect of this field is compliance with European Union (EU) law in government procurement. The findings show that compliance by public procurement authorities and their agencies does not shield legal obligations. Under the Dutch municipalities EC Procurement Directives, de Boer and Telgen (1998) assessed that about 80% of procurement projects are not complied with. Besides, the UK public sector found that public procurement regulations of the EU were not complied with, such as being unable to publish contract award notices (Martin et al., 1999). Maverick buying, which represents public officers avoiding procurement regulations, has also been observed in the Finnish government sector (Karjalainen & van Raaij, 2011). Worldwide, cunning and immoral procurement behaviours are being concealed by public procurement officers. Public agencies are less prone to deviate from procurement regulations than private procurement officers at the operational level; government officers are more devious in their deeds at the top level. Also, procuring agencies can create unwritten ground rules based on their favourite agencies' purchase practices in Bangladesh (Khan, 2013).

Prior studies were also interested in compliance with environmental policy in public procurement, and a few studies are available. Thomson & Jackson (2007) investigated green procurement practices in the UK. He noted that some development has occurred but is minimal regarding the variety of goods involved and ambition level. Meanwhile, prior studies unveiled the factors that influence the enactment of the procurement policy. Hawkins and Muir (2014) revealed that the characteristics of the procuring agencies, the institutional context, and the public procurement market environment contribute to compliance with the procurement policy. Furthermore, they found that professional procurement personnel positively influence adherence to procurement policy. Besides, motivation, determination, and 'buy-in' are prerequisites for socially responsible procurement (Murray, 2011). Nevertheless, institutional factors describe policy adherence that embraces top management support, organizational benefits, and monitoring (Kaye Nijaki & Worrel, 2012; Tukamuhabwa, 2012). Henceforth, Flynn (2016) examined the impact of institutional forces on policy compliance using a predictive model. According to his findings, rule consistency, policy compatibility, and dependence on rule setters positively affect compliance, while professional discretion negatively affects compliance behaviour. Moreover, social legitimacy, diffusion of practice, and coercive power indirectly influence policy compliance in interaction with procurement experience, involvement, and organisation size (Flynn, 2016). Henceforward, Hyacinth and Yibis (2017) posited the significant influence of institutional factors on compliance with public procurement regulations in Nigeria.

Nevertheless, macro-environmental factors, mainly opposed to public policy orders, have been listed to justify noncompliance with sustainable procurement (Morgan, 2008). Eyaa and Oluka (2011) contributed to the debate on the causes of noncompliance in public procurement through their empirical findings, which indicated that familiarity is a significant predictor of compliance. Henceforth, Tukamuhabwa (2012) conceptualized media coverage, regulation, records management, corporate culture, political intervention, discipline, organizational incentives, perceived rule legitimacy, moral responsibility, social power, familiarity with laws, and top management support as antecedents to public procurement policy compliance behaviour. Consequently, Abere and Muturi (2015) studied familiarity with procurement law, ethics, and enforcement mechanisms as predictors of public procurement regulations. Their results posited the influence of all predictors on procurement and Disposal Regulations compliance in Nyamira County. Idiosyncratically, Chikwere et al. (2019) investigated the compliance issues with Ghana's public procurement regulations. Despite progress, their findings showed that Ghana's public procurement entities improve compliance regulations with impunity. They also asserted that familiarity, incompetence, political interference, and inadequate monitoring are crucial factors which contribute to noncompliance. Although public procurement compliance consists of many predictive factors, only a handful of research has originated from theory (Blount & Hill, 2015).

2.5 GAPS IN PAST PUBLIC PROCUREMENT LITERATURE

After analyzing past literature on adherence to public procurement principles in Section 2.3, several gaps were found. First, compliance with public procurement policy research is available in developed countries (de Boer & Telgen, 1998; Flynn, 2016; Martin et al., 1999; Thomson & Jackson, 2007). A few exceptions are also observed in developing countries (Hassan et al., 2020). However, in the context of Bangladesh, studies on adherence to public procurement principles are yet to take place. Besides, measuring the adherence to public procurement principles is too country-specific because each country/organization has its own procurement principles, but there are similarities in the procurement principles. However, existing literature has not made efforts to measure the extent of adherence to public procurement principles, except for Abul Hassan et al. (2021) in the Malaysian context. More importantly, the right indicators to evaluate the adherence level of procurement principles are unavailable in Bangladesh.

In addition, past scholars have examined the factors that predict adherence to public procurement policy or regulations, such as Eyaa and Oluka (2011), Wanyama (2010), Tukamuhabwa (2012), Ntayi et al. (2012), and Flynn (2016). performances of these prior research show that the characteristics of procurement officers, the organizational context, and the macro-environment predict adherence to policy or regulations (Flynn, 2016).

Hence, many factors are connected to adherence behaviour in public procurement. Significantly, only some of the studies are based on theory (Blount & Hill, 2015; Flynn, 2016; Mwakibinga & Buvik, 2013). Hence, there is a gap in research on predictors of public procurement principles that are theoretically grounded. Further, influential predictors of compliance behaviour of public procurement have not been widely studied. Whatever little research is available, it is through case studies. Hence, this study provides ample opportunity to understand several issues empirically from multiple perspectives.

Different performance indicators of public procurement are listed in Section 2.3.2. Among the most notable and highly accepted dimensions of performance of public procurement is Caniato et al.'s (2014) model, which uses six public procurement performance indicators: cost, quality, time, innovation, flexibility, and sustainability (Patrucco, 2017), However, past research has not focused especially on the impact of procurement principles on procurement performance. Hence, there is a dearth of knowledge to explore the relationship between the effects of adherence to procurement principles on procurement performances.

The public procurement research focus is complex and has been modified from different fields. Hence, the underpinning theory has been developed from numerous disciplines. Kassim and Hussin (2010) categorized these areas into five originating areas: economics, sociology, social psychology, strategic management, and information systems. Similarly, Flynn and Davis (2014) found different theories and disciplines commonly considered in government procurement research: economics, psychology, sociology, and management. Their work also reveals varying theories in public procurement research, such as auctions theory, contract theory, institutional theory, organizational behaviour theory, principal-agent theory, supply chain management theory, and transaction cost economic theory (Trammell et al., 2020). Public procurement research can cover many domains of knowledge, but the fundamental explanations are mainly related to economic and sociological domains (Devadoss et al., 2003; Hardy & Williams, 2008)

Most studies on public procurement have adopted a qualitative approach, including case studies, content analysis, and interviews. In contrast, the quantitative approach embraces statistical tools (Kassim & Hussin, 2010; Patrucco et al., 2017; Trammell et al., 2020). In addition, the use of mixed methodology is limited. Moreover, most public procurement studies have been conducted in developed countries, such as the UK, USA, Australia, Singapore, South Korea, and Germany. However, a few exceptions are also observed in developing countries like China, Malaysia, and Uganda. Therefore, understanding the public procurement principles in a developing country, especially Bangladesh, is crucial.

2.6 SUMMARY

This chapter presents a review of the gaps in the literature on public procurement to support the current study. Specifically, the chapter begins with a general introduction to public procurement in Bangladesh, procurement principles, and public procurement performances. In addition, this chapter reviews the prior research on public procurement principles and performance. The next chapter presents the theoretical framework and development of hypotheses for the current study.

CHAPTER THREE

THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

3.1 INTRODUCTION

This This chapter explores the theoretical foundations of the current study and the development of the hypothesis. Section 3.2 provides an overview of the theories that have been utilised in public procurement research up until now. Section 3.3 offers a comprehensive explanation and exploration of the institutional theory, as well as an introduction to the extrapolative framework developed by Oliver (1991) that is utilised in the current study. Section 3.4 elucidates the variables employed in this investigation and formulates the hypothesis of the study. Section 3.5 establishes the structure for conducting the research, while Section 3.6 offers a concise overview of the chapter.

3.2 THEORIES USED IN PUBLIC PROCUREMENT RESEARCH

This section reviews the underlying theories used by prior research in public procurement research. As public procurement could be considered interdisciplinary, prior studies encompass different disciplines, including sociology, economics, social psychology, and strategic management. As a result, the theories used in those studies have emerged from various theory orientations. The theories in public procurement studies can be categorized into four originating areas: sociology, economics, social psychology and strategic management, as shown in Table 3.1.

Table 3.1: Areas of Theories used in public procurement studies

Originating Areas	Theory	Focus	Dimension	Studies
Sociology	Actor-Network Theory	Social order	People, objects, organizations	Alaweti et al. (2014); Hardy & Williams (2008); Cuganesan & Lee, (2006)
	Diffusion of Innovation Theory	Innovation adoption	Innovators, early majority, late majority, laggards, early adopters,	Croom and Brandon-Jones (2007); MacManus (2002); Moon (2005); Neupane et al. (2014)
	Institutional Theory	Social structure	Schemas, rules, norms routines	Tumuramye et al. (2018); Moe (2004); Doherty et al. (2013).
	Social Network Theory	Social relationship	Social capital	Carayannis & Popescu (2005)
	Structuration Theory	Social Practices	Social structure, Agency	Devadoss et al., (2003)
Economics	Principal-agent theory	Agency problem	Multiple stakeholders	Gelderman et al., (2006b); Apte et al. (2011); Neupane et al. (2014); Khan (2013)
	Theory of Auctions and competitive bidding	Efficiency	Risk-neutral, private valuation, symmetric information	Soudek & Skuhrovec, (2016); Tanaka & Hayashi (2016).
	Contract theory	Agency and incentives	contractual arrangements	Ponomariov & Kingsley (2011)
	Transaction Cost Economics	Economies of scale	Transaction costs, production costs	Carayannis & Popescu (2005b), Hackney et al. (2007), Wagner et al. (2005)
	Game Theory	Choice and Decision	Economics, international relations, political science	Smeltzer & Carr, (2003)
Social Psychology	Theory of planned behavior	Individual behaviour	Attitude	Aboelmaged (2010); Aman & Kasimin (2011);Glas et al., (2017)
	Technology acceptance Model	Individual behaviour	Attitude	Md Mahbubur (2008)
	The contingency theory	Individual behaviour	Attitude	Glas et al. (2017)
Strategic Management	Dynamic Capability	Process Approach	Resource development and renewal	Vaidyanathan & Devaraj (2008)
	Resource-Based View	Firm Resources	Competitive advantage, sustainability	Salleh (2006); Karjalainen & Kemppainen (2008)

Source: Author's own.

The sociological field has conducted the most research on how the public procurement procedure affects the social structure of the industry (Hardy & Williams, 2008; Devadoss et al., 2003). Past research using theories from the sociological domain, such as Actor-Network theory, institutional theory, social network theory, diffusion of innovation theory, and structuration theory, have also focused on the procurement process, including social structure, relationships, and practices (Alaweti et al., 2014; Devadoss et al., 2003; Neupane, Soar, & Vaidya, 2014; Tumuramye et al., 2018).

The economic domain has mostly contributed to the agency problem, efficiency, production cost, choice of cost, international relations, and political science. Besides, past research has used theories from the economic domain, such as the principal-agent theory, theory of auctions and competitive bidding, contract theory, transaction cost economics theory, and game theory (Carayannis & Popescu, 2005b; Gelderman et al., 2006b; Hackney et al., 2007; Ponomariov & Kingsley, 2011; Smeltzer & Carr, 2003; Soudek & Skuhrovec, 2016; Tanaka & Hayashi, 2016; Wagner et al., 2005). The above-mentioned theories have used different dimensions, such as multiple stakeholders, risk-neutral, private valuation, symmetric information, contractual arrangements, transaction costs, production costs, economics, international relations, and political science.

Other theories that have been used are the theory of planned behaviour, the technology acceptance model, and the contingency theory originating from the social psychology domain, which focuses on the users' attitude to determine the acceptance of a process (Aboelmaged, 2010; Aman & Kasimin, 2011; Glas et al., 2017). Moreover, the resource-based theory has been used to look into a firm's capability and resources in accepting a system from the strategic management perspective (Noor et al., 2006).

Studies on public procurement are primarily descriptive. This research area is underdeveloped on the whole, although glimpses of gradual advancement and development are obvious. A theoretical shortage in the realm of government procurement has not escaped the interest of scholars; Flynn and Davis (2014) showed that only 29% of the 172 articles included in the review have relied on a consolidated theory. If understanding the prevailing procurement paradigm is to be enhanced, according to Yukins (2010), it is necessary to increase theoretical precision. The current study uses institutional theory, which is a theory from the sociological domain, to research the influence of institutional predictors on adherence to public procurement principles and performances. The subsequent section explains the theory and its development and justifies the use of the theory in the present study.

3.3 INSTITUTIONAL THEORY AND ITS DEVELOPMENT

Institutional theory is one of the foremost methods for understanding organizations across disciplines (Greenwood et al., 2008), and it has been used from micro to macro (Scott, 2005). Based on institutional theory, organizations are prejudiced by their activities, environmental context, myths, and rules that represent social ideas and values (Meyer & Rowan, 1977). Thus, three indicators indicate that they are widely followed, persistent, and unquestionably accepted as institutionalized behaviours and practices (Tolbert, 1985).

Therefore, the institutional theory is a well-known sociological position that aims to explain how institutions shape and impact human behaviour within societies. It has evolved over time as a result of contributions from a number of scholars. The term ‘institutional’ was used by early organisation analyses to refer generally to facets of organizations intricated in mediating links with peripheral constituencies and precisely to fortify advantageous perceptions by constituents as a way, eventually, of confirming streams of necessary resources (Urbano et al., 2019). Hence, it can be illustrated by Parsons (1956), who first elaborated a ‘cultural, institutional’ view of organizations from a key exponent of structural functionalist theory. He framed three general organizational levels: technical (refer to production activities), managerial (refer to coordination and control), and institutional (refer to managing external links) (Parsons, 1956). Selznick (1948) established that institutionalization involved relating an organization to bigger social values in the mind of public, hence increasing its long-term survival.

Nevertheless, this organizational analysis approach was largely concealed from the early 1960s to the 1970s by the upsurge of contingency theory (Donaldson, 2001). In this tradition, studies focused on describing variations in various facets of organizations’ formal structure, depending on some theoretical assumptions (Schoonhoven, 1981). Average job concentration, classification of work events, and the relative percentage of supervisors to line employees resulted from exertions to make the most of the efficiency of production events, which are the elements of organizations’ formal structure (David et al., 2019). Subsequent assumption refers to the efficiency of specific structures relying on organizational attributes, namely the size and leading technology (Scott, 1987). By the 1970s, an expanding scholarly work had started to move the focus from internal attributes to environmental linkages as crucial contingencies. However, the underlying assumptions of earlier scholarly work were retained (Lawrence & Lorsch, 1967); formal structure was preserved as the performances of autonomous actors' decisions, driven principally by concerns of competent production (David et al., 2019).

In the late 1970s, Meyer and Rowan (1977) pointedly defied this view and designed the foundation of modern institutional theory, often named "neo-institutional theory". The neo-institutionalism phase in institutional theory introduced concepts like "institutional isomorphism," suggesting organizations become more similar to their environment for legitimacy. Sociologists such as Selznick, Berger, and Luckmann introduced concepts of "institutional isomorphism" (Bromley & Powell, 2012). Organizations retort isomorphically to the environments of institutions in order to maintain or acquire legitimacy (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). Isomorphism retorts are categorized as, coercive - refers to the convergence of retorts obsessed by compliance or legislation, normative – is based on adherence to professional standards; and mimetic – when an organization duplicates the constructions and/or practices of others that are apparently successful (DiMaggio and Powel 1983).

According to Powell (1991), organizations are able to gain legitimacy and advance their projections of survival by confronting institutional norms. Legitimacy enables an organization to shield itself from the pressures of external sources such as questioning or scrutiny of its conduct (Meyer & Rowan 1977). Confronting common norms increases the perceived legitimacy, protects organizations from external scrutiny and pressures, and increases their potential for survival (Meyer & Rowan, 1977). Legitimate activities reverberate with the common understanding amongst stakeholders of acceptable performance standards, and legitimacy can take a dominant role in increasing economic performance in regulated environments (Deephouse, 1996; Zucker, 1987). Hence, to preserve social credibility, conforming to institutional pressures becomes imperative. According to institutional theory, external institutional pressures including normative, mimetic, and coercive pressures affect organisational practices and management choices (DiMaggio & Powell, 1983a) Coercive pressure is generally seen to be prudent (Frumkin & Galaskiewicz, 2014). Legitimacy concerns and political influence are the root causes of coercive pressure (Weerakkody et al., 2017). The government essentially applies the opposite type of coercive forces that organisations must withstand (Zhu et al., 2016).

Hence, Zucker (1987) anticipated that "in terms of the types of activities and practices followed by organizations and their workers, influences within the institutional setting were causative." Later on, DiMaggio and Powell (1983) and Scott (1987) were involved in determining the pressure of institutional forces. Organizations were concerned with optimizing benefits under "new institutionalism" and functioned as 'followers of cultural law' (Edelman & Suchman, 1997). Response to institutional forces by the organizational actors depends on the intra-organizational dynamics--interests, values, power dependencies, and capacity for action (Greenwood & Hinings, 1996; Oliver, 1988). These views are supported and documented in different groups and organizations that exercise self-interest and power in response to institutional demands (Oliver, 1988). There is a superior understanding of institutional settings' often addressed and volatile existence (Scott, 2005). In an institutional field, where multiple forces are in dispute, the rule of a single force to influence organizational behaviour becomes relatively weak. Also, institutional uncertainty shapes the freedom in which individuals can pass up or reject institutional pressures (Goodrick, Elizabeth, & Salancik, 1996).

From 2000 to 2010, scholars emphasized the coexistence of multiple institutional logics in society, highlighting organizations' challenges in managing conflicting demands from economic, political, and professional angles (Lounsbury, 2023). Furthermore, in recent years, the original notion of institutional theory was that institutional forces exclusively influenced organizational activities. Since then, this hypothesis has been criticized and revised. The accepted consensus is that organizations and their workforce do not naturally demonstrate adherence; rather, they are active recipients of institutional forces. They may participate in purposeful, self-interested, and politically oriented actions to a certain degree (Powell & Maggio, 1991). Undoubtedly, government and professional representative groups are the primary actors shaping institutional behaviour (Greenwood & Hinings, 1996). In addition, multinational companies and non-governmental groups have been seen as shaping their institutional environments (Suddaby et al., 2007). The institutional theory holds that many individual and organizational actions and practices are better explained by institutional logic than by economic or technical logic (Edelman, 1992; Meyer & Rowan, 1977; Scott, 1987). Additionally, individual and organizational behaviours are influenced by pressure from regulatory agencies and professional bodies. One of these power states may form organizational activities to rely more on institutional pressures' context and characteristics (Oliver, 1991).

These academic reviews of institutional disparity and agency lead to a more graded view of the institutionalization process. As a result, it is quite prudent to view institutional theory as a widely acceptable framework for organizational or public procurement studies.

Previous scholars have gradually and contextually conducted empirical studies using institutional theory with various constructs in different areas. Table 3.2 exhibits some of the studies that employed different constructs under institutional theory in relevance to procurement and/or supply chain studies.

Table 3.2: Application of institutional theory relevant to public procurement studies

Constructs	**DV**	**Location**	**Author**
Regulation and policy motivator	SMEs friendly public procurement	China	(Liu et al., 2020)
Coercive pressure, Normative pressure, Mimetic pressure	Sustainability performance,	102 Countries, India	(Raj et al., 2020); (Dubey et al., 2017)
Compliance, Familiarity, Sanctions, Monitoring activities, Contractors resistance, Perceived inefficiency, Professionalism	Project success	Uganda	(Mwelu et al., 2021)
External shareholders' expectations, Interdepartmental collaboration, Institutional innovativeness, Centralization	Organizational Sustainable Procurement Practices	US	(Roman, 2017)
Acquiesce, Compromise, Avoid, Defy, Manipulate	Environmental performance monitoring	Malaysia	(Vejaratnam et al., 2023)
social legitimacy, economic gain, perceived consistency of institutional rules in public procurement, organisational dependence, compatibility of SME-friendly policy with organisational goals, constraints, coercion,	SMEs friendly public procurement	Ireland	(Flynn, 2016)

perceived diffusion of SME-friendly practices and coercion			
Central governmental environmental regulation, regional environmental regulations, environmental regulations from clients' countries, export, sales to foreign customers, establishment of company's green image, supplier's advances in developing environmentally friendly goods, environmental partnerships with suppliers, supplier's advances in developing environmentally friendly packages, enterprise's environmental mission, products potentially in conflict with laws, cost for disposal of hazardous materials, cost of environmentally friendly goods, and cost of environmentally friendly packaging	Green Supply Chain Management	Brazil	(Seles et al., 2016)

Sources: Authors' own

3.4 JUSTIFICATIONS AND CRITICS FOR USING NEW INSTITUTIONAL THEORY

There are several justifications for using new institutional theory, particularly for the current study, in terms of novelty and scientific validity. Firstly, this research examines the predictors of adherence to public procurement principles using new institutional theory, which focuses on institutional pressures in the public sector. New institutional theory is crucial in understanding the complexity of social phenomena (Currie, 2009) and the role of governments and professional organizations in persuading public agencies (Schneiberg & Clemens, 2006). Public procurement principles aim to control procurement practices enclosed by legislative and political decrees (Lian & Laing, 2004). Oliver (1991) developed new institutional theory condition in which conformity with rules, laws, principles, and cultural assumptions is anticipated. The study aims to extrapolate compliance factors for government procurement principles, highlighting the importance of discussing adherence to these principles.

Applying new institutional theory as a predictor of public procurement principles is original and novel. So far, institutional theory has not been used to predict procurement principles. The new institutional theory has been utilized to predict sustainable public procurement models (Sancha et al., 2015; Hoejmose et al., 2013; Zhu et al., 2013) and SME-friendly procurement policy (Flynn & Davis, 2015). Doherty et al. (2013) concluded that there is external pressure on government entities to use e-procurement technology. Johnson's (2008) analysis of the outsourcing activities of the government sector and Kidalov and Snider's (2011) comparative clarification of the US and the EU procurement regimes are relevant studies.

The scientific validity of the new institutional theory is another justification for applying it. Institutional theory has experienced a revival and is highly influenced by organizational studies. Articles related to institutional theories published in top-tier journals are evidence of this development, in which the percentage of theoretical discussion increased from 4% in 1984 to 14% in 2007 (David & Bitekine, 2009). Since this theory has matured, various original hypotheses have been modified to emulate scientific facts (Scott, 2008). It is generally recognized that institutional forces are not as deterministic as originally assumed in regulations and policies (Scott, 2005). Instead of discarding the institutional theory, these modifications have functioned as restorative measures against its former limitations and improved its parameters to predict and explain the effects of institutional pressure imposed by organizations on individuals (Scott, 2008). Applying institutional theory here is expected to contribute to the growth of scientific foundations.

Despite the relevance of new institutional theory, particularly the Oliver (1991) response model, there are critiques of the theory. Firstly, the limited control it allowed to agencies and concerns was the key issue of 'new institutionalism' (Kraatz & Zajac, 1996). Individuals and agencies have been defined as reactive, without authority, and obligated to set institutional rules. New empirical results oppose this hypothesis and show that people can act decisively and with self-interest. In Oliver's (1991) report, the Non-Governmental Organizations (NGOs) used a degree of opportunity over how they constructed their activities amid institutional constraints

Secondly, new institutionalism was often attacked for its monolithic institutional environment and the implementation of authoritative power (Scott, 2005). Meyer et al. (1983) claimed in the 'Legitimating Theory' that the organization is often split at local and central levels by its competing institutional forces. The 'conflicts, inconsistencies and ambiguities' have been implicit in creating and realizing institutional provisions (Friedland & Alford, 1991).

3.5 OLIVER'S (1991) INSTITUTIONAL RESPONSES AND HYPOTHESES DEVELOPMENT

As Oliver (1991) views, Institutional theory, once assuming automatic compliance, now views responses as predictable behaviours rather than predefined performances (Oliver, 1991:174). Oliver's (1991) article introduced a theoretical framework for understanding the relationship between institutional pressures and firm strategic responses. Subsequent studies have expanded the understanding of factors affecting organizations and their strategic responses (Clemens & Douglas, 2005; Etherington & Richardson, 1994; Flynn, 2016; Goodstein, 1994; Ingram & Simons, 1995; Milliken et al., 1998). Each of these studies also provided early evidence supporting Oliver's (1991) framework but still only represented a limited test. This study aimed to evaluate Oliver's (1991) model in the public sector by controlling for common external influences and defining even more precisely relevant institutional antecedents and their relationships to strategic responses. This approach allowed for a more precise definition of institutional antecedents and their relationship to strategic responses.

Oliver's (1991) institutional responses are useful for predicting adherence to public procurement principles, as procurement officers and entities are pressured to incorporate principles into their practices. Studies show that compliance with institutional rules by procurement officers is not always consistent (De Boer & Telgen, 1998; Martin, Hartley & Cox, 1999; Ntayi, Ngoboka & Kakooza, 2013), as they may have their own interests and values that may not align with those of the institutional rule setters, and as they may have different values and expectations from the institutional environment (Gelderman, Semeijn

& Bouma, 2015). Procurement officers should not be seen as policy enforcers as this could lead to some individuals- at the organizational level- becoming reluctant to adhere to procurement principles. Management scientists have realized that individuals are not always able or willing to respond affirmatively to institutional stresses, especially in a situation of institutional imbalance. As a consequence, institutional pressures are not always deterministic in all circumstances.

Oliver's (1991) initial assumptions have been used to predict the influences of actors on institutional pressures. Oliver (1991) put forward five predictive factors for a strategic response, namely, cause, constituents, content, control and context. Each predictive factor is again subdivided into two categories. The causes and rationale of institutional pressures (social legitimacy and economic gain), constituents of the institutional context (rule consistency, and dependence on rule setters), the content of institutional pressure (policy compatibility, professional discretion), and control systems (coercive power and diffusion of practice) are correlated with these aspects as the process by which institutional pressure is extended to persons and institutions. These eight predictive factors form the institutional theory (social legitimacy, economic gain, rule consistency, dependence on rule setters, policy compatibility, professional discretion, coercive power and diffusion of practice) are analyzed below in Sections 3.5.1-3.5.8. In addition, Oliver (1991) also posited that the environmental context (uncertainty and interconnectedness) is one in which institutional pressures are being exerted as a predictive dimension. As this study limits itself to the public sector, it is not given any further consideration here. The eight factors predicting strategic responses are described below, with a special emphasis on adherence to public procurement principles. In addition, corresponding hypotheses are also developed for each predictor.

3.5.1 Social Legitimacy

The reasoning, expectations, or goals that underpin external pressures to conform are referred to as the cause of institutional pressures (Oliver, 1991). Zucker (1987a: 451) pointed out that institutional theory underspecifies the elements that motivate external factors, such as the state, to apply pressure. Institutional forces often stem from two sources: economic gain and social legitimacy.

Social legitimacy refers to the acceptance or recognition of a particular action, behaviour, institution, or system by the members of that community, which infers it is considered appropriate, valid, and aligns with prevailing norms, values, and expectations within the community (Meyer & Rowan, 1977; Suchman, 1995). The institutional explanation for why employees adhere to an entity's or institution's beliefs is centred on the achievement of social legitimacy (Meyer, 1979). A high level of social legitimacy spreads pressures, while a lower level of social legitimacy diffuses them. In other words, social legitimacy positively affects adherence to principles, whilst lack of social legitimacy increases the risk of non-compliance (Deephouse, 1996; Russell & Meehan, 2014). In the context of public procurement, social legitimacy pressures the public procurement officers to adhere to the procurement principles in order for them to work professionally and with integrity. Organizations often respond to institutional pressures by acquiescing when they believe conformity will enhance social legitimacy (Oliver, 1991). In addition, organizational scepticism arises due to concerns about the social legitimacy of conformity and the perception that institutional objectives may conflict with organizational interests (Oliver, 1991). Hence, the above discussion has given the hypothesis below:

H1a: Social legitimacy positively impacts adherence to public procurement principles.

3.5.2 Economic Gain

In addition to the first rationale, there is also a sense of economic gain that allows procurement officers to adapt to institutional pressure (Meyer & Rowan, 1977). This pressure on institutions varies across industries (Powell, 1991). A high degree of adherence is likely to be advanced by institutional constraints connected to any form of economic advantage for public agencies. Economic gains strengthen adherence and make it useful in the institutional context. They essentially advance the form of institutional conformity. For instance, Goodstein (1994) observed that economic gain strengthens adherence in government organizations.

Many studies have already shown the positive effect of economic gain on adherence (Flynn, 2016; Gelderman et al., 2010). Similar results are anticipated in the case of adherence to public procurement principles. Having more adherence to public procurement principles in tendering for contracts can help companies explicitly and indirectly achieve financial savings. Public procurement principles adherence is specifically capable of competing with large corporations in providing value for money. Indirectly to increase competitiveness and more competitive bid rates, public procurement officers adhere to public procurement principles (Europe Economics, 2013). Due to continuous pressure on public agencies to do more with less, public procurement aims to achieve savings across their activities. Therefore, it is more logical to ensure economic gain public agencies adhere more procurement principles. This gives rise to the following assumption:

H1b: Economic gain has a positive impact on adherence to the public procurement principles of Bangladesh.

3.5.3 Rule Consistency

The first dimension of the second factor (i.e. constituent or institutional context) is the consistency of rules. Constituents or institutions tend to impose different rules on organizations that lead to conflicting pressures which consequently limit their ability to conform (Pfeffer & Salancik, 1978; W. R. Scott, 1987; Zucker, 1987). Meyer et al., (1983) observe the unaligned in state requirements which has led to greater non-compliance among the state level institutions. Similar evidence was reported in the context of private sector firms (Friedlander & Pickle, 1968), public agencies (Rogers & Molnar, 1976), and educational organizations (Gross et al., 1958; Rowan, 1982).

Public procurement regulations and objectives of procurement entities are not always inter-consistent (Flynn, 2016). This does not mean that the aims of public procurement are mutually exclusive. Erridge's (2007) case studies confirm that public contracts can be leveraged without negotiating value for money or legal obligations in the face of socioeconomic objectives. The root problem is the willingness of public procurement officers to balance between objectives and practicality. In the presence of perceived disputes, it is more likely that noncompliance with public procurement is inevitable (Flynn, 2016). When public procurement officers perceive a rule that is consistent with objectives and practicality, adherence is expected. This leads to the assumption below:

H1c: Rule consistency has a positive impact on adherence to public procurement principles in Bangladesh.

3.5.4 Dependence on Rule Setters

Public agencies' dependence on the pressurizing constituent for resources is also a predictor of the extent of possible resistance to pressure. DiMaggio and Powell (1983) hypothesized that conformity with institutional pressure is a function of external dependence on resources. The author argued for "the greater ability of organizations to resist the demands of rule setters on which they are not dependent."; and vice versa. That is, an organization will be less likely to resist external pressures when it is dependent on the sources of these pressures (Oliver, 1991). The degree of dependence on rule setters also varies by organization and industry (Reay & Hinings, 2005). Public agencies, for example, have a relatively high reliance on the government in a few categories, while government-dependent entities in the government sector are not homogeneous (Doyle, 2001). Other forms are often less dependent on the government, such as commercial companies. Due to varied levels of capital and demand reliance, agencies must behave and enforce themselves differently in each institutional environment (Tolbert, 1985). Agencies hardly resist the principles given to them with high institutional dependence. Their survival is strongly dependent on their sponsor's cooperation and faith. Organizations with low institutional reliance would have a common regulatory burden (Greenwood & Hinings, 1996). Despite non-compliance, they, therefore, suffer less from a lack of resources. Organizational dependence on the institutional rule setter is thus known to be an indicator of adherence.

In predicting adherence to the public procurement principles, the dependence on rule setters is also related. In the case of public agencies, organizational dependence is not standardized. The aspects of autonomy, priorities, mandate, and financial independence are also different for the government sector (Doyle, 2001). In addition, public sector entities, including semi-government organisations, can be classified as possessing a certain degree of autonomy. In contrast, national and local government organisations have limited autonomy compared to the former and are accountable to a higher degree of public and political obligation. In addition, government agencies vary in their priorities and authorizations, with some functioning as semi-commercial entities and others solely dedicated to providing social services. Public agencies rely substantially on government funding for their operational budget. Given the profound influence of government proximity and resource dependence on public procurement management, higher dependency on rule setters is expected to positively impact adherence to public procurement principles. Hence, the hypothesis is as follows: the profound influence of government proximity and resource dependence on public procurement management, higher dependency on rule setters is expected to positively impact adherence to public procurement principles. Hence, the hypothesis is as follows:

H1d: Dependence on rule setters has a positive impact on adherence to public procurement principles in Bangladesh.

3.5.5 Policy Compatibility

Two key factors that are believed to play a crucial role in forecasting the use of different tactics are the alignment of the pressures with organisational goals and the restriction of decision-making freedom that the pressures place on the organisation. When there is a mismatch between external demand and internal aims, strategies such as compromise, evasion, disobedience, and manipulation are more likely to be resistive (Oliver, 1991). When survival is concerned, organizations may unilaterally challenge or dismiss such external requirements (Powell, 1991). Besides organizational objectives, the anticipation of efficiency loss at in-profit organizations or that of quality of social service delivery at non-profits can also be the causes of resistance (Whetten, 1978: 262). Organizations may even be unable to comply when the consistency of pressure is low beyond a certain extent.

Many studies have shown that institutional pressures are often unlike organizational goals (Hoffman, 1999). Organizations want to shield their activities from institutional pressures (Weick, 2016). Proper compliance is necessary to represent flexible institutional requirements and make sure they do not negatively affect everyday operations (Meyer & Rowan, 1977). Here, the assumption is that if institutional pressures are aligned with organizational goals, adherence is highly expected. In contrast, the inappropriateness between institutional pressures and organizational goals amplifies institutional non-adherence. For example, Public agencies, such as, autonomic procurement agencies, local government agencies, procurement goal may differ with public procurement principles—transparency. In this context, institutional pressures are limited to how the participants complies.

Public procurement principles are motivating and proactive toward the behaviour of stakeholders of public procurement. The degree to which the principles are suited to procuring agency goals can impact adherence to public procurement principles. This effort also shows how public bodies try to behave toward public procurement principles and support competitive goals. Usually, procurement officers undertake their behavioural indications by procuring agency-rooted principles (Hawkins et al., 2011). From the above discussion, the following hypothesis is developed:

H1e: Policy compatibility has a positive impact on adherence to public procurement principles in Bangladesh.

3.5.6 Professional Discretion

Pfeffer and Salancik (1978) argued that compliance entails a relinquishment of discretion, a restriction, and an acknowledgment of constrained autonomy. Many theorists and studies have highlighted the significance of organisational discretion and the autonomy to make decisions in the relationship between organisations and their environment (Randall & Williams, 2009; Thomas & Qiu, 2013). Promoting the professional discretion of procurement officers would influence adherence to public procurement principles (Flynn, 2016). In addition, organizational support, perceived usefulness, and experience of procurement officers are significantly associated with increased perceived usefulness, which in turn is positively associated with attitudes toward public procurement principles (Mwesiumo et al., 2021). Public procurement principles embody coordinated government attempts to change procurement conduct. The procurement principles are structured to make it easier for contractors to find public sector contracts and bid for them. The procurement policy aims to ensure best practices in the procurement process. It is a 'one-size-fits-all' approach, and the consequences are likely to be perceived differently when procuring agencies. It is less expected to be perceived as a limitation because it is compliant with a procurement official's existing work practices and priorities. Where procurement policy restricts a procurement official's current policies and priorities, it is more likely to be seen as a restraint on professional discretion. It is most likely to be opposed by procurement officers in this context. Given these concepts, the study offers the following hypothesis:

H1f: Professional discretion has a positive impact on adherence to public procurement principles in Bangladesh.

3.5.7 Coercive Power

Institutional control refers to the methods used to exert pressure on organisations. There are two different ways in which pressures are applied: legal coercion and diffusion of practice (Oliver, 1991). Legal or government mandates are imposed by means of authority rather than through pressures for voluntary compliance (Oliver, 1991). When imposed through legal or government mandates that protect cultural expectations, organizations are more aware of public interest and demonstrate less defiance as the consequence is usually severe. Coercive power is the government's legitimate authority or other administrative practices to order corporate actions (DiMaggio & Powell, 1983). Institutional discourse identifies the connection between coercion and an actor's response to outside pressures. An indicator of conformity is considered to be the persuasive force of institutional pressure. Failure to comply is supposed to be obstructed when institutional pressures are punitive, i.e., imposed by the threat of punishment (Scott, 2008). In the presence of coercive institutional pressure, adherence is likely to be high.

The laws, that is, Public procurement Act- 2006, Public Procurement Regulations - 2008 and e-GP Guidelines- 2011, that govern public procurement impact the procurement officers and the procurement agencies they work for on an operational level. This force is segmented and operated by the government's legislative. Additionally, there are clear rules and references that lead to behaviour, and then adherence is assessed. In addition, there are subliminal threats of fines or official warnings for non-compliance. Prior research, however, has shown that coercive pressure from an agency or central authority improves policy compliance (Gelderman et al., 2010; Sang & Mugambi, 2014). The above discussion and prior research output give rise to the following hypothesis:

H1g: Coercive power has a positive impact on adherence to public procurement principles in Bangladesh.

3.5.8 Diffusion of Practice

In addition, institutional pressures and expectations can arise not only from legal coercion but also from the spread of established behaviours. The level of voluntary diffusion or spread of an institutional expectation or practice within an organisational sector is a reliable indicator of the probability of conforming to institutional expectations. Knoke

(1982) discovered that the most reliable indicator for forecasting the adoption of municipal reforms was the proportion of other municipalities that had already implemented the reform. Tolbert and Zucker (1983) showed that the extent to which civil service policies and programmes were adopted later on depended on how far and extensively these policies and programmes had propagated in the institutional environment. Organisations are more likely to comply to institutional standards or practices that are widely spread, and vice versa. Imitation of instances of broad diffusion throughout the field results in enormous consensus. Even decision-makers simply imitate and "will try what others have done and have found to work" (Galaskiewicz &Wasserman 1989). Conversely, the studies by Fligstein (1985), Tolbert and Zucker (1983), and Knoke (1982) revealed that organisations had less propensity to adhere to specific improvements when these innovations were not extensively disseminated. Hence, the extent to which norms and values can spread is what determines the boundaries within which institutional conformance occurs.

Many organizations have accepted this practice, which has become widely diffused and visible. Eventually, this practice will become institutionalized (Tolbert & Zucker, 1996). This diffusion of practices in organizational fields is more likely to depend on how strongly it influences the cohorts. There is ample evidence in prior studies that officers and their procuring agencies are more willing to accept the practice, which becomes widespread in their respective agencies (Flynn, 2016; Sherer & Lee, 2002). Moreover, mimetic pressures also became vibrant in amplifying compliance with sustainable procurement among the procuring agencies (Sancha et al., 2015). Here, the assumption is that if a procurement agency observes that most procuring agencies follow public procurement principles, they would also behave as per principles. Another view is that diffusion of practice is very slow in the public sector; therefore, it may not work in public procurement principles. The above discussion raises the following hypothesis:

H1h: Diffusion of practice has a positive impact on adherence to public procurement principles in Bangladesh.

3.6 PUBLIC PROCUREMENT PERFORMANCES AND HYPOTHESIS DEVELOPMENT

The primary distinction between public and private procurement is that public procurement must comply with a variety of regulations and principles (Liu et al., 2019). Institutional theory provides an explanation for how organizations are impacted by the environments in which they operate (DiMaggio & Powell, 1983b). It argues that establishing adherence to public procurement principles, procurement agencies can achieve its procurement performances, which makes it a good lens through which to examine the issues that are now being faced by public agencies (Ashworth et al., 2009). Many dimensions of public procurement performances have been used. This study captures the performance areas of public procurement. These include cost, quality, time, innovation, compliance, flexibility, sustainability, innovation, risk, and sustainability (Caniato et al., 2014; Klevensparr, 2016; Patrucco et al., 2016). In the following sub-section, the study hypothesizes that adherence to public procurement principles significantly impacts public procurement performances.

3.6.1 Cost Saving

Procurement principles play a significant role in influencing public procurement costs. When public procurement principles are properly implemented, these principles can lead to cost savings, improved efficiency, and better taxpayer value. Procurement principles encourage open and competitive bidding processes. When multiple suppliers compete for contracts, it often leads to lower prices and better value for money. In addition, adherence to procurement principles could prevent fraud and corruption, which can inflate costs. Establish robust oversight mechanisms to ensure compliance with procurement rules and regulations. Iyer and Jha (2005) revealed that transparency (presence of specific attributes), accountability (monitoring and feedback), and competition in tender stages positively impact cost performance in Indian construction projects. Dissanyaka and Kumaraswamy's (1999) study on Hong Kong building projects revealed that accountability (control system) and transparency (information flow) are key factors affecting cost performance. In addition, Tas (2020) indicates that improved public procurement regulatory regimes boost competition and cost-effectiveness, increasing the number of bidders and reducing the estimated procurement cost. Based on the discussion, the following hypothesis is offered:

H2a: Adherence to public procurement principles has a positive impact on the cost saving of public procurement in Bangladesh.

3.6.2 Better Quality

Public procurement principles are essential for improving procurement quality in the public sector. These principles provide a framework ensuring fairness, transparency, efficiency, and accountability in procurement. When adhered to principles, they contribute to better competition among suppliers and ensure that the government gets the best quality. In addition, when ensuring non-discrimination principles, ensure that all suppliers, regardless of their size or background, have a fair chance to participate in the procurement process. Islam et al. (2017) examine public procurement regulation in 142 economies, focusing on the quality of public procurement and its impact on road quality. The results show that improving the public procurement system leads to improved road quality, particularly in non-organisation for Economic Co-operation and Development countries, highlighting the importance of efficient use of public resources. Based on the discussion, the following hypothesis is offered:

H2b: Adherence to public procurement principles has a positive impact on the quality of public procurement in Bangladesh.

3.6.3 Time Saving

Public procurement is procedurally costly, slow to respond to changes, and erodes the skill requirements of procurement authorities, eroding professionalism (Schapper et al., 2006). Because public enterprises are subject to numerous rules, procurement principles are given a high priority, delaying the establishment of cooperative procurement arrangements

(Erridge & McIlroy, 2002). Furthermore, the demand for policy conformity limits employees' choices (Zimmerman, 2001). Because governmental procurement institutions stress rules, procedures, and stability due to their bureaucratic culture, they lack an orientation toward productivity and efficiency (Parker & Bradley, 2000). Wanyama (2010) suggests that public procurement may increasingly be dominated by entities with a focus on understanding and responding to the government's regulatory command rather than timeliness or service capabilities. In Bangladesh, compliance requirements according to the PPA-2006 and PPR-2008 call for lengthy procedures, especially in open bidding methods that delay service delivery. Based on the discussion, the following hypothesis is offered:

H2c: Adherence to public procurement principles has a positive impact on the time-saving of public procurement in Bangladesh.

3.6.4 Promoting Innovation

The relationship between public procurement principles and innovation is complex. Yet, it is critical for advancing and improving public services (Lember et al., 2011). Public procurement principles can either stimulate or stifle innovation, depending on its implementation (Uyarra et al., 2014). If the compliance with principles is authoritarian that might sometimes inhibit creativity. Public agencies may hesitate to provide new solutions when public procurement processes are excessively regulated and risk-averse due to the fear of failure or fines for noncompliance. Excessive documentation, lengthy approval processes, and tight adherence to predetermined criteria can all suffocate creativity and flexibility in procurement selections.

In contrast, procurement principles can also drive innovation. Public officers may seek innovative solutions for better results when held accountable for achieving specific objectives. Public principles can encourage procurement professionals to explore new technologies, methods, and business models to optimize processes and effectively meet public needs. In addition, some procurement principles explicitly promote innovation by encouraging the procurement of innovative products, services, or solutions. In such *cases*, accountability is linked to achieving innovation objectives, and procurement processes are designed to attract innovative suppliers and solutions. Based on the discussion, the following hypothesis is offered:

H2d: Adherence to public procurement principles has a positive impact on promoting innovation of public procurement in Bangladesh.

3.6.5 Allowing Flexibility

The long-term success of new procurement practices in central government depends on a shift in organizational culture, requiring agency officers to establish new relationships with contractors and rely on flexibility and negotiation throughout the acquisition life to meet procurement agency goals (Lawther, 2007). In addition, Fernandez et al. (2023) found that the flexibility in Brazilian law increased the price of potentially affected items by about

5%. This increase was attributed to demand pressure, changes in company strategic planning, and worker allocation, which affected company costs.

Public procurement principles and process flexibility are interconnected for efficient and adaptable systems. Principles ensure transparent, accountable, and fair procurement activities, while flexibility allows for tailored processes to specific circumstances and changing needs. This flexibility helps manage risks effectively, considering factors like market volatility and supply chain disruptions. Public procurement principles guide risk mitigation strategies, ensuring accountability and adaptability to changing risk profiles. The interplay between these principles and flexibility is crucial for effective and efficient public procurement performances. For example, transparency and accountability in procurement process may mitigate risk and allows flexibility for better achieve of public procurement agencies performances. Based on the discussion, the following hypothesis is offered:

H2e: Adherence to public procurement principles has a positive impact on allowing flexibility of public procurement in Bangladesh.

3.6.6 Fostering Sustainability

Public procurement principles can guide government agencies towards sustainable practices in purchasing decisions, promoting environmentally friendly practices among procurers and producers (Bratt et al., 2013). Adhering to procurement principles facilitates stakeholders in identifying opportunities to promote environmentally friendly products, ethical sourcing, and socially responsible practices (Shakya, 2015). Public procurement principles, including transparency and accountability, can prevent resource misallocation and promote sustainable practices, while compliance ensures suppliers adhere to sustainability standards and regulations. Governments can mandate that suppliers meet environmental, social, and ethical standards during bidding (Fourie & Malan, 2020). Public procurement principles promote sustainability by ensuring that decisions are made considering environmental, social, and ethical factors, thereby driving innovation and competition among suppliers to offer more sustainable products and services, ultimately driving sustainable practices throughout the supply chain. Public procurement is used to promote equality based on ethnicity and gender, human rights 'green' procurement, 'social' procurement, and sustainable development (McCrudden, 2004). The government, to achieve its strategic objectives, also frames different policies, regulations, and guidelines. The above discussion raises the following hypothesis:

H2f: Adherence to public procurement principles has a positive impact on fostering the sustainability of public procurement in Bangladesh.

3.7 ADHERENCE TO PUBLIC PROCUREMENT PRINCIPLES AS A MEDIATION

Mediation refers to the situation where an independent variable influences an performance variable by use of a third variable, known as a mediator (Baron & Kenny, 1986). The concept of public procurement standards, specifically openness, is significant in various intermediary connections, especially in the domain of human resources (Vogelgesang et al., 2013) or trust in government government (Song & Lee, 2016). Prior studies by Surroca et al. (2010), Huang and Lien (2012), and Blanco et al. (2013), have highlighted the consideration of mediating effects in the connection between social and financial performance. This study aims to enhance and refine the connection between institutional characteristics and the performance of public procurement by conducting a mediation analysis. Furthermore, Song and Lee (2016) presented empirical data that supports the idea that the views of government transparency play a mediating role in the connection between the utilisation of government social media and trust in government

In the present research, the literature review directed the study to determine adherence to public procurement principles as a mediator in the relationship between institutional factors and public procurement performances. This assumption is that whenever the procurement agencies do not adhere to the procurement principles, their performance in public procurement will decline. Thus, public procurement principles must provide guidelines so that procuring agencies can comply with them and recompense institutional factors and procurement performance. Hence, the next hypothesis is:

H3 $_{a\text{-}h}$: Adhering to public procurement principles has a mediating effect on the relationship between institutional factors (social legitimacy, economic gain, rule consistency, policy compatibility, professional discretions, dependence on rule setters, coercive power and diffusion of practice) and public procurement performances in Bangladesh.

3.8 PROPOSED RESEARCH MODEL

Based on the hypotheses developed above, Figure 1 provides the research model of the study. Institutional factors' influence on adherence to public procurement principles is rooted in the institutional theory, following the work of Oliver's (1991) eight forces related to predicting responses. The rationale of institutional pressures, the institutional context, the content of institutional pressure, and control mechanisms are correlated with these aspects as the process by which institutional pressure is extended to individuals and institutions. In addition, this model also connects the public procurement principles to its performances. The above discussion and hypotheses development can be depicted in a conceptual (hypothesized) model, as shown in Figure 1.

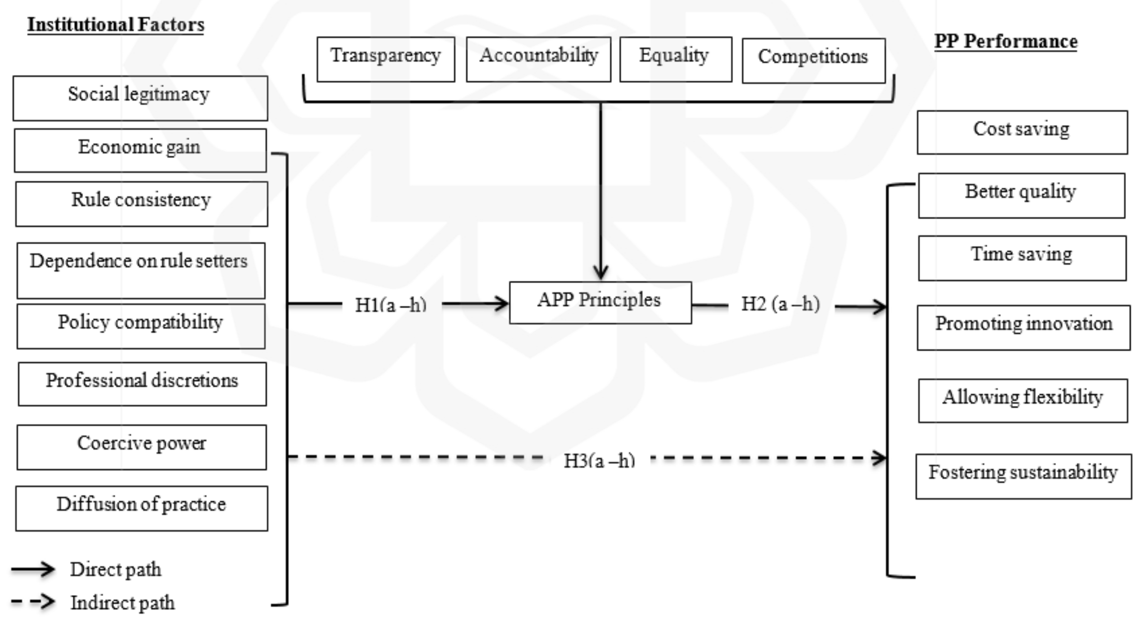

Figure 1: Research Framework

3.9 CONCLUSION

Theories guide the investigation and measure of a researchable social phenomenon. This research's topic of interest is adherence to public procurement principles, and the institutional theory is selected for this purpose. The institutional theory can explain how adherence to public procurement principles is influenced by organizational practices. Adherence to public procurement principles has not been empirically tested, except in a more recent study by (Abul Hassan et al., 2021). This study employed Oliver's (1991) prediction model by using institutional theory to investigate the adherence of public procurement principles. In this predictive model of institutional adherence, four factors are considered: rationality, context, content, and control mechanisms. All these mentioned factors came into play in the prediction model of adherence to public procurement principles. Also, Caniato et al. (2012) have given a model that consists of six performances of public procurement. Here, the study extended the Oliver (1991) model to link adherence to public procurement principles with procurement performances. Finally, the proposed conceptual research model presented in Figure 1 illustrates the proposed research model.

This chapter has formulated 22 hypotheses to achieve the study objectives defined in the Introduction. This conceptual research model guides the study in designing the research methodology in the following chapter. The proposed hypotheses are summarized as follows (Table 3.3).

Table 3.3: Summary of Hypotheses

Hypotheses	Statement of Hypotheses
H1a	Social legitimacy positively impacts adherence to public procurement principles.
H1b	Economic gain has a positive impact on adherence to the public procurement principles of Bangladesh.
H1c	Rule consistency has a positive impact on adherence to public procurement principles in Bangladesh.
H1d	Dependence on rule setters has a positive impact on adherence to public procurement principles in Bangladesh.
H1e	Policy compatibility has a positive impact on adherence to public procurement principles in Bangladesh.
H1f	Professional discretion has a positive impact on adherence to public procurement principles in Bangladesh.
H1g	Coercive power has a positive impact on adherence to public procurement principles in Bangladesh.
H1h	Diffusion of practice has a positive impact on adherence to public procurement principles in Bangladesh.
H2a	Adherence to public procurement principles has a positive impact on the cost savings of public procurement in Bangladesh.
H2b	Adherence to public procurement principles has a positive impact on the quality of public procurement in Bangladesh.

H2c	Adherence to public procurement principles has a positive impact on saving time for public procurement in Bangladesh.
H2d	Adherence to public procurement principles has a positive impact on promoting innovation in public procurement in Bangladesh.
H2e	Adherence to public procurement principles has a positive impact on the flexibility of public procurement in Bangladesh.
H2f	Adherence to public procurement principles has a positive impact on fostering the sustainability of public procurement in Bangladesh.
H3a	Adherence to public procurement principles mediates the relationship between social legitimacy and public procurement performances in Bangladesh.
H3b	Adherence to public procurement principles mediates the relationship between the economic gains of public agencies in contract competitions and public procurement performances in Bangladesh.
H3c	Adherence to public procurement principles mediates the relationship between rule consistency between different public procurement objectives and public procurement performances in Bangladesh.
H3d	Adherence to public procurement principles mediates the relationship between dependence on rule setters and public procurement performances in Bangladesh.
H3e	Adherence to public procurement principles mediates the relationship between policy compatibility and public procurement performances in Bangladesh.

H3f	Adherence to public procurement principles mediates the relationship between professional discretion and public procurement performances in Bangladesh.
H3g	Adherence to public procurement principles mediates the relationship between coercive power and public procurement performances in Bangladesh.
H3h	Adherence to public procurement principles mediates the relationship between diffusion of practice and public procurement performances in Bangladesh.

Source: Author's own

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter primarily focused on the research approaches and methods. Section 4.2 describes the philosophical assumption of social science. It then proceeds with the research design, approach, population, sample, and questionnaire design in sections 4.3, 4.4, 4.5, and 4.6, respectively. Section 4.7 enumerates the pilot study, and finally, section 4.8 describes the data analysis procedures carried out and the statistical tools used to analyze research data.

4.2 PHILOSOPHICAL ASSUMPTIONS OF THE RESEARCH

The philosophical stance and assumptions that drive how research should be performed to create knowledge are referred to as research philosophy (Collis & Hussey, 2003). Based on these assumptions, the study can choose the research strategy and method (Saunders et al., 2012). The research paradigm refers to a comprehensive framework that encompasses the entire process and reasoning behind conducting research (Antwi & Kasim, 2015). This studies can enhance the effectiveness and productivity of their research by comprehending the definitions and distinctions of research paradigms. This understanding enables them to adopt a more efficient approach to the flow of research, the process of data gathering, and the methods of analysis. Moreover, each research process comprises three components: ontology, epistemology, and technique, and these underlying beliefs influence the calibre of the research (Selvadurai, 2018). When considering research philosophy, there are two main paradigms that may be extensively discussed: positivism and interpretivism (Bryman & Bell, 2011). Positivism is a philosophical approach that emphasises the importance of observable facts and solid evidence. In contrast, interpretivism is a perspective that focuses on the subjective interpretation and projection of human imagination (Creswell, 2009; Morgan & Smircich, 1980).

The current study employed a positivist paradigm. Positive research is the epistemological assumption that tries to test theories that pursue the predictive model of adherence to public procurement principles and performances. The quantitative method was used to assess institutional factors related to adherence to public procurement principles and performances. After evaluating previous works of literature, this study developed several hypotheses. Quantitative methods are better suited to studying correlations between independent and dependent variables and statistically evaluating hypotheses based on survey data (Saunders et al., 2012). As a result, the positivist paradigm is acceptable for this study.

4.3 RESEARCH DESIGN

The research design encompasses the comprehensive study plan and gathers responses to the research questions (Adebiyi & Abayomi, 2016). The study design functions as a structure for gathering, measuring, and analysing data (Cooper & Schindler, 2013). In addition, a study design serves as more than a mere operational plan; it enables a study to gain further understanding and achieve the research goals (Smith, 2015). According to Emory and Cooper (1991), design is a strategic approach that involves the careful selection of appropriate sources, the precise specification of variables, and the systematic outlining of methods from formulating hypotheses to analysing data. It connects the study's methodologies to tackle research problems and helps in selecting appropriate sources and types of information (Kothari, 2013). Briefly, a research design identifies a problem and prepares research questions to address it (Adebiyi & Abayomi, 2016). It includes clear objectives, comprehensible questions, and a clear data collection and analysis method. This plan helps studies lead and emphasize their research, ensuring comprehension of the subject matter or study (Saunders et al., 2012). Therefore, developing a research design becomes pivotal to creating an environment for data collection and analysis so that the study can achieve its objectives (Adebiyi & Abayomi, 2016). This study plan starts with establishing the research design. Prior literature was reviewed early to identify research needs. The research strategy was later proposed, followed by the development of a theoretical framework and hypotheses.

Subsequently, the study shifted its attention towards the gathering and examination of data. Firstly, the study developed a research instrument and subsequently conducted a pilot study in the initial phase to assess the reliability and validity of the survey questions for the final survey. Subsequently, survey results were collected for the ultimate study. Following that, the data was analysed using the statistical approach called partial least squares structural equation modelling (PLS-SEM), and the conclusions were drawn based on the results. Figure 2 illustrates the current research plan for accomplishing the objectives outlined in Chapter One and examining the hypotheses generated in Chapter Three. The plan outlines the specific criteria for gathering and analysing data, specifically using quantitative research methodologies.

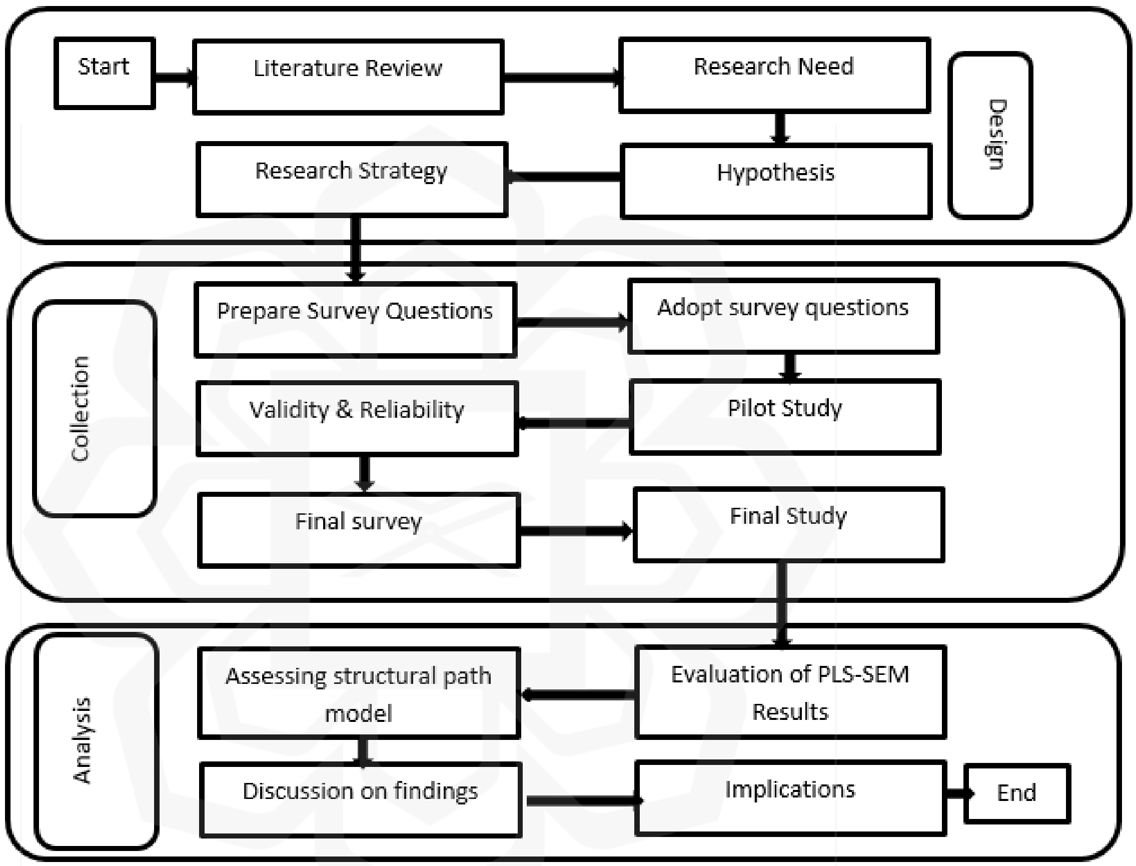

Figure 2: Research design

4.4 RESEARCH APPROACH AND METHOD

Studies commonly employ two distinct methodologies, namely the deductive approach and the inductive approach (Bryman & Bell, 2011). The deductive methodology is primarily linked to the quantitative research method, which is guided by theory (Collis & Hussey, 2009). According to Creswell (2009), quantitative research is the process of examining the connections between variables in order to investigate a theory. From a philosophical standpoint, the deductive approach aligns with the positivist paradigm. This paradigm involves studies formulating hypotheses and then subjecting them to empirical testing in order to determine whether they should be accepted or rejected (Bryman & Bell, 2011). Quantitative research involves the use of investigation or survey techniques to obtain data (Saunders et al., 2012). The inductive approach is the opposite of the deductive approach (Erkan, 2016). Qualitative research is often linked with the emergence of theory from the study (Collis & Hussey, 2009). In qualitative research, the understanding of individuals and groups is used to investigate social and human concerns (Creswell, 2009). Unlike the deductive approach, this approach does not begin with hypotheses (Erkan, 2016). This method condenses the research scope through the use of research questions and ends with conclusions, and hence is related to the interpretivism paradigm (Bryman & Bell, 2011). As a result, case studies, grounded theory, narrative inquiry, and ethnography are used as data collection methodologies in qualitative research (Saunders et al., 2012). Table 4.1 summarises the differences between deductive and inductive approach.

Table 4.1: Differences between deductive and inductive approach

Approach	Logic	Generalization	Data use	Theory
Deductive	When the premises are true, the conclusion is true.	Structured from general to specific	Data collection is applied to examine hypotheses linked to an existing theory.	Theory testing or verification
Inductive	Familiar premises are used to generate untested conclusions .	Structured from specific to general	Data collection is applied to explore a phenomenon, identify themes and patterns and build a conceptual framework.	Theory creation and formulation

Source: Saunders et al. (2012)

Quantitative methods specialize in quantities, representing theoretical constructs and concepts (Straub & Gefen, 2004). They provide robust scientific proof through field experiments, lab experiments, simulations, adaptive experiments, field studies, opinion research, and archival research (Straub & Gefen, 2004). The knowledge from a quantitative study provides enlightenment, understanding, and extrapolation to a situation (Burrell & Morgan, 2005). The primary drawbacks of the quantitative method are the strict restrictions of statistics-controlled application and the yield correlation and covariance patterns rather than causality (Ryan, 1981). Subsequently, the quantitative study performances truly offer little meaning and significance if built on insufficient data.

A precise research method is crucial for achieving research objectives (Collis & Hussey, 2009). The first stage involves reviewing the literature to develop a theoretical framework and hypotheses. The second stage focuses on answering the question of how institutional factors influence public procurement agencies' adherence to principles. This research uses a quantitative method, collecting data from public procurement officers to identify influential factors through statistical assessment.

More than a few reasons justify the proposed method as the most suitable. First, the objectives of the research are to predict the relationships between variables. Sekaran (2005) stated that hypothesis testing represents the current states of two or more variables. Next, hypothesis testing can be performed either as quantitative or qualitative research. Therefore, the survey method is suitable for collecting data. Thirdly, the public sector is usually huge in terms of size; therefore, the survey method is appropriate for understanding the attributes of a big population (Babbie, 1973). Fourthly, by using a survey questionnaire, the study can operationalize the concept in the most meaningful way (Babbie, 1973). Lastly, a survey allows the collection of rigid data from public organizations; therefore, the study can quantitively validate the proposed research model.

4.5 POPULATION, SAMPLE AND RESPONDENTS OF THE STUDY

The target population from which the sample is drawn, or the sampling frame, represents the population of interest (Burns et al., 2008). The population of this study is the procurement officers of public procurement agencies in Bangladesh. Since it was not possible to collect a list of every procurement officer of the population, non-probability sampling or purposive (judgment) sampling was used in the present study. In this study, the sampling unit or unit of analysis is the individual procurement officers of public procurement agencies or entities.

Public procurement officers are relevant respondents for the present study because they are accountable for adhering to public procurement principles when dealing with daily tasks in procurement activities. Procurement officer as a respondent was also covered by many prior studies, such as Karjalainen and van Raaij (2011) investigated 'maverick' purchasing practices among the government employees of Finland; Gelderman et al. (2006) in the Dutch context; Kassim (2011) in the Malaysian context; Mwakibinga and Buvik (2013) in the Tanzanian context; and Flynn (2016) investigated compliance with SME-friendly policy in the Irish public sector. Surveying the population of procuring officers of public agencies/entities in Bangladesh was difficult as the identity of procurement officers was not available. However, as of July 2020, there were 44 ministries and 1,365 procuring agencies in Bangladesh (https://cabinet.gov.bd). Among those procurement agencies, 37,000 procurement officers received extensive capacity development training on public procurement by the Central Procurement Technical Unit (CPTU) (World Bank, 2020). This study identifies, those trained procurement officers as respondents. After identifying the respondents, CPTU was contact for the permission of survey and requested to provide contact details of procurement officers. Upon request the responsible personal, CPTU provide a data base which contains the details of procurement officers’ addresses along with email and mobile number.

With any research, it is important to ensure that the results are applicable to the entire population. Cooper and Schindler (2011) said that the quality of a sample can be judged by how well it shows the characteristics of the population being studied. The statistical significance of a study can also be affected by the number of people in the study. If the sample size is too small, the results might not be as applicable to the whole population. If the sample size is too big, tests become overly sensitive, hence producing erroneous results (Hair et al., 2010)

For an identified population, Krejcie and Morgan (1970) provided a formula for determining sample size based on the formula:

$$s = X^2 NP(1-P) \div d^2 (N-1) + X^2 P (1-P).$$

As this study involves a population of 37,000 public procurement officers, the estimated sample size for this study should be approximately 385 respondents.

4.6 QUESTIONNAIRE DESIGN

A request in the form of a cover letter was sent to procuring officers, seeking their assistance and experience to increase the response rate. This instrument began by stating that their expertise is needed to facilitate strategy development and the study's understanding of Bangladesh's public procurement principles. This instrument was kept comparatively brief so that their regular work was not interrupted too much. Questions were set objectively, and jargon and technical language were avoided. Closed-ended questions were used, where all the possible answers were outlined, and the respondents were only required to select the best options suited to their opinions. Also, there was no need to type or consult any literature. Several steps were taken to ensure the reliability and validity of the procedures. The questionnaire was prepared, formatted, and managed using Google Forms.

4.6.1 Measuring the Adherence to Public Procurement Principles Construct

The study used four dimensions of public procurement principles stated in the PPA, 2006 of Bangladesh: (i) transparency, (ii) accountability, (iii) equality, and (iv) competition. The above four dimensions of procurement principles are also in line with public procurement principles in Europe: equal treatment, transparency, and non-discrimination (Stolfi & Murniati, 2014). However, each country and different international organizations have its own procurement principles. As the study context is on Bangladesh's public procurement, the study chose the dimensions of Bangladesh's public procurement principles. Table 4.2 displays the operational definitions and their sources.

Table 4.2: Adherence to public procurement principles operational definitions

Constructs	Definitions
Transparency	In the context of public procurement, transparency refers to the capacity of all interested parties to be aware of and comprehend the real procedures and methods used to award and manage contracts. It is a crucial prerequisite for encouraging widespread procurement participation (PPR – 2008).
Accountability	Accountability means that officers are accountable for their procurement-related actions and decisions, as well as for the results of those actions and decisions (Australian Government, 2020).
Equality	This concept forbids discrimination based on nationality, which means that everyone must be treated equally unless there is an objective reason for the difference. Direct and indirect discrimination are both forbidden. (PPR - 2008).
Competition	The procuring entity must give all prospective applicants, tenderers, or consultants the information they need to prepare an application, tender, quotation, or proposal in order to ensure fair and objective competition in the procurement process (PPA – 2006).

Source: Author's own

Employing a five-point Likert scale, respondents had to answer the statements depending on their level of adherence, starting from "strongly disagree" (1) to "strongly agree" (5). The adherence to public procurement principles is adpted from PPA 2006, PPR 2008, and e-GP (2011) Guidelines with necessary adjustments. In this study, public procurement principles have four first-order constructs (see Table 4.3) and 16 items, where the accountability construct has three items, transparency has five items, equality has four items, and competition has four items (modified from Abul Hassan et al. (2021). The items for each construct are shown in Table 4.3.

Table 4.3: Adherence to public procurement principles measurement

Constructs	**Code**	**Items**
Accountability	AC1	The bid challenge system usually ensures fairness to suppliers in the procurement process.
	AC2	There is an adequate measure in place to prevent fraud and corruption in procurement on the part of the suppliers.
	AC3	Government officers involved in procurement evaluation are committed to high standards for professional conduct or ethical principles (including independence)
Transparency	TP1	Bidding documents are published in the standard form
	TP2	Suppliers have access to information regarding procurement practices.
	TP3	The tender evaluation criteria are disclosed and accessible to suppliers.
	TP4	Laws and regulations concerning procurement are easily accessible to the public.
	TP5	A public announcement is made by the government on the awarded company.
Equality	EQ1	All acceptable bids are processed fairly based on current rules, policies, and procedures.
	EQ2	Qualification requirements for bidders are fair and appropriate.
	EQ3	All successful and unsuccessful bidders are promptly informed about the results of the bid at the same time.
	EQ4	If requested, the government provides unsuccessful bidders with the reasons for the rejection of their bid.
Competitions	CM1	All bidders have similar information on the bidding process
	CM2	All bidders are provided with similar information on the tender.
	CM3	Prior to the closing of the tender, information submitted by each bidder is kept confidential
	CM4	Equal opportunities are given to all suppliers who participate or compete in any procurement activities.

Source: Abul Hassan et al. (2021)

4.6.2 Measuring the Public Procurement Performance Construct

The impact of adherence to public procurement principles on public procurement performance is detailed here. The public procurement performances developed by Caniato et al. (2014) are cost, quality, timeliness, innovation, flexibility, and sustainability. These six indicators were operationalized through a multiple-item measure proposed to meet the research's objectives. Using a Likert scale from 1 to 5, these constructs were measured, ranging from strongly disagree (1) to strongly agree (5). In this study, the saving construct has three items (modified from Wu et al., 2007), better quality has four items (modified from Caniato et al., 2014), time-saving has four items (modified from (Caniato et al., 2014 and Nair et al., 2015), promoting innovation has five items (modified from Lember et al. 2023), allowing flexibility has five items (modified from Nair et al., 2015) and fostering sustainability has four items (modified from Brammer & Walker,2011). The public procurement performance measurement is in Table 4.4.

Table 4.4: Public Procurement Performance

Constructs	**Source**	**Code**	**Items**
			By adhering to public procurement principles,
Cost saving	Wu et al. (2007)	CT1	My agency /entity has substantially reduced the costs of procurement activities.
		CT2	My agency /entity has substantially reduced the costs spent on products and services purchased.
		CT3	My agency /entity has substantially reduced the costs of coordinating procurement with suppliers.
Better quality	Caniato et al., (2014)	PQ1	My agency /entity has increased stakeholders' satisfaction with public procurement activities.
		PQ2	My agency /entity has substantially increased the quality of supplier relationships.
		PQ3	My agency has substantially increased the quality of the public procurement process.
		PQ4	My agency /entity has substantially increased the quality of the procuring agencies' overall

			performance.
Time saving	Caniato et al., (2014); Nair et al., (2015)	PT1	My agency /entity has substantially reduced the duration of procurement planning.
		PT2	My agency has substantially reduced the duration of sourcing works/goods/services.
		PT3	My agency /entity has substantially reduced the duration of contract execution.
		PT4	My agency has substantially reduced the duration of the internal administrative process.
Promoting innovation	Lember et al., (2013)	PI1	My agency /entity encourages technological innovation in procurement.
		PI2	My agency /entity procures R&D projects for knowledge creation in science, technology, and innovation.
		PI3	My agency /entity places a strong focus on using innovation-friendly procurement techniques.
		PI4	My agency /entity places a strong focus on performance specifications.
		PI5	My agency /entity focuses on using innovation in the competitive dialogue.
Allowing flexibility	Nair et al. (2015)	PF1	My agency /entity can adapt to the rapid changes in public procurement planning.
		PF2	My agency /entity can adapt rapidly to changes in production volume in public procurement.
		PF3	My agency /entity can adapt rapidly to changes in schedules in public procurement.
		PF4	My agencies can adopt new technology in public procurement.
		PF5	My agency /entity can participate in the creation of new products in public procurement.
Fostering sustainability	Brammer & Walker (2011)	PS1	My agency /entity confirms that the supplier´s processes are environmentally friendly.
		PS2	My agency /entity encourages SMEs to participate in government procurement.
		PS3	My agency /entity emphasizes ensuring safe working conditions for employees.
		PS4	My agency /entity ensures that all of its suppliers maintain human rights.

4.6.3 Measuring the Predictors of Adherence to Principles Construct

The institutional factors used to predict adherence to procurement principles are detailed here. This predictive framework for institutional compliance was put forward by Oliver (1991). Flynn (2016) also used this model to investigate compliance with the SME-friendly procurement policy, which consists of eight factors (see Table 4.5). A multiple-item measure operationalized these institutional factors by using the Likert scale, ranging from strongly disagree (1) to strongly agree (5). In this study, the social legitimacy construct has four items, the economic gain has four items, rule consistency has three items, dependence on rule setters has three items, compatibility has three items, constraints have three items, has four items, and diffusion has four items. The measurement of adherence to public procurement principles is shown in Table 4.5.

Table 4.5: Institutional construction and their operationalization

Constructs	Code	Items
Social legitimacy	SL1	Adhering to public procurement principles in procurement activities is prestigious for my agency/entities.
	SL2	Adhering to public procurement principles in procurement activities is a social obligation for my agency/entities.
	SL3	Adhering to public procurement principles in procurement activities is right for my agency/entities.
	SL4	Adhering to public procurement principles in procurement activities is ethical for my agency/entities.
Economic gain	EG1	Adhering to public procurement principles in procurement activities can ensure the quality of public services.
	EG2	Adhering to public procurement principles in procurement activities can ensure efficient use of public expenditure.
	EG3	Adhering to public procurement principles in procurement activities can promote competition in a public contract.
	EG4	Adhering to public procurement principles in procurement activities is crucial for poverty reduction.
Rule consistency	PC1	The Public Procurement Act is consistent with the public procurement principles of my agency/entities.
	PC2	The public procurement regulation is consistent with the public

		procurement principles of my agency/entities.
	PC3	My institutional environments are consistent with the rules and demands of individuals and organizations.
Dependence on rule setters	DP1	My agencies/entities are heavily dependent on institutional rule setters.
	DP2	My agencies/entities cannot oppose the standard given by the institutional rule setter.
	DP3	My agency/entity's survival is strongly dependent on the sponsor's cooperation and faith.
Policy compatibility	CP1	The public procurement principles are compatible with my agency/entity's objectives.
	CP2	The public procurement principles motivate my agency's/entity's objectives.
	CP3	The procurement executives of my agencies/entities undertake their behavioural indications based on established public procurement principles.
Professional discretions	PD1	The public procurement principles limit my wisdom as a procurement professional.
	PD2	The discretionary powers of procurement professionals are strained by the requirements of public procurement principles.
	PD3	My professional discretion is being hampered by a "one-size-fits-all" attitude to principles.
Coercive power	CO1	Adherence to public procurement principles is mandatory for my agencies/entities in public procurement activities.
	CO2	Some circulars require my agencies/entities to adhere to the public procurement principles in procurement activities.
	CO3	There are instruction letters that require my agencies/entities to adhere to the public procurement principles in procurement activities.
	CO4	Non-adherence to public procurement principles in procurement activities has consequences in my agencies/entities.
Diffusion of practice	DF1	Many agencies/entities have already adhered to the principles of public procurement in their procurement activities.
	DF2	In the public sector, agencies that do not readily adopt public procurement principles will be left behind.
	DF3	The agency will be considered non-compliant if we do not adopt public procurement principles.

Source: Author's own.

4.6.4 Demographic Information

In this subsection, eight background information on procurement officers and their agencies are used. The information is operationalized and measured as in Table 4.6. across gender, age, experience, involvement, qualification, familiarity, and agency size.

Table 4.6: Operationalization of demographic variables

Demographic information	Operationalization	Measurement
Gender		Male Female
Age		Less than 30 years 30 to 35 years 35 to 40 years 40 years and above
Experience of officers	How long have you been working in the procuring agencies/entities?	1-10 years 10-20 years 20 -30 years 30+ years
Procurement involvement	How much of your workload is devoted to the function of procurement?	0 % 1-25 % 25-50 % 50-75 % 75-100 %
Procurement qualification	Do you have any procurement-related qualifications (Education/Training)?	Yes No
Familiarity	Are you familiar with the content of public procurement principles in Bangladesh?	Yes No
Agencies size	How many employees are there in your procuring agencies/entities?	1-50 employees 50 -250 employees 250+ employees
Procurement management	How is procurement managed in your organization?	On a centralized basis On a decentralized basis

Source: Author’s own

4.7 PILOT STUDY

In this study, pilot testing was conducted in advance of the main research to detect weaknesses in design and instrumentation so that the questionnaire could achieve the intended research objectives during the actual data collection. This study adopted a pre-testing approach for the purpose of pilot testing with a focus on the readability, understandability, and appropriateness of the questionnaire items (i.e., content validity) for the target respondents. This test not only helped to evaluate whether or not the respondents could interpret the questions presented to them in a consistent manner but also initiated the review and revision process of the questions (Burns et al., 2008). This process ensured no redundancies and double-barreled questions were being asked so as to lead to more relevant and reliable results.

As the questionnaire of this study consisted of sections on institutional factors, public procurement principles, and performances of public procurement, pilot testing was done not only with the procurement officers as the target respondents of the actual study but also with academics from IIUM's Accounting Department. Additionally, academics with a statistics background were consulted during the pilot testing to ensure the questionnaire structure, including the number of items representing each variable, the scale used, the scale value, and whether they are satisfactory for the requirements of statistical analyses using PLS-SEM. The participants in the pilot testing process are indicated in Table 4.7.

Table 4.7: Pilot Testing Groups

Group	Criteria	Specific Purpose
Four (4) procurement officers of public procurement agencies/entities of Bangladesh.	6th-grade or above procurement officers of the People's Republic of Bangladesh	1. Validity of institutional factors. 2. Validity of public procurement principles. 3. Validity of performances of public procurement.
Three (3) experts' in Public Administration studies	University professors or lecturers with doctoral qualifications in public administration studies and a minimum of ten years of teaching experience in public procurement.	Validity of public procurement principles scale
Three (3) experts' in Statistics	Academicians (Professor & Senior lecturer) with statistical knowledge and experience either through teaching and/or research and publication.	Validity of measurement items and scale for SEM analysis

Source: Author's own

The questionnaires for pilot testing were self-administered in this study. The participants were informed about the purpose of the study and the overall contents of the questionnaire and given adequate time to look into it. They assessed the relevance of the items and whether the items measured what they were intended to measure. They were allowed to comment, omit, or modify the statements as needed and to give suggestions for improving the questionnaire. The emphasis was on the validity of the public procurement principles, institutional factors, performances of public procurement, and measured constructs in the context of public procurement.

In total, 10 respondents were involved in the pilot testing. Two respondents gave online comments on the contents of the questionnaire. The remaining eight respondents were unable to attend face-to-face consultations due to the COVID-19 pandemic but gave their comments at the time of interviews through ‘Google Meet.’ The constructive comments and feedback gathered from the pilot testing, as in section A, experts' feedback, was to eliminate the question-based format and to use a statement-based format as well as recommendations to improve the layout of the questionnaire; in section B, experts' comments were to avoid long questions, redundant questions as well as few confusing items; and in section C, the experts highly appreciated but recommended shortening the questions. The overall feedback was to use simple questions, eliminate long and redundant questions, and improve the questionnaire layout.

Based on the pilot testing inputs, some amendments were made to the questionnaire in terms of reducing the number of questionnaire items that were confusing, redundant, or inappropriate. During pilot testing, the modifications made to the questionnaire are summarized in Table 4.8.

Table 4.8: Pre- and post-questionnaire modifications

Section	During pilot testing	Post pilot testing
Section A: Respondents' Background	Statement-based format	Question-based format
Section B: Public Procurement Principles constructs	Twenty items to measure public procurement principles.	Sixteen items to measure public procurement principles.
Section C: Public procurement performances constructs	Twenty-nine items to measure public procurement performances.	Twenty-five items to measure public procurement performances.
Section D: Predictors of adherence to public procurement principles	Twenty-nine items to measure predictors of adherence to public procurement principles and public procurement performances.	Twenty-seven items to measure predictors of adherence to public procurement principles and public procurement performances.

Source: Author’s own

Additionally, the overall presentation of the questionnaire was improved to ensure a better appearance in the eyes of the respondents, with the aim of motivating them to give better responses to all questions asked. The advice was sought from English lecturers from a public university on the amended questionnaire to check for items that might be redundant in meaning and to ensure the statements which were resentenced or shortened from the original version represented the actual meaning as per the original statements. Additionally, an academician from the IIUM Accounting Department and a procurement official were consulted for further comments on the final version of the questionnaire before the actual survey took place. The final version of the questionnaire is as in Appendix 1.

4.8 DATA COLLECTION AND ANALYSIS

The questionnaire was distributed online via email as well, and all communications with the procurement officers were conducted via email. Respondents accessed the questionnaire by clicking on a web link. The e-survey approach is preferable in terms of resource utilization, which is an important factor in deciding research strategies (Czaja & Blair, 1996). Much evidence has also proven that e-surveying costs are much less than the postal mail method (Schreckhise, 2005). In addition, e-surveying allows faster turnaround times compared to postal services (Flynn, 2016). Further, data retrieved from the e-surveying method allows effortless transfer to the SPSS file for further statistical analysis. This help studies to avoid the task of entering massive data manually.

Furthermore, e-surveying is more convenient from the respondents' standpoint (Flynn, 2016). The questionnaire was directly sent via email to the procuring agency, and the return of the response required just a click of the mouse. Also, e-surveying provides flexibility in completing the questionnaire at a convenient time for respondents, which eventually boosts the response rate. Finally, due to just after the COVID-19 pandemic, procurement officials were still somewhat maintaining social distancing; e-surveying was the only means left to collect data. Prior research has also evinced that incomplete responses in e-surveys are less compared to mail surveys (McDonald & Adam, 2003).

The study chose the self-administered technique for several reasons. Firstly, the non-availability of financial resources and labour costs to collect data from the geographically dispersed population of procuring agencies. Hence, limited resource is the main reason for selecting the self-administered option by the studies (Leeuw, 2008). E-surveys can enhance the use of the self-administered approach. These practices also improve confidentiality and secrecy when responding. Moreover, lesser interference also reduces respondent bias in this method (Fowler, 1995). A self-administered questionnaire has a few shortcomings, such as a low response rate, lack of control, and unfit for open-ended questions (Leeuw, 2008; Flynn, 2016).

Descriptive statistics is a useful tool for describing the centre and spread of a distribution (Cooper & Schindler, 2014). This study utilized a central tendency (means) test to analyze the overall distribution of all the variables used in the study. The study analyzed the findings by calculating the mean score ranking from the mean results. The study's findings are clearly presented through the rankings, which interpret the importance of the rated items (Cooper & Schindler, 2014). The standard deviation is a statistical method that measures the dispersion of a distribution. The normal distribution rule states that all data will fall within plus and minus three standard deviations of the mean (Lind et al., 2020). This study used descriptive statistical analysis to answer the first research questions. The mean and standard deviation were used to rank objectives and principles based on respondents' perceived importance. The Likert scale was used to analyze the results. High adherence levels were rated between 3.5 and 5.0, moderately adhering between 2.5 and 3.0, and low adherence levels below 2.5 (Abul Hassan et al., 2021).

4.8.1 Data Analysis Using PLS-SEM

The current study used SPSS for descriptive statistical analyses and PLS-SEM to estimate the hypothesized relationships. The application of regression-based approaches, also known as first-generation techniques, that analyze empirical data to either identify or confirm theoretical hypotheses, dominated the research landscape through the 1980s, while SEM as a second-generation method has expanded rapidly since the early 1990s (Hair et al., 2014). As Gefen et al. (2000: 6) noted, “SEM has become de rigueur in validating instruments and testing linkages between constructs.”

The decision to use SEM is due to the limitations of the regression-based approach and the advantages of SEM for data analysis. Three limitations of the regression-based approach (Haenlein & Kaplan, 2004) are:

1 The concept of a simple model structure that includes only one dependent variable and multiple independent variables. This limits the applicability in a more complex situation, particularly when the study is attempting to investigate the potential effects of a moderating or mediating variable on the relationship between the dependent and independent variables.

2 The assumption is that all variables are treated as observable, whereby their values are obtainable from real-world sampling experiments. For unobservable variables or latent constructs, the applicability of the first-generation regression-based technique may be limited.

3 The speculation of being error-free for all measured variables. This is applicable in situations where neither a systematic nor a random error occurs, and in reality, this error-free situation is rare.

The SEM is a technique that allows for the separation of dependent variables within a set. It provides the most appropriate and efficient estimation technique for simultaneously testing multiple exogenous and endogenous latent construct relationships (Hair et al., 2010). Exogenous latent variables only function as independent variables in a structural model, whereas endogenous latent variables serve as dependent variables or both independent and dependent variables (Hair et al., 2014). Other advantages of SEM include its ability to model and analyze mediating and moderating effects of certain variables, to deal with multicollinearity problems among independent variables (Zainudin, 2012), and to handle the effects of estimated measurement error for latent constructs (Smith & Langfield-Smith, 2004). Concerning sample size, SEM is applicable with a minimum sample size of 100 (Hair et al., 2010).

The two types of SEM are covariance-based SEM (CB-SEM) and variance-based SEM (PLS-SEM or PLS path modelling). CB-SEM is used to confirm (or reject) theories by determining how well a proposed theoretical model can estimate the covariance matrix for a sample data set (Hair et al., 2014). By contrast, PLS-SEM is mainly used to develop theories in exploratory research by focusing on the explained variance of endogenous latent variables (Hair et al., 2014). A comparison in terms of characteristics of PLS-SEM and CB-SEM is shown in Table 4.9 below.

Table 4.9: Comparison between PLS-SEM and CB-SEM

Criteria	PLS	CB-SEM
Objective	Prediction-oriented	Parameter-oriented
Approach	Variance-based	Covariance-based
Assumption	Predictor specification (nonparametric)	Typically, multivariate normal distribution and independent observations (parametric)
Parameter estimates	Consistent as indicators and sample size increase (i.e. consistency at large)	Consistent
Latent variable scores	Explicitly estimated	Indeterminate
Epistemic relationship between a latent variable and its measures	It can be modelled in either formative or reflective mode	Typically, only with reflective indicators.
Implications	Optimal for prediction Accuracy	Optimal for parameter accuracy
Model complexity	Large complexity (e.g., 100 constructs and 1000 indicators)	Small to moderate complexity (e.g., less than 100 indicators)
Sample size	Power analysis based on the portion of the model with the largest number of predictors. Minimal recommendations ranged from 30 to 100 cases	Ideally, based on power analysis of specific model – minimal recommendations range from 200 to 800 cases

Source: Chin and Newsted (1999)

4.8.2 Overview of PLS-SEM

This study adopted the emerging second-generation tool referred to as PLS-SEM. The PLS software used in this study is SmartPLS Version 4.0 M3, developed by Ringle et al. (2022). This software is user-friendly and downloadable from https://www.smartpls.com. This website also provides an excellent platform for discussion of SmartPLS through its online forum. The definitions of common terminologies used in PLS are summarized in the following Table 4.10.

Table 4.10: Common Terminologies in PLS-SEM

Terminology	Definition
Average variance extracted	Average variance measures convergent validity, indicating how well a latent construct explains the variance of its indicators.
Composite reliability	Composite reliability measures internal consistency without equal indicator loadings, unlike Cronbach's alpha.
Constructs (also called latent variables)	Creates abstract, complex measure concepts that cannot be directly observed using multiple items.
Convergent validity	Convergent validity measures the positive correlation between a measure and alternative measures of the same construct.
Discriminant validity	Discriminant validity measures a test's divergence from unrelated measures, indicating its conceptually unrelated construct and its ability to distinguish between them.
F^2 effect size	measures the predictor construct's impact on the endogenous construct, evaluating relative impact.
Q^2 effect size	measures predictor construct relevance on the endogenous construct, evaluating relative predictive relevance.
Formative measurement model	assumes the construct is caused by assigned indicators in a specification.
Hierarchical component models (HCM)	Second-order structures with multiple layers and higher abstraction levels.
Interaction term	is an auxiliary variable in the PLS path model, accounting for moderator and exogenous latent variables' interaction.
Outer loadings	represent single regressions of indicator variables on their corresponding constructs.
Outer weights	represent multiple regression results on a construct's indicators.
Reflective measurement model	assumes indicators are caused by underlying constructs, guiding measurement specification.

Source: Hair et al. (2014)

PLS-SEM is characterized by two basic components: the measurement model and the structural model (Figure 3). The measurement model is "an element of a path model that contains the indicators and their relationships with the constructs, and is also called the outer model in PLS-SEM" (Hair et al., 2014: 29), while the structural model is "an element of a PLS path model that contains the constructs as well as the relationships between them. It is also called the inner model in PLS-SEM" (Hair et al., 2014: 31). A diagrammatic presentation of a simple path model based on Hair et al. (2014) is shown in Figure 3 below.

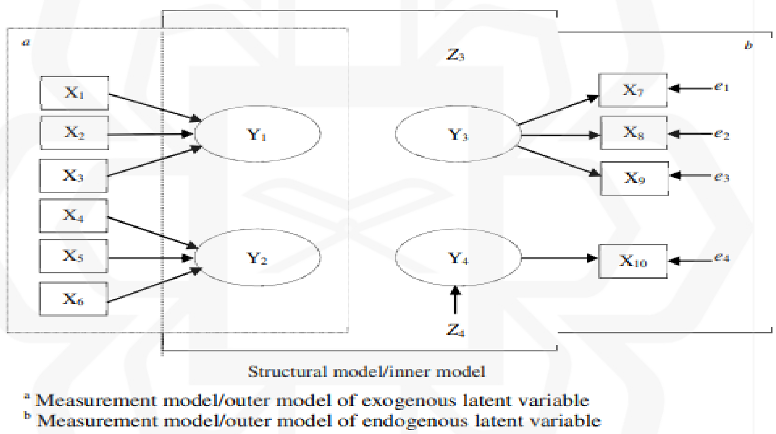

Figure 3: Structural Model/inner model (Hair et al., 2014)

Two types of measurement models are reflective and formative measurement models (refer to Table 4.10 for definitions). These measurement models are considered first-order components that involve a single layer of the construct. Diagrammatically, these two models are shown in Figure 4 and Figure 5.

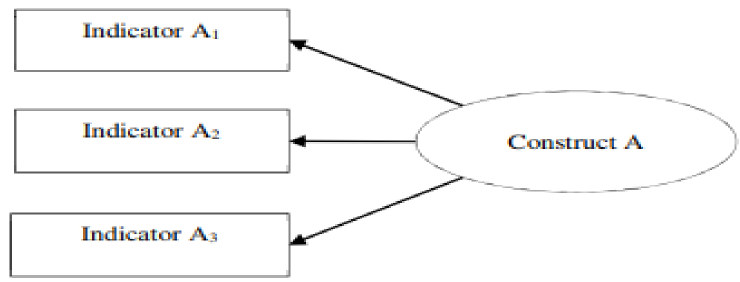

Figure 4: Reflective Measurement Model (Hair et al., 2014)

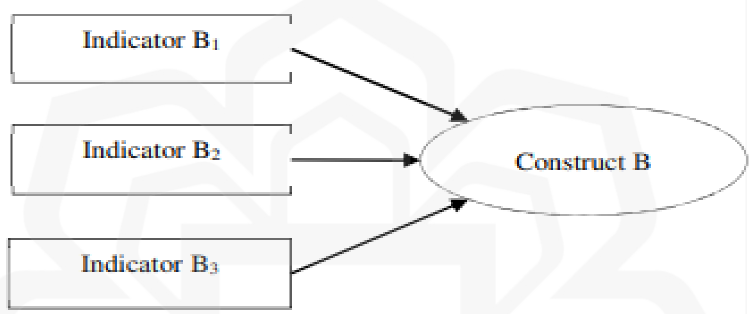

Figure 5: Formative Measurement model (Hair et al., 2014)

In some instances, the constructs involved in research are quite complex and are operationalized at a higher level of abstraction, commonly in the form of second-order structures containing two layers of components (Ringle et al., 2012; Wetzels et al., 2009). This is known as a higher-order model or hierarchical component model (Hair et al., 2014). In general, a higher (or second-) order construct is "a general concept that is either represented (reflective) or constituted (formative) by its dimensions (lower (or first---) order constructs)" (Becker et al., 2012). Hierarchical component models (HCM) are categorized into four types depending on the relationship among the first-order latent variables (or lower-order components (LOCs)) and their manifest variable, as well as based on the relationships among the second-order latent variables (or higher-order components

(HOC)) and the first-order latent variables (Jarvis et al., 2003; Ringle et al., 2012). The types and their different characteristics are summarized in Table 4.11.

Table 4.11: The main distinctive features of hierarchical component models

	Type I model (Reflective reflective)	Type II model (Reflective formative)	Type III model (Formative reflective)	Type IV model (Formative formative)
Path relationship between HOC and LOC	Reflective relationship from HOC to LOC	Formative relationship from LOC to HOC	Reflective relationship from HOC to LOC	Formative relationship from LOC to HOC
Relationship between LOC and indicators	Reflective Indicators	Reflective indicators	Formative indicators	Formative indicators

Source: Becker et al. (2012)

The four types of HCM are diagrammatically presented in Figure 6 as adopted from Jarvis et al. (2003). Components 1 to 4 in each diagram represent the LOCs, while the second-order construct represents the HOC.

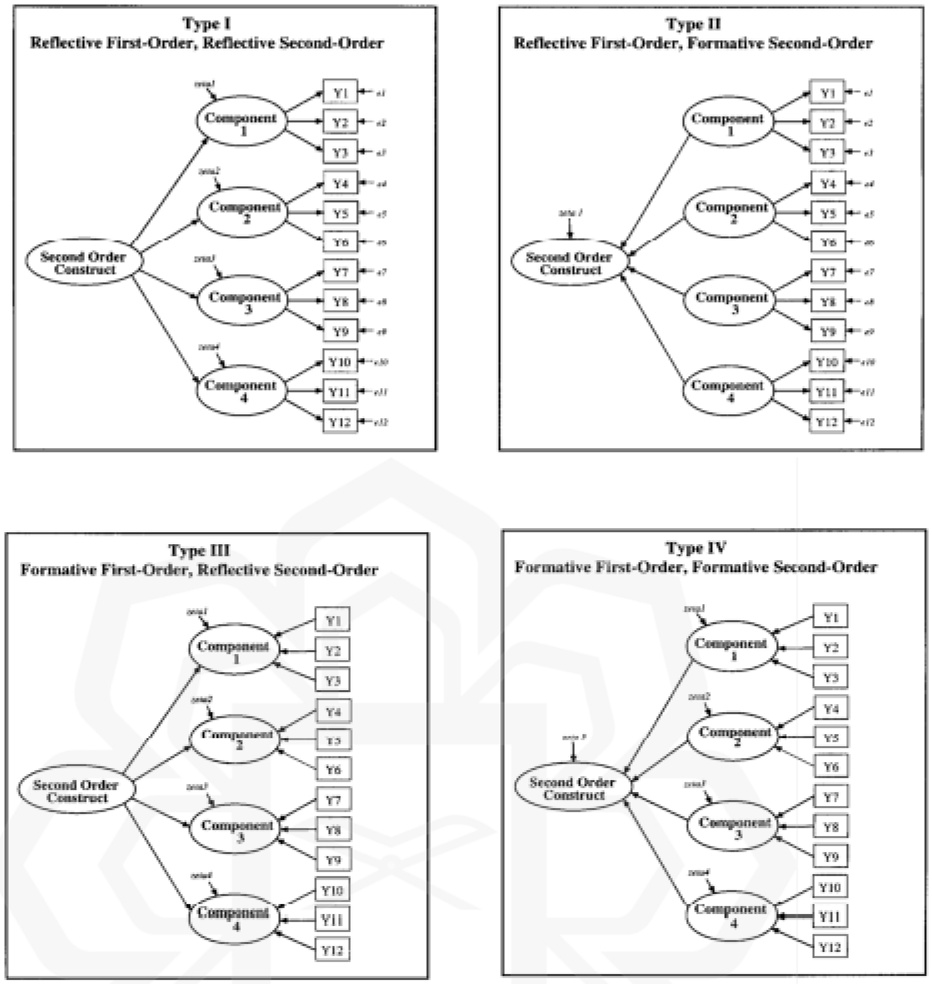

Figure 6: The four types of Hierarchical Component Models (Jarvis et al., 2003)

Many studies use PLS path modelling because: firstly, PLS is recommended in an early stage of theoretical development for testing and validating exploratory models; and secondly, PLS is suitable for prediction-oriented research because it assists when the research focus is on the explanation of endogenous constructs (Henseler et al., 2009). Other five reasons highlighted by the studies in international marketing, as summarized by Henseler et al. (2009: 283), are:

• PLS delivers latent variable scores, i.e., proxies of the constructs, which are measured by one or several indicators (manifest variables).

• PLS path modelling avoids small sample size problems and can, therefore, be applied in some situations when other methods cannot.

• PLS path modelling can estimate very complex models with many latent and manifest variables.

• PLS path modelling has less stringent assumptions about the distribution of variables and error terms.

• PLS can handle both reflective and formative measurement models.

In the present investigation, PLS-SEM was used rather than CB-SEM for the following reasons:

1 The complexity of the research models - the research model includes both reflective and reflective constructs. The ability of PLS-PM to model both reflective and reflective constructs makes it suitable for this study's purpose. Indicators for all constructs are in reflective mode.

2 The ability of PLS-SEM to easily model multidimensional constructs (Wetzels et al., 2009) is valuable, as in this study, both public procurement principles and performance are multidimensional constructs. Multidimensional constructs refer to first-order reflective and second-order reflective constructs measured by repeated reflective indicators. PLS-SEM allows conceptualizing multidimensional constructs through the repeated use of manifest variables, i.e., the measurement

indicators (Chin, 2010; Guinot et al., 2001; Tenenhaus et al., 2005; Wetzels et al., 2009). As such, a multidimensional construct represented by all the manifest variables of the underlying lower-order latent variables can be created (Wetzels et al., 2009).

3 The interaction effects of mediating variables tested in this study warrant more appropriate use of PLS-SEM. Several academics from many fields, including strategic management, management information systems, e-business, marketing, consumer behaviour, and accounting, have used PLS (Dibbern et al., 2004; Fornell & Robinson, 1983; Hulland, 1999; Lee et al., 2011; Pavlou & Chai, 2002; Reinartz et al., 2004).

4.8.3 Techniques in PLS-SEM Analysis

The PLS-SEM analysis consists of two main steps: the evaluation of the measurement model and the structural model. In evaluating the measurement model, the reliability and validity of the elements are assessed for convergent and discriminant validity using loading or weighting cross-loading, composite reliability (CR), and extracted average variance (AVE). The cut-off values for item loadings, CR, and AVE are respectively 0.5, 0.7, and 0.5 (Hair et al., 2010).

As for discriminant validity, the guidelines by Hair et al. (2014) are followed. Firstly, an indicator's outer loadings on a construct should be higher than all its cross-loadings with other constructs. The presence of cross-loadings that exceed the indicators' outer loadings indicates a discriminant validity problem. Although no threshold yet exists for loadings to establish convergent and discriminant validity, all the loadings of the measurement items on their assigned latent variables should be larger than any other loading. For example, if one of the measurement items loads with a .70 coefficient on its latent construct, then the loadings of all the measurement items on any other latent constructs should be below .60 (Gefen & Straub, 2005). Secondly, the square root of each construct's AVE must be greater than its highest correlation with any other construct. This refers to the Fornell-Larcker Criterion, where the square root of the AVE values is compared to the latent variable correlations. The square root of the AVE of each construct should be much larger than the correlation of the specific construct with any of the other constructs in the model (Chin, 1998) and should be at least .50 (Fornell & Larcker, 1981). Unfortunately, no guidelines are available for how much larger the AVE should be than these correlations (Gefen & Straub, 2005).

In more complex research that involves second-order constructs (refer to Section 4.8.4), further steps need to be taken in order to validate the second-order model. As the concern of this study is particularly on second-order formative constructs, the assessment involved the testing for a unidimensional model followed by a multidimensional model prior to confirming the second-order formative model (Yi, 2009). Unidimensionality is defined as "the existence of one latent trait underlying the data" (Hattie, 1985), and its construct is measured by a single dimension comprising a set of indicators (Nazif, 2011). On the other hand, a multidimensional construct "consists of a number of interrelated attributes or dimensions and exists in multidimensional domains" (Law et al., 1998). In addition, the assessment of formative constructs is done by testing for the significance of the weights and examining multicollinearity (VIF) between indicators (Gholami et al., 2013).

Once the measurement model is satisfactory for convergent and discriminant validity, the next step is to evaluate the structural model for the model's predictive capabilities and the relationships between the constructs. This covers the assessment of the collinearity issue, significance and relevance of structural model relationships, coefficient of determination (R^2 values), effect size, and predictive relevance of the constructs.

4.9 SUMMARY

Chapter four represents the research methodology applied in answering the research questions and in testing the hypothesized relationships between the exogenous or independent variables and endogenous or dependent variables. The next two chapters focus on the analysis and findings of this study. Chapter 5 discusses the quantitative results supported by past empirical evidence. The major findings quantitatively derived from this study are summarized in this chapter. Chapter 6 describes the study's contributions to theory and practice, its limitations, and suggestions for future research.

CHAPTER FIVE

FINDING AND DISCUSSION

5.1 INTRODUCTION

This chapter presents the results of the quantitative data analyses and discussion. The chapter begins with an analysis of response rate, non-response analysis, common method bias test, preliminary data analysis, and multivariate analysis from sections 5.2 to 5.6, respectively. These are important elements of data examination to reveal what is not apparent in the actual data, and that may cause biases or non-significance in the results that cannot be distinguished from the true results (Hair et al., 2010). After that, in section 5.7, the study discussed the characteristics of respondents. In section 5.8, the study provides a descriptive analysis of predictors of adherence to public procurement principles (see sub-section 5.8.1), public procurement performances (see sub-section 5.8.2) and adherence to public procurement principles (see sub-section 5.8.3).

Next, in section 5.9, the study evaluated PLS-SEM results following the two-stage procedure, i.e., the evaluation of the measurement (sub-section 5.9.1) and structural models (sub-section 5.9.2) used to investigate the hypothesized relationships in this study following the analytic technique proposed by Anderson and Gerbing (1988). The study used SPSS version 20 and Smart PLS M2 Version 4.0 (Ringle et al., 2022) as statistical tools. In addition, in section 5.10, the coefficient of determination (R^2), the effect size (f2), and cross-validated redundancy (Q2) determination are presented to assess the quality of the path model's predictions. Finally, this chapter concludes with the findings on the relevant hypothesized relationships in sections 5.11.

5.2 RESPONSE RATE

As mentioned in Chapter Four, the target respondents of this study are the public procurement officers of the procurement agencies/entities of Bangladesh. The data collection process took eight months, starting in the middle of June 2022 and continuing until February 2023. Questionnaires were sent to 1,500 public procurement officers as per the database shared by the CPTU of Bangladesh. All questionnaires were sent via email, and respondents were given two weeks to submit their responses. A cover letter was attached to briefly explain the study as well given the assurance that this information will be used strictly for academic purpose and respondent identity will remain anonymous. Within two weeks of the initial distribution, 70 questionnaires were returned. An additional 60 questionnaires were received in the following two weeks. After four weeks of initial distribution, a follow-up email was sent to remind participants to respond to the questionnaire. A month after the first follow-up, a second follow-up was carried out to encourage more responses. As a result, 287 completed questionnaires were received from the multiple follow-ups. In total, there are 417 completed responses, which represents a useful response rate of 27.8%. Table 5.1 provides a summary of information on the response rate.

Table 5.1: Response rate

Distribution and responses	**Total**	**Percentage**
Number of questionnaires distributed	1500	100%
Responses from the initial distribution	130	8.6%
Responses after follow-up	287	19.1%
Total usable responses	417	27.8%

5.3 TEST FOR NONRESPONSE BIAS

In this study, a late response bias analysis was undertaken to determine whether significant differences exist between the early and late respondents. In testing for non-response bias, Levene's test for equality of variance was used to identify which values to employ when assessing the equality of the means (Pallant, 2013). If the F-statistic test is not significant, i.e., $p>0.05$, the two variances are deemed not statistically different, and the assumption of equal variance can be accepted. Table 5.2 shows the results of the Levene's test. Based on the results, p-values more than 0.05, indicating that it is not statistically significant. This implies that neither the early nor the late replies are noticeably different. Hence, there is no issue of non-response bias.

Table 5.2: Mean score of the early responses and late responses

Variables				Levene's test for equality of variance	
	N	**Mean**	**Std. Deviation**	**F**	**Sig**
Early responses	130	3.7830	0.22231	.214	.644
Late responses	287	4.0971	0.21688		

5.4 COMMON METHOD BIAS TEST

When the same response method is used to measure the independent and dependent variables, common method bias might manifest. While common method bias can have negative effects on a study's validity, it can also have an impact on the associations that are posited in the PLS-SEM path model (Kock et al., 2021). This study utilized Harman's (1976) single-factor test to examine the probable presence of common method bias. Common method bias, or more consistently, systematic error variances shared among constructs that are measured with an established function of a similar method or source, refers to the variances attributable to the measurement process as opposed to the variables the measures are intended to represent. Using Harman's (1976) single-factor test, the results demonstrate that the first common factor accounts for only 22.087%, which is less than 50%, as proposed by Podsakoff and Organ (1986). Therefore, it is established that frequent procedure variations will not be likely to influence the performances.

5.5 PRELIMINARY DATA ANALYSIS

For the actual analysis to be executed, the raw data from the distributed survey required further preparation. The data preparation for this study involved data coding, data entry, and data screening. The subsequent sub-sections describe each of the processes.

5.5.1 Data coding

Data coding converts collected information to meaningful variables and numerical numbers for categorical components. Accordingly, this transformation is done by keying it into the computer to facilitate analysis (Sarstedt & Mooi, 2019). Hence, questions were coded based on the literature review in chapter two according to their numbering, sections, and individual subject factors. A specific codebook promotes orderliness and organization of massive data (Cooper & Schindler, 2014). This study collected data online (Google Forms) and extracted it into a Microsoft Excel sheet. Correspondingly, 68 questions were coded for 18 constructs, excluding the respondents' backgrounds. For instance, the questions in the section on social legitimacy are coded as SL1 until SL4, while economic gain was coded as EG1 until EG4 in the codebook. Ultimately, the data from Excel was transferred into the SPSS sheet, and data screening was performed.

5.5.2 Data Screening

In this study, treating missing data comes first in the data screening process before outliers are checked and normality is evaluated. These three processes are crucial for preventing problems that could occur during the analysis (Hair et al., 2019). The subsequent parts present the process of data screening technique.

5.5.2.1 Treatment of missing data

Missing data commonly arises when respondents inadvertently omit responses by not answering multiple questions. Nevertheless, the data collection was carried out through an online approach that necessitated the respondents to provide comprehensive answers to each question. Consequently, there was no documentation of any data that was absent or unaccounted for. As a consequence, there were a cumulative of 417 replies obtained during the data screening procedure. Afterwards, the data was examined for any values that deviated significantly from the expected range.

5.5.2.2 Checking for Outliers

Outliers, as defined by Kline (2015) and Pallant (2011), are scores that deviate significantly from the majority of other scores. It is important to acknowledge the presence of outliers since they can distort data analysis and undermine the validity of generalising results to the full population (Hair et al., 2019; Tabachnick & Fidell, 2013). This study utilised a boxplot recommended by Pallant (2011) to detect univariate outliers. The boxplot visually represents the outliers as data points located outside the rectangular box, which are then ringed by the SPSS software. Therefore, numbers demonstrate the identify of responders. To evaluate the severity of outlier concerns, the 5% trimmed mean was calculated using the descriptive table. This method provides both the original mean value and the 5% trimmed mean value. Any significant change that is large between these two means indicates the presence of outliers. Consequently, this study removed outliers (19) based on boxplot analysis and emphasized the 5% trimmed mean value.

5.6 ASSUMPTIONS OF MULTIVARIATE ANALYSIS

To carry out the multivariate analysis, assumptions of normality and multicollinearity were tested as described in the following sub-section.

5.6.1 Normality Assessment

Normality pertains to the form of data distribution, which must exhibit symmetry and a bell-shaped curve, indicating a normal distribution of data (Pallant, 2011). This study followed the suggestions of Sarstedt and Mooi (2019) and Hair et al. (2017) for conducting normality testing. These tests involved examining normal probability Q-Q plots, as well as assessing skewness and kurtosis values, from a graphical standpoint. Based on the Q-Q plot assessments, the majority of the data is closely distributed around the normal line, and there is no evidence of a non-linear trend in the generated value. Consequently, no modifications or alterations were performed due to the presence of non-linear data (Tabachnick & Fidell, 2013).

Skewness and kurtosis are statistical measures used to assess the normalcy of data. Skewness is determined by the presence of symmetry in the distribution of values, while Kurtosis is determined by the presence of peakedness in the distribution (Pallant, 2011). Kline (2016) states that the skewness number should be less than or equal to 1.96, and the kurtosis value should be less than 10.0. All values remain below the cut-off point value, as previously stated. Thus, it may be deduced that all data conform to a normal distribution and are therefore suitable for further study. The descriptive analysis results, which include the mean, standard deviation, skewness, and kurtosis, are presented in Appendix 2.

5.6.2 Multicollinearity Test

Multicollinearity occurs when there is a substantial association between two or more separate latent factors (Field, 2009). The presence of multicollinearity among exogenous variables can have a substantial impact on the regression coefficients and can potentially affect the statistical significance of the results (Hair et al., 2014). In order to determine the presence of multicollinearity among the variables, this study initially analysed the correlation matrix (Hair et al., 2014). Multicollinearity occurs when the correlation coefficient between latent variables is more than 0.90 (Hair et al., 2014). According to this criterion, Table 5.3 indicates that none of the correlation matrix values reach or exceed 0.90, indicating the absence of multicollinearity among the variables.

Table 5.3: Correlations matrix of exogenous variables

Constructs	SL	EG	PC	DP	CP	PD	CO	DF
SL	1							
EG	.105*	1						
PC	.187**	.211**	1					
DP	.153**	.249**	.323**	1				
CP	0.005	.340**	.141**	.226**	1			
PD	.105*	.582**	.137**	.241**	.310**	1		
CO	.122*	.245**	.612**	.311**	.186**	.137**	1	
DF	.192**	.272**	.128*	.426**	.291**	.190**	.252**	1

* Correlation is significant at the 0.05 level (2-tailed).

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

Note: SL = Social legitimacy, EG = Economic Gain, PC = Rule consistency, CP = Policy compatibility, PD = Professional discretion, DP = Dependence on rule setters, CO = Coercive power, DF = Diffusion of practice.

5.7 CHARACTERISTICS OF RESPONDENTS

The 398 respondents who took part in the survey had their background data displayed in Table 5.4. This background information includes gender, age, experience as a public procurement official, time spent on procurement activities, familiarity with procurement principles, number of employees, and procurement qualification/training.

Table 5.4: Respondents' Profile (n=398)

Characteristics	Frequency	Per cent	Cumulative Percent
Gender			
Male	344	86.4	86.4
Female	54	13.6	100.0
Years of experience in public procurement tasks			
1-10 years	14	3.6	3.6
10- 20 years	243	61.0	64.6
20- 30 years	125	31.4	96.0
30+ years	16	4.0	100.0
Time spends/involvement in public procurement activities.			
0 per cent	0	0.0	0.0
1-25 percent	25	6.3	6.3
26-50 percent	150	37.7	44.0
50-75 percent	120	30.2	74.1
76-100 percent	103	25.9	100.0
Agencies Size (No. of employees)			
1-50 employees	45	11.3	11.3
50-250 employees	70	17.6	28.9
250+ employees or more	283	71.1	100.0
Procurement qualification/training			
Yes	398	100	100.0
No	0	0	100.0

Based on the information in Table 5.4, the respondents are predominantly male (86.4%) compared to female (13.6%). In terms of working experiences, 96.4% of respondents have been working on tasks related to public procurement for more than 10 years. Regarding time spent on procurement activities, 44% of procurement employees spent 50% of their time in procurement activities, while one-fourth of employees spent more than 75% of their time in procurement activities.

Based on information on the number of employees in the organization the officer attached to, most respondents came from large government agencies with more than 250 employees (71.1%) and medium-sized with 50 to 250 employees (17.6%). Only 11.3% of respondents are from small procuring agencies with 50 or fewer employees. The demographic data also revealed that all the respondents had been trained in procurement activities and were aware of public procurement practices. In conclusion, based on the demographic information, the respondents of the current study have sufficient knowledge and experience dealing with public procurement and, hence, are credible in providing information for the present study.

5.8 DESCRIPTIVE ANALYSIS

The following subsections provide descriptive analysis of predictors of adherence to public procurement principles (see the sub-section 5.8.1), public procurement performances (see the sub-section 5.8.2) and adherence to public procurement principles (see the sub-section 5.8.3).

5.8.1 Predictors of Adherence to Public Procurement Principles

Table 5.5 presents the findings concerning the predictors of adherence to each of the eight predicting factors of public procurement principles. Based on the five-point Likert scale used in this study, a higher mean score implies greater importance of the respective predictability of adherence (Abul Hassan et al., 2021). The predictors of adherence to public procurement principles evaluated are social legitimacy, economic gain, rule consistency, dependence on rule setters, policy compatibility, professional discretion, coercive power, and diffusion of practice.

Table 5.5 presents the mean scores for each predicting factor. As shown in Table 5.5, the range of mean scores of predictors of adherence is 3.746 to 4.024. Policy compatibility with a mean score of 4.024 implies a high level of agreement on predicting adherence, followed by rule consistency (mean: 3.884), dependence on rule setters (mean: 3.865), coercive power (mean: 3.813), and social legitimacy (mean: 3.787). The diffusion of practice, with a mean score of 3.746, demonstrated high agreement in predicting adherence despite its lowest mean score among the predicting variables of adherence.

Table 5.5: Overall results for the agreement of predictors of adherence to principles

No	Predictors of adherence	Mean	SD
1	Social legitimacy	3.787	0.881
2	Economic Gain	3.786	0.881
3	Rule consistency	3.884	0.741
4	Dependence on rule setters	3.865	0.741
5	Policy compatibility	4.024	0.822
6	Professional discretion	3.752	0.966
7	Coercive power	3.813	0.830
8	Diffusion of practice	3.746	0.835
	Overall level of predictors of adherence	**3.832**	

5.8.2 Public Procurement performances

Table 5.6 presents the results concerning the public procurement performances for each of the six performances of public procurement principles. Based on the five-point Likert scale used in this study, a higher mean score implies greater agreement with public procurement performances. The public procurement performances evaluated are cost-saving, better quality, time-saving, promoting innovation, allowing flexibility, and fostering sustainability.

Table 5.6 presents the overall results based on each variable of the public procurement performances. As shown in Table 5.6, the range of mean scores of public procurement performances is 3.886 to 4.038. The results show a high level of agreement on public procurement performances, with the highest mean score of time-saving (mean: 4.038), followed by better quality (mean: 4.005) and promoting innovation (mean: 3.971). The public procurement performances with the lowest level of agreement are cost-saving (mean: 3.897) and allow flexibility (mean: 3.886).

Table 5.6: Overall results for the agreement of public procurement performances

No	Public procurement performances	Mean	SD
1	Cost saving	3.897	0.756
2	Better Quality	4.005	0.677
3	Time saving	4.038	0.731
4	Promoting innovation	3.971	0.645
5	Allowing flexibility	3.886	0.785
6	Fostering sustainability	3.932	0.919
	Overall level of predictors of adherence	**3.955**	

5.8.3 Adherence to Public Procurement Principles

Table 5.7 presents the overall results based on each category of the public procurement principles. As shown in Table 5.7, the range of mean scores of public procurement performances is 3.822 to 4.042, and the average level of adherence to overall public procurement principles is 3.933. This implies a high level of adherence to Bangladesh's overall public procurement principles, which include accountability, transparency, equality, and competition. The results show a high level of agreement on public procurement principles, with the highest mean score of equality principles (mean: 4.042), followed by accountability principles (mean: 3.944) and transparency principles (mean: 3.923). The public procurement principles with the lowest level of agreement are competition principles (mean: 3.822). The next section discusses the results of each of the principles.

Table 5.7: Level of Adherence to the Public Procurement Principles

No	Public procurement principles	Mean	SD
1	Accountability	3.944	0.636
2	Transparency	3.923	0.569
3	Equality	4.042	0.662
4	Competition	3.822	0.788
	The overall level of adherence	**3.933**	

5.8.4 Objective 1: Level of Adherence to Public Procurement Principles

The initial objective of the study is to evaluate the extent to which procurement officers adhere to the principles of public procurement, as perceived by them. Tables 5.8 to 5.13 display the results on the level of compliance with each of the four public procurement principles. According to the five-point Likert scale employed in this study, a higher average score indicates a stronger commitment to the ideas. The assessed public procurement principles include public accountability, openness, equality, and competitiveness.

5.8.4.1 Accountability Principle:

There are three items to measure the construct of adherence to the accountability principle. As shown in Table 5.8, all three statements have a mean score of above 3.80, and the average mean score for accountability is 3.94, indicating that the adherence to accountability of the respondents on average is high. The highest mean scores are for the statement "There is an adequate measure in place to prevent fraud and corruption in procurement on the part of the suppliers" (mean = 4.01, SD = 0.78), followed by "Government officers involved in procurement evaluation are committed to high standards for professional conduct or ethical principles (including independence)" (mean = 3.99, SD = 0.77).

Table 5.8: Level of Adherence to Accountability Principle

Items	Statements	Mean	SD
AC1	The bid challenge system is usually to assure fairness to suppliers in the procurement process	3.83	0.86
AC2	There is an adequate measure in place to prevent fraud and corruption in procurement on the part of the suppliers	4.01	0.78
AC3	Government officers involved in procurement evaluation are committed to high standards for professional conduct or ethical principles (including independence)	3.99	0.77
	Average	**3.94**	

Note*: 1=Strongly disagree (1-20%), 2=Disagree (21-40%), 3= Neutral (41-60%), 4=Agree (61-80%), 5= Strongly agree (81-100%)

The bid challenge process shows fairness to suppliers' procurement process. The results may be due to the use of anonymity, where organizations' identities are identified by writing rather than their name or logo (Abul Hassan et al., 2021). This study also assures that the procurement process is examined fairly and professionally, as well as better accountability principles. The integrity pact in public procurement is ensured by professional and ethical government officers, preventing corruption and fraud. Adequate measures in place to prevent fraud and corruption in Bangladesh's procurement process are ranked first. In addition, the third item is that the commitment of government officers to their professional conduct or ethical principles in the procurement process is also high. This is a positive finding as it reflects the proper implementation of the tendering process. More specifically, the results imply that the tenders are being fairly, ethically, and professionally evaluated, which consequently leads to the projects being awarded to the most credible supplier, which implies the government is appropriately discharging its accountability to the public in the procurement process. These favourable findings, to some extent, infer that the accountability principle is adhering in the awarding process of contracts under public procurement.

5.8.4.2 Transparency Principle

There are five items to measure the construct of adherence to the transparency principle. As shown in Table 5.9, all five statements have a mean score above 3.80, and the average mean score for transparency is 3.92, indicating a high level of adherence to the transparency principles. Two items with the highest mean scores are "A public announcement is made by the government on the awarded company" (mean = 4.05, SD = 0.76), followed by "Bidding documents are published in the standard form" (mean = 3.99, SD = 0.73).

Table 5.9: Level of Adherence to Transparency Principle

Items	Statements	Mean	SD
TP1	Bidding documents are published in the standard form	3.99	0.73
TP2	Suppliers do have access to information regarding the practices of procurement	3.89	0.72
TP3	The tender evaluation criteria are disclosed and accessible to suppliers	3.87	0.72
TP4	Laws and regulations concerning procurements are easily accessible to the public	3.81	0.82
TP5	A public announcement is made by the government on the awarded company	4.05	0.76
	Average	**3.92**	

Note*: 1=strongly disagree (1-20%), 2=Disagree (21-40%), 3= Neutral (41-60%), 4=Agree (61-80%), 5= strongly agree (81-100%)

Generally, the Ministry of Finance has created criteria for suppliers to follow when providing specifications for public procurement, including direct purchase, quotation, or tender, through the e-GP platform (Ministry of Finance, 2023). Furthermore, the necessary details about suppliers, bidding prerequisites, and criteria for evaluating tenders can all be found on the procurement website. Nevertheless, the findings regarding compliance with the transparency principles differ from those of Jones (2013) and Stolfi and Murniati (2014), who examined the Malaysian public procurement system and identified the need for enhancing transparency in the system as a crucial aspect. The respondents reported a low level of adherence to transparency items concerning procurement laws and regulations, indicating a lack of information provided to government suppliers regarding procurement regulations, among the five transparency items. The overall results reveals high level of adherence to transparency principles, contrasting to Ethiopia's study (Abebe, 2012; Abul Hassan et al., 2021). However, in the case of easy public access to procurement laws and regulations, this study is in line with the findings of (Abebe, 2012)

5.8.3.3 Equality Principle

There are four items to measure the construct of adherence to equality principles. As shown in Table 5.10, all four statements have a mean score above 3.93, and the average mean score for equality is 4.04, indicating a high level of adherence to the equality principles. Two items with the highest mean scores are “All acceptable bids are processed fairly based on current rules, policies, and procedures" (mean = 4.24, SD = 0.82), followed by "If requested, the government provides unsuccessful bidders with the reasons for the rejection of their bid" (mean = 4.04, SD = 0.83).

Table 5.10:Level of Adherence to Equality Principle

Items	**Statements**	**Mean**	**SD**
EQ1	All acceptable bids are processed fairly based on current rules, policies, and procedures	4.24	0.82
EQ2	Qualification requirements for bidders are fair and appropriate	3.95	0.90
EQ3	All successful and unsuccessful bidders are promptly informed about the results of the bid at the same time	3.93	0.83
EQ4	If requested, the government provides unsuccessful bidders with the reasons for the rejection of their bid	4.04	0.83
	Average	4.04	

Note*: 1=strongly disagree (1-20%), 2=Disagree (21-40%), 3= Neutral (41-60%), 4=Agree (61-80%), 5= Strongly agree (81-100%)

The study is in line with Komakech's (2016) focus on fairness, which aims to ensure equal competition and avoid discrimination in tender awarding processes. Komakech (2016) emphasizes that fairness involves treating identical situations or different situations differently, regardless of nationality, and that this is achieved through equal treatment for all procurement participants. Evidently, the findings (Table 5.10) on adherence to equality principles can be read positively, as they indicate that the public procurement process has been properly implemented, reflecting the equality principle. In particular, the results suggest that the procurement process disseminates identical information and accepts bids in accordance with the present rules, regulations, and procedures. On the other hand, the slightly unfavourable results suggest the existence of outside interference and cronyism that affect the tendering process of contracts under public procurement; this has also been emphasized by previous studies (Abul Hassan et al., 2021; Azmi & Rahman, 2015; Hui et al., 2011).

5.8.4.4 Competition Principle

There are four items to measure the construct of the competition principle. As shown in Table 5.11, all four statements have a mean score of 3.74 and above, and the average mean score for competition principles adherence is 3.82, indicating a high level of adherence to the competition principles. Two items with the highest mean scores are “All bidders have similar information on the bidding process” (mean = 3.95, SD = 0.85), followed by “All bidders are provided with similar information on the tender” (mean = 3.82, SD = 0.94).

Table 5.11:Level of Adherence to Competition Principle

Items	Statements	Mean	SD
CM1	All bidders have similar information on the bidding process	3.95	0.85
CM2	All bidders are provided with similar information on the tender	3.82	0.94
CM3	Prior to the closing of the tender, information submitted by each bidder is kept confidential	3.74	0.98
CM4	Equal opportunities are given to all suppliers in participating or competing in any procurement activities	3.77	0.93
	Average	3.82	

Note*: 1=strongly disagree (1-20%), 2=Disagree (21-40%), 3= Neutral (41-60%), 4=Agree (61-80%), 5= strongly agree (81-100%)

The Government Procurement Department has established guidelines for bidders, ensuring similar information on the bidding process and tender documents (Ministry of Planning, 2018). This has resulted in the respondents ranking first and second in this study. The government requires procurement officers and committees to maintain confidentiality, and respondents perceive that the information submitted by each bidder being kept confidential prior to the tender close is moderately adhered to. The study's findings align with those of Abul Hassan et al. (2021) and Komakech (2016), who highlighted key elements of competition of public procurement in Malaysia and Uganda, respectively, including accessibility of opportunities, sufficient time for bidders, equal evaluation based on criteria, and use of standard bidding documents. However, Abebe (2012) did not explicitly discuss open and fair competition in public procurement practices.

5.8.4.5 Adherence of Procurement Principle as per Procurement Cycle

The public procurement cycle in Bangladesh has three stages: procurement preparation, process, and administration. Six items were used in this study to measure the extent of adherence to principles in the procurement preparation stage. According to the results, practically every item is higher than 3.81. Most respondents agree with most of the assertions relating to procurement preparation based on all mean scores of close to 3.89. In addition, six items were used in this study to measure the extent of adherence to principles in the procurement preparation stage. According to the results, practically every item is higher than 3.74. Most respondents agree with most of the assertions relating to procurement preparation based on all mean scores of close to 3.94. Finally, procurement administration has four items, with each item being higher than 3.83. and the average rating in this stage is 3.08.

Table 5.12: Level of Adherence as per the public procurement cycle

Stages	Code	Items	Mean	SD
Procurement preparation	TP1	Bidding documents are published in the standard form	3.99	0.73
	TP2	Suppliers do have access to information regarding the practices of procurement	3.89	0.72
	TP3	The tender evaluation criteria are disclosed and accessible to suppliers	3.87	0.72
	TP4	Laws and regulations concerning procurements are easily accessible to the public	3.81	0.82
	CM1	All bidders have similar information on the bidding process	3.95	0.85
	CM2	All bidders are provided with similar information on the tender	3.82	0.94
		Average	3.89	
Procurement process	AC3	Government officers involved in procurement evaluation are committed to high standards for professional conduct or ethical principles (including independence).	3.99	0.77
	EQ1	All acceptable bids are processed fairly based on current rules, policies, and procedures	4.24	0.82
	EQ2	Qualification requirements for bidders are fair and appropriate	3.95	0.90
	EQ3	All successful and unsuccessful bidders are promptly informed about the results of the bid at the same time	3.93	0.83
	CM3	Prior to the closing of the tender, information submitted by each bidder is kept confidential	3.74	0.98
	CM4	Equal opportunities are given to all suppliers in participating or competing in any procurement activities	3.77	0.93

		Average	3.94	
Procurement administration	AC1	The bid challenge system is usually to assure fairness to suppliers in the procurement process	3.83	0.86
	AC2	There is an adequate measure in place to prevent fraud and corruption in procurement on the part of the suppliers	4.01	0.78
	TP5	A public announcement is made by the government on the awarded company	4.05	0.76
	EQ4	If requested, the government provides unsuccessful bidders with the reasons for the rejection of their bid	4.04	0.83
		Average	3.98	

5.9 EVALUATION OF PLS-SEM RESULTS

The present study employed a two-stage procedure consisting of (a) the evaluation of the measurement model and (b) the evaluation of the structural model (Hair et al., 2014;

Henseler et al., 2009). Figure 7 exhibits a two-step method, which is sometimes referred to as the evaluation of the inner and outer models (Ramayah et al., 2011).

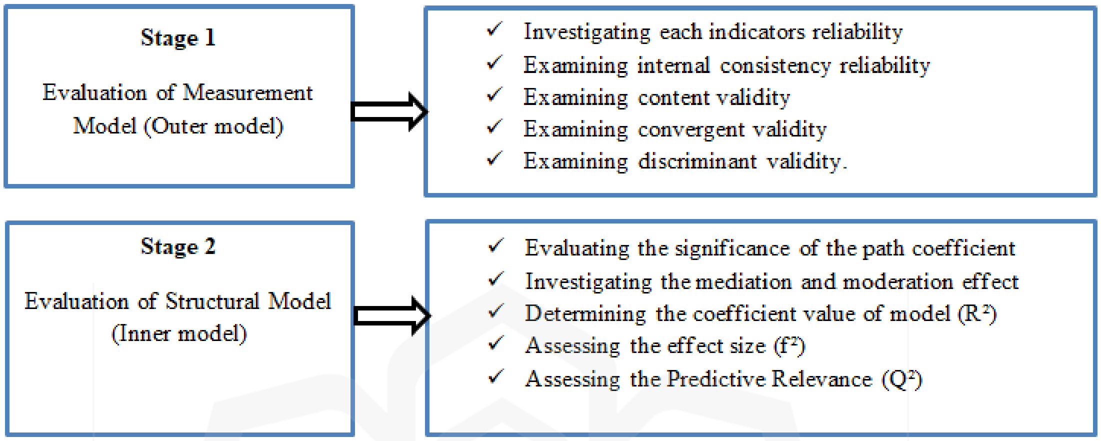

Figure 7: Two-stage process of Evaluating PLS path modelling, Source: Henseler et al. (2009)

5.9.1 The Measurement Model

This study evaluated the measuring or outer model using the smart PLS 4.0 version. The outer or measuring model takes into account the assessment of the components, which reveals how well the items load and represent their respective structures. Essential to the PLS-SEM process for evaluating the outer model are measures of reliability and validity; therefore, in the PLS-SEM approach, the assessment of the outer model must satisfy the following criteria: (i) internal consistency, (ii) convergent validity and (iii) discriminant validity of the reflective constructs (Hair et al., 2014; Henseler et al., 2009). Figure 8 demonstrates the research model with structural path dimensions.

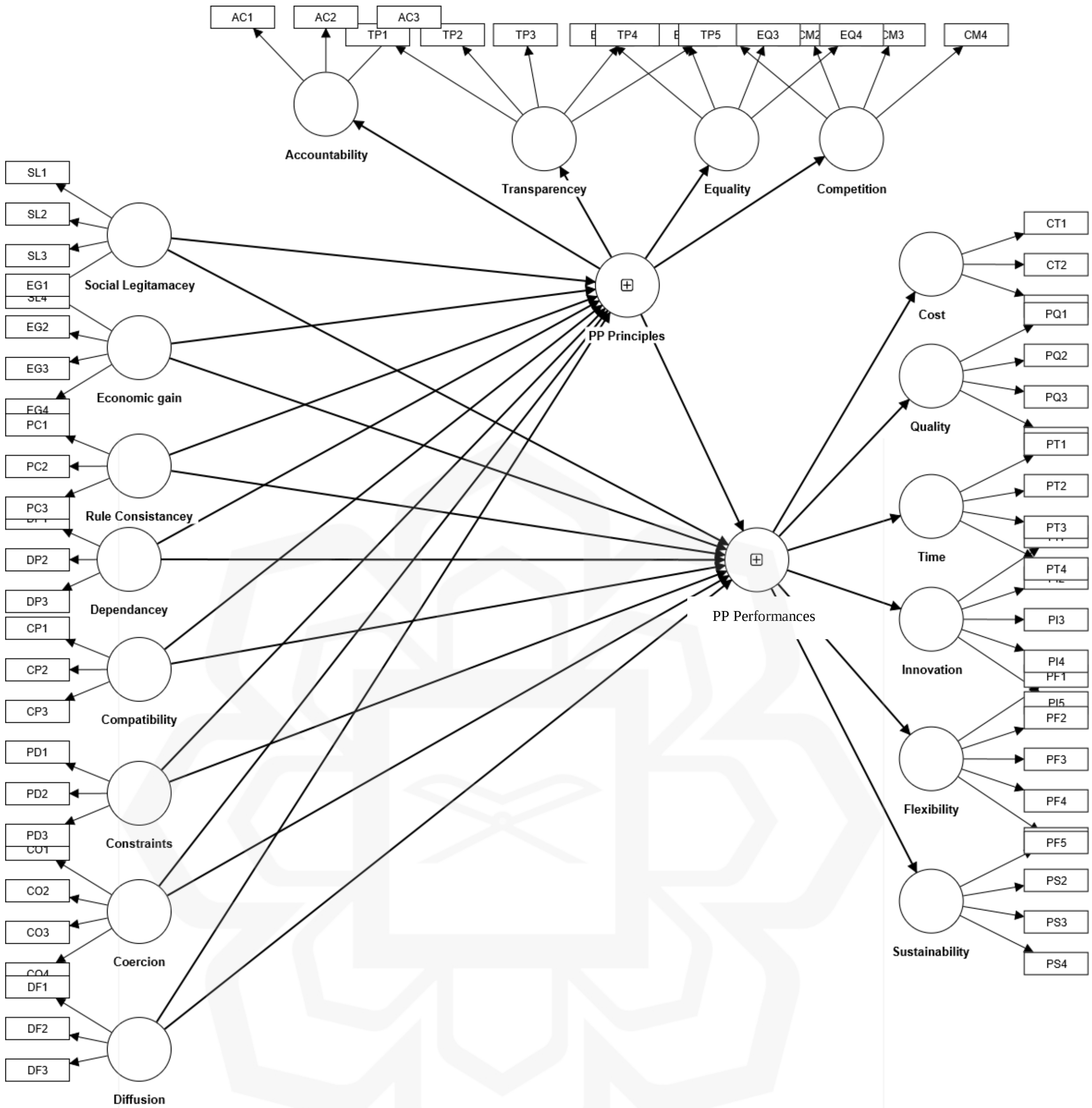

Figure 8: Research Model

This study's research model is depicted in Figure 8. The label for each construct is shown in Table 5.13. Before evaluating the measurement approach, it is crucial to classify these multi-item constructs as either reflecting or formative.

In a reflective measurement model, the arrows' direction is "from the construct to the indicator variables, indicating the assumption that the construct causes the measurement (more precisely, the co-variation) of the indicator variables" (Hair et al., 2014: 30). In other words, the indicator variables or measures represent the effects of an underlying construct; i.e., the causality is from the construct to its measures (Hair et al., 2014).

By contrast, in a formative measurement model, the arrows' direction is "from the indicator variables to the construct, indicating the assumption that the indicator variables cause the measurement of the construct" (Hair et al., 2014: 29). This implies that indicators cause the variable and each indicator for a formative construct capture a specific aspect of the construct's domain, therefore, omitting an indicator from potentially altering the nature of the construct (Hair et al., 2014). The error in the measurement model led to raising doubt on the validity of the structural model (Jarvis et al., 2003). Table 5.13 provides a summary of the names and categories of the important constructs in the research model.

Table 5.13: Label and Type of Key Construct

Constructs	**Type of Construct**	**Lower Order Construct**
Social legitimacy	Reflective	Not applicable
Economic Gain	Reflective	Not applicable
Rule consistency	Reflective	Not applicable
Dependency on rule setters	Reflective	Not applicable
Policy Compatibility	Reflective	Not applicable
Professional discretion	Reflective	Not applicable
Coercive power	Reflective	Not applicable
Diffusion of practice	Reflective	Not applicable
PP Principles	Second-order Reflective	Accountability, Transparency, Equality, and Competition.
PP performances	Second-order Reflective	cost saving, better quality, time-saving, promoting innovation, allowing flexibility, and fostering sustainability

All the multi-item constructs in the research model were conceptualized as reflective, and the public procurement principles and public procurement performances were hypothesized as second-order reflective. A second-order model is a public procurement principle that contains two layers of constructs. Second-order reflective refers to reflective-reflective, which has reflective measurement models of all constructs in the path relationships.

The public procurement principles consist of four first-order factors: accountability, transparency, equality, and competition, which were all conceptualized as reflective, i.e., measured by reflective indicators. Public procurement performances consist of six first-order factors: cost-saving, better quality, time-saving, promoting innovation, allowing flexibility, and fostering sustainability. Reflective indicators also measured these. Reflective indicators are a representative sample of all possible items within the conceptual domain of the construct that show the same construct is responsible for all the indicator items. The individual items should be interchangeable, and any one item can typically be omitted without significantly altering the meaning of the construct as long as the construct has enough reliability (Hair et al., 2014).

Having established the type of constructs involved in the measurement model, the next step was to analyze the model. Following the two-stage analytical procedures recommended by Anderson and Gerbing (1988), the data analysis started with testing the reliability and validity of the measurement model, followed by an examination of the structural relationships outlined in the structural model. Reliability tests the consistency of a measuring instrument in measuring the relevant concept, whereas validity tests how well an instrument measures the particular concept it is intended to measure (Sekaran & Bougie, 2010).

All the reflective constructs were assessed for convergent and discriminant validity. Convergent validity is the “extent to which indicators of a specific construct converge or share a high proportion of variance in common” (Hair et al., 2010: 689), and discriminant validity refers to the “extent to which a construct is truly distinct from other constructs” (Hair et al., 2010: 689).

Since the research model included the constructs of first-order reflective and second-order reflective – Type I: Reflective-reflective model – the assessment of the measurement model in this study began with the assessment of reflective constructs using both convergent and discriminant validity analysis. The assessment of reflective constructs was later done by testing again by using both convergent and discriminant validity analysis (Gholami et al., 2013).

5.9.1.1 Construct Validity

Construct validity, content validity, convergent validity, and discriminant validity are the three forms of testing validity that must be undertaken to validate the constructs (Hair et al., 2012). The following are the criteria explanations:

5.9.1.1.1 Content Validity

In order to establish the validity of individual indicators using the PLS-SEM method, the outer loadings of all constructs must be investigated (Hair et al., 2012, 2014). The factor loading indicates "the degree to which each item in the correlation matrix corresponds with the particular main component." Factor loadings can vary from -1.0 to +1.0, with larger absolute values suggesting a stronger relationship between the item and the underlying components" (Pett et al., 2003). None of the items in the research has factor loadings less than 0.50, the minimum acceptable value (Hair et al., 2016). Consequently, no additional items were eliminated. The factor loadings are shown in Table 5.15.

The purpose of obtaining internal consistency of reliability, which is used extensively in research, is to ascertain the degree to which all observed items for a particular construct or subscale are measuring the same item. This can be done by determining the degree to which all observed items measure what they are intended to measure (Urbach & Ahlemann, 2010). When conducting research in the social sciences, it is customarily appropriate to make use of Cronbach's alpha and CR in order to ascertain the degree of internal consistency (Peterson & Kim, 2013; Urbach & Ahlemann, 2010). CR was used in this research to evaluate the internal consistency across all constructs.

It has been demonstrated by several authors (Götz et al., 2010; Urbach & Ahlemann, 2010) that the coefficient value of CR provides a less substantially biased estimation when compared to Cronbach's alpha value. In addition, they stated that the coefficient of composite dependability evaluates the equal contribution of all items for a particular variable despite the fact that it does not take into account the actual relevance of each item while loading it. In addition, the reliability of scales might be overestimated or even underestimated using Cronbach's alpha value, and both scenarios are possible. However, studies have specified the rule of thumb for measuring the internal consistency of reliability by using the coefficient of CR (Bagozzi & Yi, 1988; Hair et al., 2012). According to this rule of thumb, the value of the coefficient of CR must be above 0.70 in order to be considered at a satisfactory level, whereas a value of less than 0.70 is considered to be at an unsatisfactory level, and 0.60 demonstrates that there is a lack of dependability (Hair et al., 2014).

The dependability of all latent variables, including dependent, independent, and mediating factors, is presented in Table 5.14. Here, the coefficient of CR for all latent variables ranges from 0.867 to 0.946. This demonstrates that all latent constructs have an appropriate level of internal consistency, as confirmed by a number of specialists in the field (Hair et al., 2014; Bagozzi & Yi, 1988). In addition, the AVE values for all of the latent constructs are between 0.570 and 0.818. This finding satisfies Chin's (1998) recommendation that the AVE threshold value should be greater than 0.50.

Table 5.14: Content Validity

Constructs	Items	Outer Loadings	Cronbach's Alpha	CR	AVE
Accountability principles	AC1	0.841	0.783	0.786	0.697
	AC2	0.845			
	AC3	0.818			
Transparency principles	TP1	0.768	0.815	0.818	0.573
	TP2	0.745			
	TP3	0.769			
	TP4	0.753			
	TP5	0.751			
Equality principles	EQ1	0.613	0.786	0.817	0.61
	EQ2	0.844			
	EQ3	0.844			
	EQ4	0.799			
Competition principles	CM1	0.800	0.872	0.872	0.723

	CM2	0.86			
	CM3	0.869			
	CM4	0.869			
Coercive power	CO1	0.851	0.879	0.889	0.733
	CO2	0.833			
	CO3	0.863			
	CO4	0.876			
Policy compatibility	CP1	0.905	0.888	0.89	0.818
	CP2	0.921			
	CP3	0.886			
Cost Saving	CT1	0.912	0.878	0.881	0.805
	CT2	0.924			
	CT3	0.854			
Diffusion of practice	DF1	0.846	0.908	0.909	0.784
	DF2	0.906			
	DF3	0.906			
Dependence on rule setters	DP1	0.829	0.803	0.807	0.717
	DP2	0.863			
	DP3	0.847			
Economic gain	EG1	0.843	0.893	0.898	0.756
	EG2	0.909			
	EG3	0.852			
	EG4	0.873			
Rule consistency	PC1	0.899	0.847	0.851	0.766
	PC2	0.889			
	PC3	0.837			
Professional discretion	PD1	0.885	0.883	0.887	0.809
	PD2	0.918			
	PD3	0.896			
	PF1	0.881			
Allowing flexibility	PF2	0.898	0.924	0.925	0.768
	PF3	0.84			
	PF4	0.879			
	PF5	0.882			
Promoting innovation	PI1	0.811	0.856	0.857	0.635
	PI2	0.83			
	PI3	0.814			
	PI4	0.757			
	PI5	0.77			
Better quality	PQ1	0.838	0.844	0.853	0.684
	PQ2	0.888			
	PQ3	0.859			

	PQ4	0.714			
Fostering sustainability	PS1	0.917	0.923	0.924	0.813
	PS2	0.911			
	PS3	0.898			
	PS4	0.882			
Time saving	PT1	0.874	0.898	0.9	0.766
	PT2	0.915			
	PT3	0.879			
	PT4	0.831			
Social legitimacy	SL1	0.911	0.915	0.924	0.797
	SL2	0.907			
	SL3	0.895			
	SL4	0.858			

5.9.1.1.2 Convergent Validity

Convergent validity is the extent to which each item of a certain construct is meant to reflect the latent construct, and the separate items are correlated to measure the same latent construct. In other words, convergent validity refers to the degree to which a certain construct is internally consistent (Hair et al., 2006). According to Fornell and Larcker (1981), in order to establish convergent validity for any of the latent constructs, the value of AVE needs to be at least 0.05. This is one of the requirements. The reason that the AVE cut-off value should be set at or above 0.50 is that it is necessary for the latent variable to have item variances of at least 50% in order to establish good convergent validity. This is the explanation for setting the AVE cut-off value (Urbach & Ahlemann, 2010).

In addition, the findings of loadings and cross-loadings, which are provided in Table 5.15, suggest that none of the items' loadings fall short of the 0.50 threshold required for acceptance. This demonstrates that all latent constructs not only meet the AVE criterion of

0.50 or above but also converge with a greater loading towards their respective constructs. This demonstrates that all latent variables in this study have gained convergent validity.

Table 5.15: Loadings and Cross-loadings

	AC	**CM**	**CO**	**CP**	**CT**	**DF**	**DP**	**EG**	**EQ**	**PC**	**PD**	**PF**	**PI**	**PQ**	**PS**	**PT**	**SL**	**TP**
AC1	***0.84***	0.35	0.20	0.18	0.12	0.22	0.21	0.26	0.48	0.14	0.24	0.09	0.18	0.18	0.08	0.17	0.19	0.39
AC2	***0.85***	0.26	0.16	0.13	0.06	0.12	0.19	0.18	0.37	0.05	0.18	0.08	0.15	0.15	0.09	0.12	0.05	0.57
AC3	***0.82***	0.50	0.22	0.22	0.12	0.31	0.28	0.25	0.35	0.10	0.23	0.06	0.19	0.15	0.07	0.16	0.07	0.28
CM1	0.34	***0.80***	0.15	0.33	0.17	0.23	0.48	0.39	0.29	0.26	0.37	0.09	0.24	0.21	0.13	0.18	0.12	0.25
CM2	0.37	***0.86***	0.25	0.44	0.14	0.34	0.47	0.39	0.25	0.21	0.37	0.10	0.22	0.23	0.13	0.16	0.11	0.20
CM3	0.37	***0.87***	0.24	0.44	0.13	0.38	0.47	0.32	0.33	0.21	0.36	0.07	0.26	0.24	0.09	0.12	0.12	0.23
CM4	0.40	***0.87***	0.21	0.39	0.08	0.38	0.35	0.38	0.26	0.19	0.36	0.09	0.18	0.17	0.12	0.08	0.08	0.17
CO1	0.19	0.24	***0.85***	0.17	0.20	0.19	0.30	0.20	0.18	0.65	0.12	0.22	0.18	0.17	0.21	0.15	0.13	0.24
CO2	0.14	0.17	***0.83***	0.18	0.14	0.19	0.22	0.19	0.22	0.56	0.05	0.20	0.16	0.07	0.17	0.13	0.05	0.20
CO3	0.17	0.20	***0.86***	0.12	0.20	0.23	0.27	0.21	0.23	0.46	0.14	0.21	0.20	0.16	0.20	0.20	0.13	0.26
CO4	0.27	0.23	***0.88***	0.17	0.17	0.26	0.27	0.24	0.25	0.43	0.16	0.20	0.17	0.21	0.24	0.17	0.10	0.28
CP1	0.23	0.39	0.15	***0.91***	0.00	0.23	0.14	0.31	0.18	0.07	0.29	-0.03	0.21	0.09	0.00	0.02	-0.05	0.11
CP2	0.18	0.45	0.17	***0.92***	0.03	0.29	0.25	0.32	0.21	0.12	0.31	0.04	0.21	0.07	0.04	0.03	0.02	0.10
CP3	0.16	0.44	0.18	***0.89***	0.01	0.27	0.23	0.29	0.17	0.19	0.25	-0.01	0.21	0.07	-0.02	0.03	0.04	0.11
CT1	0.11	0.15	0.20	0.04	***0.91***	0.04	0.16	0.15	0.21	0.24	0.18	0.59	0.59	0.48	0.51	0.64	0.16	0.18
CT2	0.13	0.14	0.18	0.00	***0.92***	0.05	0.12	0.14	0.22	0.23	0.16	0.60	0.55	0.45	0.53	0.67	0.18	0.19
CT3	0.07	0.12	0.19	0.00	***0.85***	0.04	0.08	0.11	0.17	0.16	0.14	0.53	0.50	0.46	0.44	0.63	0.17	0.14
DF1	0.19	0.39	0.27	0.26	0.06	***0.85***	0.43	0.27	0.23	0.11	0.16	0.08	0.14	0.13	0.13	0.08	0.15	0.15
DF2	0.21	0.36	0.23	0.25	0.05	***0.91***	0.42	0.23	0.20	0.13	0.17	0.06	0.18	0.12	0.07	0.06	0.20	0.12
DF3	0.21	0.34	0.23	0.25	0.05	***0.91***	0.35	0.25	0.20	0.15	0.18	0.10	0.16	0.09	0.13	0.04	0.15	0.13
DP1	0.17	0.43	0.26	0.17	0.10	0.33	***0.83***	0.25	0.24	0.33	0.21	0.09	0.15	0.18	0.14	0.06	0.15	0.20
DP2	0.21	0.41	0.29	0.17	0.14	0.36	***0.86***	0.22	0.21	0.28	0.20	0.14	0.15	0.19	0.12	0.10	0.12	0.21
DP3	0.28	0.47	0.24	0.24	0.10	0.41	***0.85***	0.16	0.33	0.22	0.20	0.11	0.20	0.16	0.10	0.09	0.12	0.23
EG1	0.23	0.36	0.22	0.33	0.13	0.20	0.24	***0.84***	0.16	0.21	0.44	0.17	0.19	0.19	0.22	0.11	0.09	0.07
EG2	0.26	0.38	0.23	0.29	0.14	0.25	0.23	***0.91***	0.22	0.20	0.48	0.14	0.16	0.15	0.21	0.13	0.13	0.16
EG3	0.25	0.38	0.18	0.28	0.12	0.27	0.21	***0.85***	0.23	0.14	0.55	0.12	0.20	0.15	0.19	0.17	0.07	0.17

EG4	0.21	0.39	0.23	0.28	0.14	0.24	0.18	***0.87***	0.17	0.19	0.56	0.15	0.20	0.14	0.16	0.12	0.08	0.15
EQ1	0.17	0.09	0.13	0.07	0.17	0.05	0.07	0.10	***0.61***	0.11	0.07	0.12	0.18	0.05	0.18	0.18	0.08	0.27
EQ2	0.43	0.31	0.25	0.17	0.16	0.22	0.30	0.19	***0.84***	0.21	0.19	0.15	0.29	0.17	0.17	0.26	0.11	0.47
EQ3	0.43	0.30	0.19	0.19	0.19	0.22	0.27	0.19	***0.84***	0.10	0.22	0.10	0.24	0.13	0.12	0.21	0.09	0.46
EQ4	0.40	0.28	0.22	0.18	0.19	0.24	0.27	0.22	***0.80***	0.15	0.18	0.18	0.32	0.21	0.20	0.24	0.13	0.52
PC1	0.11	0.24	0.52	0.09	0.18	0.15	0.30	0.19	0.21	***0.90***	0.17	0.25	0.19	0.09	0.24	0.13	0.20	0.27
PC2	0.11	0.25	0.55	0.15	0.23	0.10	0.29	0.18	0.13	***0.89***	0.13	0.28	0.22	0.17	0.23	0.18	0.17	0.23
PC3	0.08	0.19	0.52	0.13	0.21	0.09	0.25	0.18	0.15	***0.84***	0.06	0.25	0.22	0.10	0.21	0.19	0.12	0.23
PD1	0.24	0.41	0.15	0.31	0.16	0.19	0.23	0.58	0.24	0.09	***0.89***	0.13	0.24	0.25	0.21	0.18	0.11	0.17
PD2	0.21	0.38	0.12	0.26	0.15	0.14	0.18	0.53	0.18	0.14	***0.92***	0.14	0.20	0.18	0.16	0.14	0.07	0.15
PD3	0.24	0.37	0.12	0.27	0.18	0.19	0.24	0.47	0.18	0.15	***0.90***	0.12	0.19	0.22	0.15	0.19	0.11	0.16
PF1	0.06	0.10	0.21	0.01	0.54	0.05	0.14	0.17	0.14	0.27	0.15	***0.88***	0.38	0.28	0.70	0.36	0.14	0.15
PF2	0.11	0.09	0.20	0.02	0.57	0.07	0.07	0.15	0.16	0.25	0.14	***0.90***	0.36	0.31	0.73	0.40	0.11	0.18
PF3	0.10	0.12	0.23	0.02	0.54	0.06	0.17	0.18	0.23	0.24	0.14	***0.84***	0.34	0.30	0.74	0.40	0.11	0.20
PF4	0.02	0.05	0.19	-0.01	0.56	0.07	0.11	0.12	0.08	0.26	0.13	***0.88***	0.39	0.30	0.69	0.37	0.11	0.12
PF5	0.13	0.08	0.24	-0.04	0.61	0.08	0.10	0.11	0.18	0.28	0.08	***0.88***	0.37	0.30	0.72	0.42	0.10	0.18
PI1	0.21	0.18	0.12	0.27	0.48	0.15	0.09	0.20	0.25	0.14	0.19	0.31	***0.81***	0.39	0.33	0.43	0.09	0.17
PI2	0.15	0.17	0.11	0.20	0.50	0.10	0.13	0.19	0.30	0.17	0.18	0.34	***0.83***	0.33	0.34	0.40	0.11	0.18
PI3	0.15	0.23	0.11	0.20	0.51	0.12	0.14	0.14	0.24	0.17	0.14	0.34	***0.81***	0.40	0.31	0.40	0.11	0.13
PI4	0.15	0.24	0.25	0.09	0.45	0.17	0.24	0.16	0.26	0.24	0.21	0.33	***0.76***	0.36	0.30	0.37	0.11	0.15
PI5	0.15	0.24	0.25	0.15	0.49	0.11	0.21	0.18	0.28	0.23	0.21	0.35	***0.77***	0.38	0.30	0.45	0.09	0.19
PQ1	0.18	0.23	0.17	0.10	0.48	0.11	0.14	0.16	0.19	0.13	0.20	0.28	0.43	***0.84***	0.24	0.42	0.19	0.16
PQ2	0.15	0.19	0.15	0.09	0.45	0.12	0.16	0.17	0.18	0.11	0.24	0.29	0.41	***0.89***	0.24	0.39	0.17	0.14
PQ3	0.18	0.22	0.18	0.07	0.40	0.11	0.24	0.14	0.17	0.15	0.22	0.32	0.39	***0.86***	0.28	0.34	0.16	0.17
PQ4	0.10	0.19	0.12	0.01	0.36	0.05	0.16	0.13	0.08	0.07	0.13	0.24	0.31	***0.71***	0.23	0.32	0.11	0.10
PS1	0.08	0.15	0.23	0.02	0.49	0.12	0.13	0.25	0.20	0.27	0.20	0.74	0.35	0.27	***0.92***	0.34	0.16	0.17
PS2	0.09	0.14	0.24	0.00	0.52	0.11	0.14	0.18	0.18	0.23	0.18	0.75	0.37	0.28	***0.91***	0.34	0.17	0.15
PS3	0.08	0.11	0.22	0.00	0.50	0.11	0.17	0.18	0.15	0.25	0.17	0.74	0.36	0.28	***0.90***	0.33	0.22	0.16

PS4	0.10	0.10	0.19	0.01	0.48	0.08	0.06	0.21	0.21	0.18	0.16	0.72	0.35	0.25	***0.88***	0.35	0.19	0.16
PT1	0.17	0.13	0.17	0.04	0.62	0.05	0.08	0.16	0.26	0.19	0.18	0.40	0.43	0.38	0.34	***0.87***	0.10	0.22
PT2	0.15	0.12	0.17	0.02	0.68	0.03	0.07	0.14	0.25	0.15	0.14	0.41	0.45	0.41	0.33	***0.92***	0.12	0.20
PT3	0.15	0.13	0.15	0.01	0.66	0.03	0.09	0.10	0.25	0.13	0.19	0.41	0.45	0.40	0.36	***0.88***	0.09	0.20
PT4	0.17	0.17	0.18	0.05	0.57	0.10	0.11	0.14	0.25	0.21	0.16	0.34	0.47	0.37	0.28	***0.83***	0.10	0.19
SL1	0.13	0.14	0.12	0.01	0.18	0.19	0.15	0.08	0.14	0.15	0.12	0.11	0.12	0.18	0.19	0.12	***0.91***	0.16
SL2	0.11	0.10	0.13	0.01	0.16	0.19	0.17	0.08	0.11	0.21	0.10	0.14	0.12	0.19	0.21	0.09	***0.91***	0.16
SL3	0.12	0.10	0.07	0.02	0.17	0.15	0.11	0.11	0.15	0.12	0.09	0.11	0.12	0.17	0.19	0.13	***0.90***	0.17
SL4	0.08	0.10	0.13	-0.02	0.16	0.17	0.12	0.11	0.07	0.19	0.07	0.10	0.09	0.14	0.14	0.06	***0.86***	0.14
TP1	0.30	0.15	0.21	0.07	0.15	0.13	0.14	0.13	0.39	0.33	0.08	0.16	0.10	0.09	0.13	0.15	0.12	***0.77***
TP2	0.31	0.18	0.25	0.07	0.16	0.09	0.22	0.08	0.38	0.29	0.11	0.16	0.19	0.15	0.13	0.16	0.14	***0.75***
TP3	0.30	0.17	0.23	0.10	0.14	0.13	0.17	0.13	0.45	0.24	0.10	0.15	0.14	0.09	0.15	0.18	0.17	***0.77***
TP4	0.37	0.23	0.22	0.08	0.16	0.11	0.20	0.13	0.42	0.11	0.19	0.09	0.18	0.14	0.10	0.18	0.16	***0.75***
TP5	0.58	0.21	0.19	0.12	0.11	0.14	0.23	0.14	0.48	0.11	0.18	0.15	0.18	0.19	0.16	0.19	0.09	***0.75***

Note: AC = Accountability principles, TP = Transparency principles, EQ = equality principles, CM = Competition principles, CT = Cost saving, PQ = Better quality, PT = Time saving, PF = Allowing Flexibility, PI = Promoting innovation, PS = Fostering sustainability, SL = Social legitimacy, EG = Economic Gain, PC = Rule consistency, CP = Policy compatibility, PD = Professional discretion, DP = Dependency on rule setters, CO = Coercive power, DF = Diffusion of practice.

This study has two second-order constructs: public procurement principles: non-discrimination and equality, transparency, and confidentiality; and public procurement performances: cost saving, better quality, time saving, promoting innovation, allowing flexibility, and fostering sustainability, to measure the outer model with their first-order construct. Therefore, the performances of the measurement model, such as CR, AVE, and the cross-loadings, were explored based on the first-order construct.

5.9.1.1.3 Discriminant Validity

In contrast to convergent validity, discriminant validity examines the extent to which one latent variable may be differentiated from those of other variables (Duarte & Raposo, 2010). The AVE value of a particular latent variable is also used to evaluate discriminant validity (Fornell & Larcker, 1981). The approach taken by Fornell and Larcker (1981) was utilized in this work to conduct an analysis of discriminant validity. They proposed placing the square root of AVE for all latent constructs on the diagonal of the correlation matrix, as shown in Table 5.16 with the bold values, with the square roots of AVE being larger than the correlations between latent variables. This was done because the square roots of AVE were larger than the correlations between latent variables. The results of the research indicate that the square roots of AVE are greater than the correlation values that exist between all latent variables. Therefore, it is demonstrated that the research's latent constructs are distinct from other concepts and fulfil the criterion for discriminant validity.

Table 5.16: Discriminant validity - Fornell & Larcker Criterion

Constructs	AC	CM	CO	CP	CT	DF	DP	EG	EQ	PC	PD	PF	PI	PQ	PS	PT	SL	TP
AC	**0.84**																	
CM	0.44	**0.85**																
CO	0.23	0.25	**0.86**															
CP	0.21	0.47	0.19	**0.90**														
CT	0.12	0.15	0.21	0.02	**0.90**													
DF	0.25	0.39	0.26	0.29	0.05	**0.89**												
DP	0.27	0.52	0.31	0.23	0.13	0.43	**0.85**											
EG	0.27	0.44	0.25	0.34	0.15	0.28	0.25	**0.87**										
EQ	0.48	0.33	0.26	0.21	0.22	0.25	0.31	0.23	**0.78**									
PC	0.11	0.26	0.61	0.14	0.24	0.13	0.32	0.21	0.19	**0.88**								
PD	0.26	0.43	0.14	0.31	0.18	0.19	0.24	0.59	0.22	0.14	**0.90**							
PF	0.09	0.10	0.24	0.00	0.64	0.08	0.13	0.16	0.18	0.30	0.15	**0.88**						
PI	0.21	0.27	0.21	0.23	0.61	0.16	0.20	0.22	0.34	0.24	0.23	0.42	**0.80**					
PQ	0.19	0.25	0.19	0.09	0.52	0.12	0.21	0.18	0.19	0.14	0.24	0.34	0.47	**0.83**				
PS	0.10	0.14	0.24	0.01	0.55	0.12	0.14	0.22	0.21	0.26	0.20	0.82	0.40	0.30	**0.90**			
PT	0.18	0.16	0.19	0.03	0.72	0.06	0.10	0.15	0.29	0.19	0.19	0.45	0.52	0.45	0.38	**0.88**		
SL	0.12	0.12	0.12	0.01	0.19	0.19	0.15	0.10	0.13	0.19	0.11	0.13	0.13	0.19	0.21	0.12	**0.89**	
TP	0.50	0.25	0.29	0.12	0.19	0.16	0.26	0.16	0.57	0.28	0.18	0.19	0.21	0.18	0.18	0.23	0.18	**0.76**

Note: AC = Accountability principles, TP = Transparency principles, EQ = Equality principles, CM = Competition principles, CT = Cost saving, PQ = Better quality, PT = Time saving, PF = Allowing flexibility, PI = Promoting innovation, PS = Fostering sustainability, SL = Social legitimacy, EG = Economic Gain, PC = Rule consistency, CP = Policy compatibility, PD = Professional discretion, DP = Dependency on rule setters, CO = Coercive power, DF = Diffusion of practice.

Despite the extensive usage of the Fornell-Larcker methodology for discriminant validity, it is still regarded as a weak method for determining the discriminant validity of constructs, necessitating an alternative that may solve these problems (Henseler et al., 2015). The greatest drawback of the Fornell-Larcker technique is its inability to provide a further theoretical explanation, i.e., its inability to detect the absence of discriminant validity in typical research conditions using simulation. To evaluate discriminant validity, Henseler et al. (2015) devised a technique known as the Heterotrait-Monotrait (HTMT) Ratio of Correlations. In this technique, the correlations between the constructs are compared to a preset threshold value. Some writers (Gold et al., 2001; Teo et al., 2007) have suggested a threshold value of 0.90 for the HTMT approach. Table 5.17 demonstrates that all correlation values between latent constructs fall below the specified cutoff value of 0.90. Thus, it can be concluded that all research constructs are unique from one another and have gained discriminant validity using the HTMT approach.

Table 5.17: Discriminant Validity –HTMT

Construct	AC	CM	CO	CP	CT	DF	DP	EG	EQ	PC	PD	PF	PI	PQ	PS	PT	SL	TP
AC																		
CM	0.54																	
CO	0.27	0.28																
CP	0.26	0.53	0.21															
CT	0.14	0.17	0.24	0.03														
DF	0.31	0.44	0.28	0.32	0.06													
DP	0.33	0.62	0.37	0.27	0.16	0.50												
EG	0.32	0.50	0.28	0.38	0.17	0.30	0.29											
EQ	0.58	0.38	0.30	0.24	0.27	0.27	0.36	0.26										
PC	0.14	0.30	0.71	0.16	0.27	0.15	0.39	0.24	0.23									
PD	0.31	0.49	0.16	0.35	0.20	0.21	0.29	0.66	0.25	0.16								
PF	0.11	0.11	0.27	0.04	0.71	0.08	0.16	0.18	0.21	0.34	0.16							
PI	0.25	0.31	0.24	0.26	0.70	0.18	0.24	0.25	0.40	0.28	0.27	0.47						
PQ	0.23	0.29	0.21	0.10	0.60	0.13	0.26	0.21	0.22	0.16	0.28	0.39	0.55					
PS	0.11	0.15	0.27	0.03	0.61	0.13	0.16	0.25	0.25	0.29	0.22	0.88	0.45	0.34				
PT	0.22	0.18	0.22	0.04	0.81	0.07	0.12	0.17	0.34	0.23	0.21	0.49	0.59	0.51	0.41			
SL	0.14	0.14	0.14	0.05	0.21	0.21	0.18	0.12	0.15	0.21	0.12	0.14	0.15	0.21	0.22	0.12		
TP	0.60	0.29	0.34	0.14	0.22	0.18	0.31	0.18	0.69	0.35	0.21	0.22	0.25	0.21	0.20	0.27	0.21	

Note: AC = Accountability principles, TP = Transparency principles, EQ = Equality principles, CM = Competition principles, CT = Cost saving, PQ = Better quality, PT = Time saving, PF = Allowing flexibility, PI = Promoting innovation, PS = Fostering sustainability, SL = Social legitimacy, EG = Economic Gain, PC = Rule consistency, CP = Policy compatibility, PD = Professional discretion, DP = Dependency on rule setters, CO = Coercive power, DF = Diffusion of practice.

5.9.1.1.4 Validating Higher order construct

Second-order latent constructs have been utilized throughout this study in the form of adherence to public procurement principles and public procurement performances. Before beginning the path model analysis, it was necessary to determine whether or not the first-order latent variables can be explained conceptually by their respective second-order latent variables. This must be done before beginning the path model study. Hence, the second-order constructs need to have appropriate demonstrations from their first-order variables, and the first-order latent variables need to have convergent as well as discriminant validity. In addition, the HOCs were validated as a part of the assessment of the measurement model. It must be determined whether or not each of the constructs meets the criteria for reliability and convergent validity. In addition, as indicated by Sarstedt and Mooi (2019), the LOCs were used in the study to examine the HOC's discriminant validity with regard to the other LOCs. The findings of the investigation into the validity of the HOC indicate that both reliability and validity are demonstrated. When the value for reliability is greater than 0.70 and the AVE is greater than 0.50, this demonstrates that the reliability and convergent validity of all other constructs have been established (Table 5.18). In addition to the evaluation of the concept's reliability and validity, a comparison of the HOC with the LOC's discriminant validity was conducted. According to the findings of Fornell and Larcker's (1981) criterion, the square root of the AVE of the construct is greater than its correlation with all other constructs (Table 5.19). In addition, the HTMT is also lower than .90. and AVE is higher than its correlation with all other constructs (Table 5.20).

Table 5.18: Reliability Test (CA, CR & AVE)

	Cronbach's Alpha	**CR**	**AVE**
PP performances	0.859	0.867	0.591
PP Principles	0.774	0.782	0.603

Table 5.19: Discriminant Validity- Fornell and Larcker

Constructs	**CO**	**CP**	**DF**	**DP**	**EG**	**PC**	**PD**	**PP performances**	**PP Principles**	**SL**
CO	0.856									
CP	0.185	0.904								
DF	0.257	0.293	0.885							
DP	0.312	0.23	0.433	0.847						
EG	0.246	0.338	0.277	0.245	0.87					
PC	0.606	0.141	0.128	0.322	0.209	0.875				
PD	0.143	0.313	0.191	0.242	0.587	0.138	0.9			
PP performances	0.28	0.084	0.129	0.2	0.238	0.297	0.26	0.769		
APP Principles	0.347	0.366	0.361	0.484	0.392	0.294	0.379	0.335	0.768	
SL	0.123	0.006	0.192	0.153	0.104	0.186	0.107	0.209	0.194	0.893

Note: SL = Social legitimacy, EG = Economic Gain, PC = Rule consistency, CP = Policy compatibility, PD = Professional discretions, DP = Dependence on rule setters, = Coercive power, DF = Diffusion of practice, PP performances, PP Principles

Table 5.20: Discriminant validity –HTMT

Constructs	**CO**	**CP**	**DF**	**DP**	**EG**	**PC**	**PD**	**PP Performances**	**APP Principles**	**SL**
CO										
CP	0.211									
DF	0.283	0.324								
DP	0.37	0.267	0.501							
EG	0.276	0.381	0.304	0.293						
PC	0.711	0.162	0.146	0.392	0.242					
PD	0.155	0.35	0.211	0.286	0.657	0.16				
PP performances	0.319	0.103	0.143	0.24	0.271	0.347	0.295			
APP Principles	0.414	0.396	0.398	0.568	0.434	0.355	0.422	0.408		
SL	0.135	0.046	0.211	0.178	0.116	0.212	0.116	0.233	0.231	

Note: SL = Social legitimacy, EG = Economic Gain, PC = Rule consistency, CP = Policy compatibility, PD = Professional discretions, DP = Dependence on rule setters, CO = Coercive power, DF = Diffusion of practice, PP performances, PP Principles

5.9.2 Assessing the Significance of Structural (Inner) Path Model

Following an evaluation of the measurement (outer) model in section 5.10.1, this section conducts an analysis of the relevance of the structural (inner) route model. According to Henseler et al. (2016), a structural path model is typically considered theory-based and serves as the primary concentration point for research questions and hypotheses. They also addressed the following two important questions: (a) What should be included in the path model, and (b) How effectively are the constructs theorized to be associated with one another, i.e., the directions and strengths of the relationships among or within the constructs? In particular, the structural path model is built by first examining the coefficient of determination (R^2), then evaluating the effect size (f^2), and lastly estimating the predictive relevance (Q^2) in the relationship (Hair et al., 2014; Urbach & Ahlemann, 2010; Henseler et al., 2009). In accordance with the suggestions of earlier studies (Hair et al., 2014; Henseler et al., 2009), the current inquiry utilized the standard bootstrap process with 5,000 samples and 398 cases. This was done in order to get the most accurate results possible. Next, each of the study's hypotheses was tested by utilizing the path coefficient data.

5.9.2.1 Objective 2: Influence of Predictors on Adherence to Public Procurement Principles

In order to assess the relationship between independent variables, i.e., institutional factors (social legitimacy, economic gain, rule consistency, policy compatibility, professional discretions, dependence on rule setters, coercive power, and diffusion of practice), and adherence to public procurement principles, PLS-SEM bootstrapping process was conducted using 5,000 samples (Hair et al., 2014). Table 5.21 exhibits the standardized path coefficients (β), the standard deviation, T-values, P-values, and the decisions taken based on the results for the theorized links between independent variables and dependent variables.

Table 5.21: Institutional factors and adherence to procurement principles

No	Hypothesis Path	β	STDEV	T-Values	P-Values	Decision
H1a	Social Legitimacy -> APP Principles	0.086	0.051	1.699	0.089	Not Supported
H1b	Economic Gain -> APP Principles	0.084	0.053	1.589	0.112	Not Supported
H1c	Rule Consistency -> APP Principles	0.041	0.061	0.666	0.505	Not Supported
H1d	Dependency on rule setters -> APP Principles	0.237	0.065	3.639	0.000	Supported
H1e	Policy compatibility -> APP Principles	0.179	0.059	3.061	0.002	Supported
H1f	Professional discretion -> APP Principles	0.159	0.049	3.256	0.001	Supported
H1g	Coercive power, -> APP Principles	0.145	0.050	2.890	0.004	Supported
H1h	Diffusion of practice -> APP Principles	0.089	0.067	1.323	0.186	Not Supported

Note: SL = Social legitimacy, EG = Economic Gain, PC = Rule consistency, CP = Policy compatibility, PD = Professional discretions, DP = Dependence on rule setters, CO = Coercive power, DF = Diffusion of practice.

The results in Table 5.21 indicate that four of the eight hypothesized relationships between institutional factors and adherence to public procurement principles are significant, and thus, these four hypotheses are supported. In contrast, four of eight hypothesized relationships between institutional factors and adherence to public procurement principles are insignificant, and thus, these four hypotheses are not supported.

H1a evaluates whether social legitimacy has a significant positive impact on adherence to public procurement principles. The results reveal that social legitimacy does not significantly impact adherence (β =.086, t = 1.699, p = 0.089). Hence, H1a is not supported. The result of this study is similar to Flynn's (2016) finding that social legitimacy has no impact on compliance with SME-friendly public procurement policies. Social legitimacy concepts are fundamental to institutional theories of why individuals adhere to laws, policies, and prevalent societal norms (Meyer & Rowan, 1977; Meyer, 1979; Parsons, 1956; Selznick, 1948). Individuals demonstrate conformity with institutional norms out of concern for their reputation if they do not behave in socially acceptable ways (Dowling & Pfeffer, 1975; Suchman, 1995), given the undeniable political and cultural support for principles in public procurement (Loader, 2013, 2015). It was anticipated that legitimacy concerns would promote policy compliance. However, this research finding demonstrates contrasting results. This makes assumptions, given that public procurement officers have a lack of concern about their reputation.

H1b evaluates whether economic gain has a significant impact on adherence to public procurement principles. The results reveal that economic gain (EG) does not significantly impact adherence (β = .084, t = 1.589, p =0.112). Hence, H1b is not supported. It was anticipated that economic gain to the government's entities would provide an incentive for policy adherence. Other studies on public procurement have demonstrated that economic gain encourages policy compliance (Gelderman et al., 2010). However, the result of the current study is parallel to Flynn's (2016) finding that economic gain has no impact on compliance with SME-friendly public procurement policies. The result suggests that economic gain cannot effectively motivate public procurement officers to adhere to policy. The study suggests that despite the economic success of public sector organizations in Bangladesh, there is no significant association between economic gain and institutional adherence to public procurement principles.

H1c evaluates whether or not institutional rule consistency (PC) has a significant impact on adherence to public procurement principles. The results reveal that rule consistency has an insignificant impact on adherence to public procurement principles ($\beta = .041$, $t = 0.666$, $p = 0.505$). Hence, H1c is not supported. These results contradict Flynn's (2016) finding that rule consistency has a significant impact on SME-friendly public procurement policies. In addition, Borry et al. (2018) stated that rule consistency of government towards public agencies enhances compliance. The possible reason for the insignificant finding is that the government policy contradicts the objective of procurement entities. The evidence suggests that when a conflict of interest is considered to exist, adherence to public procurement principles is generally trumped by the lowest price imperative and/or compliance with procurement legislation(Cabras, 2011; Gelderman et al., 2015; Loader, 2011; Peck & Cabras, 2011; Preuss & Walker, 2011; Walker & Preuss, 2008). Even some academicians stated that the government imposes numerous, and sometimes contradictory, expectations on public procurement officers (Kidalov & Snider, 2011; Williams & Smellie, 1985).

The fourth factor is related to organizational dependence on the institutional rule setters in public procurement; H1d evaluates whether or not dependence on the institutional rule setters (DP) has a significant impact on adherence to public procurement principles. The results reveal that dependence on rule setters significantly impacts adherence to public procurement principles (β = 0.237, t =3.639, p <.05). Hence, H1d is supported. As anticipated, public procurement officers are more likely to adhere to procurement principles because the procurement entities derive the funds from government development projects. These results are in agreement with Blount and Hill (2015), who found that high control and dependency on rule setters increase institutional compliance requirements for procurement agencies and their members. Public procurement entities/agencies are relatively more dependent on resources and less financially autonomous than other types of public sector organizations. In addition, the study contradicts Flynn's (2016) research, which asserts that reliance on institutional rule setters does not affect compliance with SME-friendly public procurement policies.

H1e evaluates whether or not policy compatibility (CP) has a significant impact on adherence to public procurement principles. The results reveal that policy compatibility CP has a significant impact on adherence (β = .179, t = 3.061, p <.05). Hence, H1e is supported. Murray (1999, 2001), Pickernell et al. (2011), and Preuss (2007) posited a similar relationship regarding the connection between socioeconomic development goals at the organizational level and the facilitation of public tendering. It is also believed that the value system of procurement agencies influences how their procurement officers behave while making purchases (Hawkins et al., 2011). There is a natural match or compatibility between this stated purpose and what procurement principles recommend for organizations looking to enable the largest involvement of suppliers. Their own efforts to manage the procurement function in accordance with the concepts of social responsibility, inclusivity, and equality of opportunity should be reinforced and guided by procurement principles.

H1f investigates the impact of perceived constraints on professional discretion (PD) on adherence to public procurement principles. The results reveal that professional discretion has a significant impact on adherence to public procurement principles ($\beta = .159$, $t = 3.256$, $p < .005$). Hence, H1f is supported. Public procurement principles are no different from any other institutional policies. If public procurement officers perceive procurement principles as a threat to their ability to operate independently, they would likely object to procurement rules in these situations because they limit their flexibility and adaptability (Seo & Creed, 2002). Procurement principles may appear to be a burden if, for instance, the procurement entities' primary goal for public procurement officers is to achieve cost savings by consolidating purchasing needs and implementing long-term framework agreements with major suppliers (Loader, 2011). A "one size fits all" approach to purchasing is provided by procurement principles. Hence, if professional discretion is allowed in procuring agencies, adherence to principles might be ensured, as evidenced in the present study.

H1g evaluates whether or not coercive power (CO) has a significant impact on adherence to public procurement principles. The results reveal that coercive power significantly impacts adherence ($\beta = .145$, $t = 2.890$, $p < .005$). Hence, H1g is supported. The coercive power behind public procurement principles, for one, causes public procurement officers to incorporate policy recommendations into their procurement practices. This finding is consistent with what has emerged in the relationship between consent and procurement rule compliance in some studies (Gelderman et al., 2010; Mwakibinga & Buvik, 2013; Sang & Mugamni, 2014). Yet, it is inconsistent with what has emerged elsewhere concerning the non-significant effect of coercive power on adherence to centralized framework agreements (Karjalainen & Von Raaij, 2011) and the adoption of sustainable supplier development programs (Sancha et al., 2015).

H1h evaluates whether or not the diffusion of practice (DF) has a significant impact on adherence to procurement principles. The results reveal that DF has an insignificant impact on adherence (β = .089, t = 1.323, p =0.186). Hence, H1h is not supported. The diffusion of procurement practices throughout the public procurement field does not directly influence policy compliance. The starting assumption in proposing this hypothesis is that public procurement officers who adhere to procurement principles would be led to mimic their behaviour. Other procurement-related studies have observed mimetic forces as significant in the decision of firms to adopt sustainable and environmentally friendly purchasing practices (Hoejmose et al., 2014; Sancha et al., 2015; Zhu et al., 2013). The institutional literature is also replete with instances of mimetic behaviour in everything from corporate philanthropy (Galaskiewicz & Wasserman, 1989) to TQM (Westphal et al., 1997).

5.9.2.2 Objective 3: Impact of Adherence to Public Procurement Principles on performances

In order to assess the relationship between independent variables, i.e., public procurement principles, and the dependent variables of public procurement performances (cost saving, better quality, time saving, promoting innovation, allowing flexibility, and fostering sustainability), PLS-SEM bootstrapping process was conducted using 5,000 resamples (Hair et al., 2014). Table 5.22 exhibits the standardized path coefficients (β), the standard deviation, T-values, P-values, and the decisions taken based on the results for the theorized links between the independent variables and the dependent variables.

Table 5.22: Procurement principles and procurement performances

No	Hypothesis	β	STDEV	T-Values	P-Values	Decision
H2a	APP Principles -> CT	0.232	0.051	4.536	0	Supported
H2b	APP Principles -> PQ	0.276	0.047	5.852	0	Supported
H2c	APP Principles -> PT	0.292	0.054	5.403	0	Supported
H2d	APP Principles -> PI	0.347	0.048	7.183	0	Supported
H2e	APP Principles -> PF	0.202	0.05	4.04	0	Supported
H2f	APP Principles -> PS	0.217	0.058	3.767	0	Supported

Note: APP Principles =Adherence to Public procurement principles, CT =Cost saving, PQ =Better quality, PT = Time saving, PI = Promoting innovation, PF = Allowing flexibility, and PS = Fostering sustainability

The results in Table 5.22 indicate that all six hypothesized relationships between public procurement principles and public procurement performances are significant, and thus, six hypotheses are supported.

H2a evaluates whether adherence to public procurement principles significantly impacts public procurement costs. The results reveal that adherence to public procurement principles significantly positively impacts cost saving ($\beta = 0.232$, $t = 4.536$, $p <.005$). Hence, H2a is supported. This finding is in line with Changalima et al. (2022) that compliance with public procurement regulation has a significant and positive relationship with achieving efficiency and economical use of public funds in terms of value for money in public procurement. The findings are reinforced by Eyaa and Oluka (2011), who pronounced that the need to achieve performances in public procurement should be underlined through compliance with procurement laws and regulations. Likewise, Litschig and Zamboni-Filho (2008) have similar findings regarding a more general set of procurements in Brazil. Hence, adherence to procurement principles enhances cost savings by promoting strategic supplier selection, negotiation, standardization, risk management, technology integration, lifecycle cost consideration, competition, and effective supplier relationship management.

H2b evaluates whether adherence to public procurement principles significantly impacts the quality of public procurement. The results reveal that adherence to public procurement principles significantly positively impacts better quality ($\beta = 0.276$, $t = 5.852$, $p < .005$). Hence, H2b is supported. The earlier study by Changalima et al. (2022) stated that compliance would safeguard the overarching aims of public procurement, which are the better quality of services, commodities and works. Furthermore, following the findings of Tanzanian audit reports, procurement practitioners who fail to adhere to procurement laws and regulations have lost public funds (read as better quality) during the public procurement process (PPRA, 2021). The emphasis is on complying with the procurement regulatory framework for public organizations to achieve VfM in procurement (National Audit Office of Tanzania, 2020). Hence, adherence to procurement principles enhances quality by focusing on supplier qualification, clear contractual agreements, quality assurance, control measures, collaboration, performance metrics, continuous improvement, risk management, and innovation.

H2c evaluates whether adherence to public procurement principles significantly impacts the time-saving of public procurement. The results reveal that adherence to public procurement principles significantly positively impacts time saving ($\beta = 0.292$, $t = 5.403$, $p < .005$). Hence, H2c is supported. The findings of the current study are in line with the results of Hawkins and Muir (2014), which state that compliance and procurement lead time are positively associated. Similarly, Chowdhary et al. (2011), in the study of compliance analytics, found that adherence to compliance enhances cost savings. Adherence to procurement principles, such as transparency, accountability, equality, and competitiveness, can have a favourable impact on the time saving it takes to complete a public procurement. When these ideas are applied to the procurement process, it becomes more streamlined and responsive, resulting in faster and more efficient public procurement services on time. The real impact, however, may vary depending on the exact implementation and regulatory environment in a given jurisdiction.

H2d evaluates whether adherence to public procurement principles significantly impacts promoting innovation. The results reveal that adherence to public procurement principles significantly positively impacts promoting innovation ($\beta = 0.347$, $t = 7.183$, $p < .005$). Hence, H2D is supported. This finding is supported by the qualitative articulation by Raiteri (2018) that both economists and policymakers are increasingly considering innovative public procurement. Similarly, Castelnovo et al. (2023) stated that an increasing body of empirical research indicates that public procurement can be a useful demand-side innovation policy. Public procurement is the most widely used demand-side policy to address innovation (Grossman & Helpman, 1991). In addition to that, Blind (2012) identifies regulatory framework conditions as an important factor influencing innovation activities. Different types of regulations have different impacts, and even the same type of regulation can influence innovation in different ways depending on how it is implemented.

H2e evaluates whether adherence to public procurement principles significantly impacts public procurement flexibility. The results reveal that adherence to public procurement principles significantly positively impacts flexibility ($\beta = 0.202$, $t = 4.040$, $p < .005$). Hence, H2e is supported. This result is consistent with Fernandez et al.'s (2023) findings from the perspective of the Brazilian federal government, which indicate that the effect of flexibility in the legal provision on emergency purchases increases the price. By fostering transparency, accountability, equality, and competitiveness, procurement principles can significantly improve the flexibility of public procurement procedures. When these principles are effectively implemented, they can foster a public procurement environment that allows for more agile reactions to changing circumstances and demands. However, the degree of flexibility attained will be determined by the specific application of these principles as well as the legal framework in existence.

H2f evaluates whether adherence to public procurement principles significantly impacts fostering sustainability. The results reveal that adherence to public procurement principles significantly positively impacts fostering sustainability ($\beta = 0.217$, $t = 3.767$, $p < .005$). Hence, H2f is supported. This result is consistent with the theoretical rhetoric of Butler (2011), Shaky (2015), Fourie and Malan (2020) and McCrudden (2004), who argue that adhering to procurement principles promotes environmentally friendly products, ethical sourcing, and socially responsible practices. This implies that by ensuring compliance with procurement principles, a government can achieve its strategic objectives, such as promoting equality based on ethnicity and gender, human rights, green procurement, social procurement, and sustainable development.

5.9.2.3 Objective 4: Mediation Role of Adherence to Principles

The third structural path model, like the first and second, was analyzed using the PLS-SEM bootstrapping process with 5,000 resamples to assess the mediating role of adherence to public procurement principles in the relationship between the independent variable, institutional factors (social legitimacy, economic gain, rule consistency, policy compatibility, professional discretion, dependence on rule setter, coercive power, diffusion of practice), and the dependent variable, i.e., public procurement performances. Hair et al. (2014) stated that the bootstrapping approach is suitable for PLS-SEM mediation testing.

The bootstrapping method is preferred over other approaches because it makes no assumptions about the distributions of variables or sampling distributions in statistics. It also has the advantage of being applicable to small sample sizes with high confidence. Furthermore, the bootstrapping technique for mediation testing reveals greater statistical power than the Sobel test, which has low statistical power when applied to a small sample (Hair et al., 2014). Moreover, the bootstrapping mediation test approach gives a standard error of path coefficient, whereas the other approaches, like (Baron & Kenny, 1986), do not give any standard error (Hayes & Preacher, 2010).

Mediation analysis was performed to assess the mediating role of adherence on the linkage between the independent variables, i.e., institutional factors (social legitimacy, economic gain, rule consistency, policy compatibility, professional discretion, dependence on rule setter, coercive power, and diffusion of practice) and the dependent variable, i.e., public procurement performances. This study investigated the path coefficient for path "a," path "b," and path "c," where path "a" represents the direct relationship between independent and dependent variables, path "b" represents the relationship between independent and mediating variables, and path "c" represents the relationship between the mediator and dependent variables.

In Table 5.23, in Path “a” for the relationship between institutional factors and public procurement performances, out of eight independent variables, four variables are statistically significant, and in Path “b,” for the relationship between independent variables and adherence to public procurement principles, four variables are also significant. Table 5.23 also shows in the path (ć) that the relationships between adherence to public procurement principles and public procurement performances are statistically significant.

Table 5.23: Results of structural path model of indirect effects

Paths	Hypothesized Paths	β	STDEV	T Values	P Values	Decision
Path "a"	Social Legitimacy -> PP performances	0.111	0.05	2.201	0.028	Supported
	Economic Gain -> PP performances	0.043	0.07	0.626	0.532	Not Supported
	Rule Consistency -> PP performances	0.148	0.061	2.431	0.015	Supported
	Dependency on rule setters -> PP performances	-0.019	0.057	0.328	0.743	Not Supported
	Policy compatibility -> PP performances	-0.093	0.042	2.19	0.029	Supported
	Professional discretions -> PP performances	0.137	0.055	2.475	0.013	Supported
	Coercive power -> PP performances	0.095	0.05	1.92	0.055	Not Supported
	Diffusion of practice -> PP performances	0.003	0.054	0.048	0.962	Not Supported
Path "b"	Social Legitimacy -> APP Principles	0.086	0.051	1.699	0.089	Not Supported
	Economic Gain -> APP Principles	0.084	0.053	1.589	0.112	Not Supported
	Rule Consistency -> APP Principles	0.041	0.061	0.666	0.505	Not Supported
	Dependency on rule setters -> APP Principles	0.237	0.065	3.639	0	Supported
	Policy compatibility -> APP Principles	0.179	0.059	3.061	0.002	Supported
	Professional discretions -> APP Principles	0.159	0.049	3.256	0.001	Supported
	Coercive power-> APP Principles	0.145	0.05	2.89	0.004	Supported
	Diffusion of practice -> APP Principles	0.089	0.067	1.323	0.186	Not Supported
Path "c"	APP Principles -> PP performances	0.21	0.065	3.232	0.001	Supported

Note: SL = Social legitimacy, EG = Economic Gain, PC = Rule consistency, CP = Policy compatibility, PD = Professional discretions, DP = Dependence on rule setters, CO = Coercive power, DF = Diffusion of practice.

The results (see Table 23) reveal that the total effect of social legitimacy on public procurement performances is significant (H3a: $\beta = .111$, $t = 2.201$, $p < .028$). With the inclusion of the mediating variable - adherence to public procurement principles, the impact of social legitimacy on public procurement performances is also significant ($\beta = .111$, $t = 2.201$, $p < .028$). The indirect effect of social legitimacy on public procurement performances through adherence is insignificant ($\beta = .018$, $t = 1.472$, $p= .141$). This shows that the relationship between social legitimacy and public procurement performances has no mediation by adherence to public procurement principles. This could be due to various external factors, such as political pressure, public perception, and stakeholder expectations. In addition, social legitimacy may be influenced by factors beyond the principles, and its influence on performances may not inevitably be mediated by procurement principles.

The results (see Table 24) reveal that the total effect of economic gain on public procurement performances is insignificant (H3b: $\beta = .043$, $t = .628$, $p = .532$). With the inclusion of the mediating variable - adherence to public procurement principles, the impact of economic gain on public procurement performances is also insignificant ($\beta = .043$, $t = .626$, $p = .532$). The indirect effect of economic gain on public procurement performances through adherence is significant ($\beta = .018$, $t =1.398$, $p =0.162$). This shows that the relationship between economic gain and public procurement performances is not mediated by adherence to public procurement principles. This could be due to exploitation and malpractices, inadequate implementation and execution, limited focus on value creation, and the impact of external factors and market conditions. Though public procurement principles play an important role in administrative procurement processes, they may not be the sole determinant of economic performances, and other factors can significantly influence the relationship between economic gain and procurement performances.

Furthermore, the results (see Table 24) reveal that the total effect of rule consistency on public procurement performances is significant (H3c: $\beta = .157$, $t = 2.59$, $p <. 010$). With the inclusion of the mediating variable - adherence to public procurement principles, rule consistency on public procurement performances is significant ($\beta = .148$, $t = 2.431$, $p <. 015$). The indirect effect of rule consistency on public procurement performances through adherence is insignificant ($\beta = .009$, $t = .612$, $p= .54$). This shows that the relationship between rule consistency and public procurement performances has no mediation by adherence to public procurement principles. This could be due to the limited influence of principles, organizational factors, external pressures, implementation challenges, and stakeholder behaviour. While procurement principles provide a basis for good governance, the actual adherence to rules and regulations in public procurement can be influenced by various factors beyond the scope of these principles.

The results (see Table 24) reveal that the total effect of dependence on rule setters on performances is insignificant (H3d: $\beta = 0.031$, $t = 0.546$, $P =0.585$). With the inclusion of the mediating variable - adherence to public procurement principles, the impact of dependence on rule setters on performances is insignificant ($\beta = -0.019$, $t = 0.328$, $P =0.743$). The indirect effect of dependence on rule setters on performances through adherence is significant ($\beta = .050$, $t = 2.504$, $p < .012$). This shows that the relationship between dependence on rule setters and performances is fully mediated by adherence to public procurement principles. This could be because organizations can minimize the negative effects of dependence on rule setters on procurement performance, maintain integrity in the process, and achieve better performances despite the challenges posed by dependence on rule setters.

The results (see Table 24) reveal that the total effect of policy compatibility on public procurement performances is insignificant (H3e: $\beta = -0.055$, $t = 1.217$, $p = .224$). With the inclusion of the mediating variable - adherence to public procurement principles, the impact of policy compatibility on public procurement performances is significant ($\beta = -0.093$, $t = 2.190$, $p < .029$). The indirect effect of policy compatibility on public procurement performances through adherence is significant ($\beta = .038$, $t = 2.186$, $p < .029$. This shows that the relationship between policy compatibility and public procurement performances is partially mediated by adherence to public procurement principles. This could be because procurement principles mediate the relationship between policy compatibility and public procurement performances by providing alignment with organizational objectives, standardization and consistency, risk mitigation, accountability and transparency, and value for money. By following these principles, organizations can enhance the policy compatibility of their procurement processes with desired objectives, thereby positively impacting procurement performances.

In addition, the results (see Table 24) reveal that the total effect of constraints on public procurement performances is significant (H3f: $\beta = 0.170$, $t = 3.126$, $p < .002$). With the inclusion of the mediating variable - adherence to public procurement principles, the impact of constraints on performances is significant ($\beta = 0.137$, $t = 2.475$, $p < .013$). The indirect effect of constraints on performances through adherence is significant ($\beta = .033$, t

$= 2.984$, $p < .017$). This shows that the relationship between constraints and performances is partially mediated by adherence to public procurement principles. This could be due to leadership decision-making, promoting fairness, offering flexibility within a framework, enabling risk management, and enhancing accountability and efficiency. By adhering to these principles, procurement professionals can navigate constraints effectively, ensuring that procurement processes remain aligned with desired performances, ultimately improving procurement performances.

Moreover, the results (see Table 24) reveal that the total effect of coercive power on public procurement performances is significant (H3g: $\beta = .126$, $t = 2.575$, $p < .010$). With the inclusion of the mediating variable - adherence to public procurement principles, the impact of coercive power on public procurement performances is insignificant ($\beta = .095$, $t = 1.92$, $p = .055$). The indirect effect of coercive power on public procurement performances through adherence is significant ($\beta = .030$, $t = 2.049$, $p < .04$). This shows that the relationship between coercive power and public procurement performances is fully mediated by adherence to public procurement principles. This could be due to promoting transparency and accountability, ensuring fair competition, guiding ethical conduct, enabling due diligence and risk assessment, and establishing mechanisms for enforcement and compliance. By adhering to these principles, public agencies can lessen the influence of coercive power on procurement decisions, protect the integrity of the procurement process, and enhance overall procurement performances.

Finally, the results (see Table 24) reveal that the total effect of diffusion on public procurement performances is insignificant (H3h: $\beta = 0.021$, $t = 0.387$, $p = .699$). Including the mediating variable - adherence to public procurement principles, the impact of diffusion on public procurement performances is also insignificant (β = -.112, t = 1.108, p =. 134). The indirect effect of diffusion on public procurement performances through adherence is insignificant (β = .019, t = 1.174, p= .241). This shows that the relationship between diffusion and public procurement performances is not mediated by adherence to public procurement principles due to their limited influence on adoption, the importance of organizational readiness and capacity, the impact of external factors and stakeholder engagement, the need for innovation and learning, and the complexity of the procurement ecosystem. While procurement principles provide a foundation for good governance, additional factors and strategies are required to effectively manage the diffusion process and enhance procurement performances.

Table 5.24: Mediation Analysis

Total effect		**Direct effect**		**Indirect Effects of IV on DV**					
β	**p-value**	**β**	**p-value**	**Relationships**	**β**	**SD**	**t-value**	**p-value**	**Decision**
0.129	0.011	0.111	0.028	H3a: Social legitimacy -> APP Principles -> PP performances	0.018	0.012	1.472	0.141	No mediation
0.061	0.374	0.043	0.532	H3b: Economic Gain -> APP Principles -> PP performances	0.018	0.013	1.398	0.162	No mediation
0.157	0.010	0.148	0.015	H3c: Rule Consistency -> APP Principles -> PP performances	0.009	0.014	0.612	0.54	No mediation
0.031	0.585	-0.019	0.743	H3d: Dependence on rule setters-> APP Principles -> PP performances	0.050	0.020	2.504	0.012	Full mediation
-0.055	0.224	-0.093	0.029	H3e: Policy compatibility -> APP Principles -> PP performances	0.038	0.017	2.186	0.029	Partial mediation
0.170	0.002	0.137	0.013	H3f: Professional discretion-> APP Principles -> PP performances	0.033	0.014	2.384	0.017	Partial mediation
0.126	0.01	0.095	0.055	H3g: Coercive power -> APP Principles -> PP performances	0.030	0.015	2.049	0.04	Full mediation
0.021	0..699	0.003	0.962	H3h: Diffusion of practice -> APP Principles -> PP performances	0.019	0.016	1.174	0.241	No mediation

Note: SL = Social legitimacy, EG = Economic Gain, PC = Rule consistency, CP = Policy compatibility, PD = Professional discretions, DP = Dependence on rule setters, CO = Coercive power, DF = Diffusion of practice, and APP Principles = Adherence to public procurement principles.

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5.10 THE PREDICTION QUALITY OF THE MODEL

The R^2, the effect size (f^2), and cross-validated redundancy (Q^2) determination are all used to assess the quality of the route model's predictions, which are explored in the following sections sequentially.

5.10.1 Coefficient of Determination (R^2)

When evaluating the structural path model, the coefficient of determination, also known as the determination of R^2, is the most significant criterion for all endogenous latent components (Hair et al., 2014). How many total variances of exogenous variables can be described by all of its endogenous variables is referred to as the R^2 value (Cohen, 1988). Although R^2 does not have a best-generalized value, it is believed that the higher the R^2 value, the more variations must be accounted for. R^2 of .10, according to studies (Falk & Miller, 1992), is thought to be the minimum acceptable threshold. The R^2 values for endogenous variables are divided into three categories by Cohen (1988). According to his recommendations, R^2's determination value of 0.02 should be viewed as weak, 0.13 should be viewed as moderate, and 0.26 is significant. Other studies employing the PLS-SEM path modelling approach, such as Chin (1998), described R^2 values of 0.67 as substantial, 0.33 as moderate, and 0.19 as weak. As a result of the aforementioned classification, the recommendations made by Chin (1998) for R^2 values are more applicable, given that this study uses the PLS-SEM approach as its primary statistical analysis.

Table 5.25: Results of R^2 Endogenous Variables

Latent Constructs	R^2 Value	Evaluation Criteria By Chin (1998)
APP Principles	0.371	Moderate
PP performances	0.198	Small

Table 5.25 exhibits the total variances of two endogenous variables: adherence to public procurement principles and public procurement performances. Results indicate that all eight institutional factors (independent variables), along with adherence to public procurement principles (mediating variable), can explain 19.8 % variances in public procurement performances (dependent variable). In addition, the eight institutional factors altogether contribute to explaining 37.1% of variances in adherence to public procurement principles.

5.10.2 Assessment of Effect Size (f^2)

The above evaluation criteria, as suggested by Hair et al. (2014), is to evaluate the effect size (f^2) after determining the R^2 for all of the endogenous latent dimensions, i.e., adherence to public procurement principles and public procurement performances. To determine whether the exclusion of a specific concept from the study model may have a significant impact on its dependent constructs, an evaluation of f^2 is required (Hair et al., 2013). Cohen (1988) suggested that when computing the f^2 value, the value of f^2 between 0.02 and 0.14 is regarded as a small effect size, the value between 0.15 and 0.34 as a medium effect size, the value between 0.35 and above as a big effect size, and the value below 0.02 as having no effect. The effect size formula is shown below:

$$f^2 = \frac{R^2 included - R^2 excluded}{1 - R^2 included}$$

Where R^2 included represents the R^2 value of an endogenous latent construct when an exogenous latent construct is included, and R^2 excluded represents the R^2 value when the corresponding endogenous variable is omitted from the model.

The effect size results for all exogenous and endogenous variables are shown in Table 5.26. According to Cohen (1988), among all exogenous variables for its endogenous latent construct, i.e., institutional factors, only three, namely, policy compatibility, professional discretion, and coercive power show a small effect size on adherence to public procurement principles. Similarly, for the endogenous variable of public procurement performances, only public procurement principles, social legitimacy, professional discretion, and rule consistency show a small effect size. Though the endogenous latent constructs (see Table 26) are found to be statistically significant in comparison to their exogenous counterparts, effect size analyses reveal a small effect size for some of the endogenous variables. It is crucial to note that Cohen (1988) suggested that exogenous variables with small effect sizes do not necessarily imply that they are statistically insignificant for the model.

Table 5.26: Effect Size (f2) of Endogenous of Latent Variables

Relationships	f^2	Effect Size
Coercive power-> APP Principles	0.02	Small
Policy compatibility -> APP Principles	0.04	Small
Professional discretions -> APP Principles	0.02	Small
APP Principles -> PP performances	0.03	Small
Professional discretions -> PP performances	0.02	Small
Rule consistency -> PP performances	0.02	Small
Social legitimacy -> PP performances	0.02	Small

Note: SL = Social legitimacy, PC = Rule consistency, CP = Policy compatibility, PD = Professional discretions, CO =Coercive power.

5.11.3 Assessment of Predictive Relevance (Q^2)

Following a satisfactory assessment of the effect size for all endogenous variables, this study used Stone-Geisser's method of blindfolding to evaluate the value of predictive relevance (Q^2) of the study model (Geisser, 1974; Stone, 1974). The blindfolding method employs a sample reuse procedure to compute cross-validated predictive relevance, also known as Stone-Geisser's value of Q^2 (Geisser, 1974; Stone, 1974). Scholars (Hair et al., 2014; Chin, 1998) have advised that when calculating Q^2 for endogenous latent variables in a specific model, the predictive relevance value must be greater than zero ($Q^2>0$). Thus, the blindfolding procedure was used to estimate the value of cross-validated redundancy. Table 5.27 shows that Q^2 for all endogenous latent variables is greater than zero, indicating that the model has cross-validated redundancy (Chin, 1998; Henseler et al., 2009).

Table 5.27: Results of Q^2 of endogenous variables

Latent Constructs	Q^2
APP Principles	0.326
PP performances	0.132

5.10.4 Assessment of Goodness-of-Fit Index (GoF)

The PLS-SEM method lacks appropriate global standards to assess the goodness of model fit, unlike the CB-SEM methodology. This deficiency is typically seen as a significant drawback of the PLS-SEM approach (Hair et al., 2012). It is important to note that the term "fit" may differ between the CB-SEM and PLS-SEM approaches. The logic of fit in the CB-SEM method is based on the covariance matrix, which emerges from the contradictions of practical (empirical) and hypothesized models, whereas PLS-SEM focuses on the contradiction between the observed (in the case of manifested variables) or approximated (in terms of latent constructs) values of the endogenous latent constructs and the values forecasted by the study model in question (Hair et al., 2014). The current study calculated the GoF value to determine the validity of the PLS-SEM model, as proposed by scholars (Tenenhaus et al., 2004) so that the GoF value can be determined to compare the model's performance. The current thesis used the formula of Wetzels et al. (2009) to calculate the GoF value. They also recommended the baseline for GoF values of 0.10, 0.25, and 0.36 as small, medium, and large, respectively. Using the stated formula, this study obtained a GoF value of 0.627, indicating that the research model has a large GoF supporting appropriate PLS-SEM model validity.

$$GOF = \sqrt{(\overline{R^2} \times \overline{AVE})}$$

$$GOF = \sqrt{(.549 \times .717)}$$

$$GOF = .627$$

5.11 SUMMARY OF STUDY HYPOTHESES TESTING

Table 5.28 summarizes all the hypothesized relationships that were tested in this study, along with their results based on the testing using different statistical methods.

Table 5.28: Summary of Study Hypotheses Testing

Hypotheses	**Statement of Hypotheses**	**Decision**
H1a	Social legitimacy has a positive impact on adherence to public procurement principles in Bangladesh.	Not Supported
H1b	Economic gain has a positive impact on adherence to the public procurement principles of Bangladesh.	Not Supported
H1c	Rule consistency has a positive impact on adherence to public procurement principles in Bangladesh.	Not Supported
H1d	Dependence on rule setters has a positive impact on adherence to public procurement principles in Bangladesh.	Supported
H1e	Policy compatibility has a positive impact on adherence to public procurement principles in Bangladesh.	Supported
H1f	Professional discretion has a positive impact on adherence to public procurement principles in Bangladesh.	Supported
H1g	Coercive power has a positive impact on adherence to public procurement principles in Bangladesh.	Supported
H1h	Diffusion of practice has a positive impact on adherence to public procurement principles in Bangladesh.	Not Supported

H2a	Adherence to public procurement principles has a positive impact on the cost savings of public procurement in Bangladesh.	Supported
H2b	Adherence to public procurement principles has a positive impact on the quality of public procurement in Bangladesh.	Supported
H2c	Adherence to public procurement principles has a positive impact on saving time for public procurement in Bangladesh.	Supported
H2d	Adherence to public procurement principles has a positive impact on promoting innovation in public procurement in Bangladesh.	Supported
H2e	Adherence to public procurement principles has a positive impact on the flexibility of public procurement in Bangladesh.	Supported
H2f	Adherence to public procurement principles has a positive impact on fostering the sustainability of public procurement in Bangladesh.	Supported
H3a	Adherence to public procurement principles mediates the relationship between social legitimacy and public procurement performances in Bangladesh.	Not Supported
H3b	Adherence to public procurement principles mediates the relationship between the economic gains of public agencies in contract competitions and public procurement performances in Bangladesh.	Not Supported
H3c	Adherence to public procurement principles mediates the relationship between rule consistency between different public procurement objectives and public procurement performances in Bangladesh.	Not Supported

H3d	Adherence to public procurement principles mediates the relationship between dependence on rule setters and public procurement performances in Bangladesh.	Supported
H3e	Adherence to public procurement principles mediates the relationship between policy compatibility and public procurement performances in Bangladesh.	Supported
H3f	Adherence to public procurement principles mediates the relationship between professional discretion and public procurement performance in Bangladesh.	Supported
H3g	Adherence to public procurement principles mediates the relationship between coercive power and public procurement performances in Bangladesh.	Supported
H3h	Adherence to public procurement principles mediates the relationship between diffusion of practice and public procurement performances in Bangladesh.	Not Supported

5.12 CHAPTER SUMMARY

This chapter concludes by explaining the statistical methods used to assess research hypotheses. This section focuses on data screening, including normality and outlier identification. It also covers early data analysis, such as multicollinearity testing, non-response bias test, and test of CMV. This part also explains the procedures and performances of examining the measurement model that established the reliability and validity of all latent constructs. Detailed explanations of the PLS-SEM significance of route coefficients f^2, R^2, and Q^2 for this study's path models are given. Finally, this chapter ends by giving a detailed summary of the testing of study hypotheses along with the decisions.

CHAPTER SIX

CONCLUSION

6.1 INTRODUCTION

The results of this study indicate that institutional theory is applicable for measuring the adherence to public procurement principles among public procurement officers (government procurement officers) in Bangladesh's public procurement entities. In addition, the study concludes that adherence to public procurement principles has a substantially favourable effect on the performances of public procurement. Moreover, the study discovers that adherence to public procurement principles mediates the relationships between institutional factors and public procurement performances.

6.1.1 The Extent of Adherence to The Public Procurement Principles

The first research objective is to examine the extent of adherence to public procurement principles among public procurement officers in Bangladesh. Survey results indicate that public procurement officers observe high level of adherence to public procurement principles.

6.1.2 The influence of institutional factors on the adherence to public procurement principles

The second research objective is to investigate the influence of institutional factors on the adherence to public procurement principles among public procurement agencies, as stated in hypotheses H1 (a to h). Survey results indicate that out of the eight institutional factors – social legitimacy, economic gain, rule consistency, dependence on rule setters, policy compatibility, professional discretion, coercive power, and diffusion of practice - four institutional factors – dependence on rule setters, policy compatibility, professional discretion, and coercive power, have a positive impact on adherence to public procurement principles. In contrast, the empirical results do not support social legitimacy, economic gain, rule consistency, and diffusion of practice. These findings imply that institutional factors significantly impact adherence to public procurement principles.

6.1.3 Examination of the performances of adherence to public procurement principles

The third research objective is to examine the impact of adherence to public procurement principles on the public procurement agencies of Bangladesh, as stated in hypothesis H2 (a to f). Survey results indicate that adherence to public procurement principles positively impacts public procurement performances - cost saving, better quality, time-saving, promoting innovation, allowing flexibility, and fostering sustainability.

6.1.4 The mediating role of adherence to public procurement principles

The fourth research objective is to investigate the mediating role of adherence to public procurement principles on the relationship between institutional factors and public procurement performances, as stated in hypothesis H3 (a-h). Survey results indicate that adherence to public procurement principles has a full mediation role in the relationship between two institutional factors - dependence on rule setters and coercive power - and public procurement performances. In addition, survey results indicate that adherence to public procurement principles partially mediates the relationship between two institutional factors (policy compatibility and professional discretion) and public procurement performances. Finally, survey results indicate that adherence to public procurement principles does not mediate the relationship between four institutional factors (social legitimacy, economic gain, rule consistency, and diffusion of practice) and public procurement performances.

Table 6: 1 Summery of research objectives, questions and findings

SL	Research objectives	Research questions	Findings
1	To examine the extent of adherence to the public procurement principles by public procurement agencies in Bangladesh.	To what extent are public procurement principles adhered to by the public procurement agencies in Bangladesh?	Public procurement officers observe high level of adherence to public procurement principles
2	To investigate the institutional factors influencing the adherence to public procurement principles among public procurement agencies in Bangladesh.	How do institutional factors influence the public procurement agencies' adherence to public procurement principles in Bangladesh?	Four institutional factors – dependence on rule setters, policy compatibility, professional discretion, and coercive power, have a positive impact on adherence to public procurement principles.

3	To examine the performances of adherence to public procurement principles in the public procurement agencies in Bangladesh	What are the performances of adherence to public procurement principles by the public procurement agencies of Bangladesh?	Adherence to public procurement principles positively impacts public procurement performances - cost saving, better quality, time-saving, promoting innovation, allowing flexibility, and fostering sustainability.
4	To examine the mediating role of adherence to public procurement principles in the relationship between institutional factors and procurement performances of procurement agencies in Bangladesh.	Is there a mediating role of adherence to public procurement principles in the relationship between institutional factors and public procurement performances of procurement agencies in Bangladesh?	Adherence to public procurement principles has a full mediation role in the relationship between two institutional factors - dependence on rule setters and coercive power - and public procurement performances. In addition, survey results indicate that adherence to public procurement principles partially mediates the relationship between two institutional factors (policy compatibility and professional discretion) and public procurement performances

6.2 RESEARCH CONTRIBUTION

Public procurement research is continually developing (Flynn, 2016). Progress is being made in untangling procurement principles and tendering success predictors (Flynn et al., 2013; McKevitt et al., 2014; Tammi et al., 2014; Temponi & Cui, 2008), but much needs to be uncovered. This work makes crucial and timely additions to public procurement principles, closing the knowledge gap, which the following sections explain. Theoretical contributions are in 6.2.1. Institutional theory in empirical public procurement research is unique. Public procurement is also relatively new for institutional theorists. Practical contributions are the full assessment of public procurement principles and their promoters and inhibitors in Section 6.2.2. Section 6.2.3 explains the study's methodology. These include creating a compliance index for public procurement principles, a prediction model of policy adherence, PLS, and an innovative survey technique for public officers.

6.2.1 Theoretical contribution

This study has many theoretical contributions. It conceptually justifies its phenomena of interest, something that has not been researched on public procurement principles. The study takes an institutional perspective on public procurement principles and hypothesizes relations between important institutional theory and compliance behaviour. There have been few attempts to operationalize theories of principal-agent interactions, transaction costs, and institutions in debates on public procurement (Erridge, 1998; Kidalov & Snider, 2011; Yukins, 2010). Where earlier studies have attempted primary surveys in this area, the research has not been theoretically grounded (Fee et al., 2002; Loader, 2011). In contrast to these two trends of unproven theory and non-theoretical empirical investigation, the hypothetic deductive technique adopted here breaks new ground. It shifts the academic discourse on adherence to public procurement principles and public procurement from descriptive "what" questions to explanatory "why" questions. The inability to effectively utilize and engage with theory has made this inevitable. In this work, the application of institutional theory immediately overcomes this weakness. Like any good theory, it simplifies some of the complexities surrounding adherence to public procurement principles and provides a credible account of public procurement officers' adherence to it.

This study operationalized and tested the institutional theory, which is innovative. Oliver's (1991) predictive framework identifies institutional predictors that explain compliance behaviour. This methodology has been used to research organizational reactions to family-friendly work policies (Goodstein, 1994; Ingram and Simons, 1995) and SME-friendly procurement policies (Flynn, 2016), but never in public procurement principles. Oliver's (1991) framework's comprehensiveness makes it useful here. It includes the institutional framework, pressures, and rationales for conformity. Other procurement studies have conceptualized and operationalized the institutional theory using coercive, normative, and mimetic pressures (Sancha et al., 2015; Zhu et al., 2013). Their approach captures institutional influences less thoroughly than Oliver's (1991) paradigm, but studies should consider applying it in future studies. This study validates Oliver's (1991) approach to predicting adherence to public procurement principles.

Operationalizing and testing the institutional theory also enhance public procurement. Theoretically, it strengthens. It promotes institutional approaches in public procurement research; theories are underutilized in public procurement. Flynn and Davis 2014) found that less than one in three public procurement publications published since 2001 are conceptually framed compared to operations and supply chain management. The authors noted that there is little institutional theory research. Their views and worries are not the first. Snider and Rendon (2008) criticized the absence of public procurement policy theory. Other studies have called for a more theoretical application to comprehend, explain, and anticipate modern procurement patterns (McCue & Prier, 2008; Snider, 2006; Yukins, 2010). This study's clear theoretical frame of reference advances public procurement as a management science sub-discipline and boosts its scholarly credentials. It also increases the likelihood that policymakers and practitioners will benefit from the research (Dimitri, 2013).

The institutional theory is essential to the discussion of public procurement principles. Public procurement is helpful for studying institutional factors. Political pressures, national laws and conventions, national policies, and cultural norms and expectations determine the "rules of the game" more than market forces (Baily, 1978; Rainey & Bozeman, 2000; Snider et al., 2013). They have studied education, health, and finance since "new institutionalism" three decades ago (Galvin, 2002; Meye et al., 1983; Meyer et al., 1987; Rowan, 1982; Scott et al., 2000; Suddaby et al., 2007; Tolbert, 1985). This work expands the institutional theory by emphasizing public procurement. Theorists have learned how institutional dynamics affect the unique public procurement environment. It also questions how institutional forces are modelled. It shows that institutional influences can limit compliance behaviour depending on the persons and organizations subject to them.

6.2.2 Practical contribution

This study advances public procurement research empirically. First, it shows how public procurement officers respond to institutional pressures to follow public procurement principles. Despite the interest in public procurement principles, little information has been provided on their efficacy and, before that, if they are being implemented (OECD, 2013). Abul Hassan et al. (2021) concluded that we know more about public procurement rhetoric than reality. The results of this study may be insightful for various parties of public procurement activities. The Ministry of Finance may emphasize law, rules, and guidelines enforcement on matters related to public procurement in ensuring value for money from procurement activities. In addition, contractors or suppliers may continue to insist policymakers uphold public procurement principles. Moreover, development partners can apprehend the current findings in assist them in refining or formulating policies for the partner countries. Second, this research illustrates how the institutional context affects public procurement officials' compliance behavior. The findings remedy this oversight and help to identify institutional factors, mostly related to public procurement and its principles, which influence compliance behavior.

Third, the framework this study developed can assist procurement officers to achieve and improve procurement performances. When compliance with public procurement principles, such as accountability principles, it is advised that procurement agencies pick contractors based on the rules and guidelines, to ensure that officials are responsible for their actions and decisions that they make about procurement and for the resulting performance. In addition, procurement officers should look for an adherence to public procurement principles, for which contractors must be focused on performances, which confirms that procurement agencies satisfy all public procurement standards. Finally, due to poor implementations of public procurement principles, PPR has not been achieved in the context of Bangladesh’s public agencies. Therefore, Bangladesh's public procurement authority or regulatory bodies should put extra emphasis on monitoring the adherence to public procurement principles of the public agencies.

6.2.3 Methodological contribution

Several noteworthy additions to methodology and research design are also made by the study. The theory-based methodology proposed for predictors of adherence to procurement principles is novel and constitutes a first in terms of adherence to public procurement principles. In spite of its limitations, it lays the foundation for future studies. Studies could also retest the model under different conditions and contrast their findings with those shown here. As an alternative, they might want to alter or amend a number of its predictors before putting it to the assessment by the country's public procurement officers. Prediction frameworks have been developed as a result of attempts to explain public procurement officers' behavior. Examples include Preuss and Walker's (2011) model of psychological hurdles to sustainable purchasing, Flynn's (2016) model of SME-friendly procurement policy, and Gelderman et al.'s (2006) model of public procurements' adherence to EU Procurement Directives. The policy compliance model proposed in this work complements and even expands upon these past attempts. It takes into account both the direct and indirect interaction impacts that independent variables (institutional factors) might have on policy compliance results. This is evident in the use of a PLS approach to evaluate the model, which is also a first-time addition to research on adherence to procurement principles. The formulation of a composite measure of adherence to public procurement principles is central to this study. Previously, Abul Hassan et al. (2021) provided a similar measure for

Malaysia. Its design and application here are fresh and inventive. The measures themselves are exhaustive, comprising no less than 16 variables pertaining to non-discrimination and equality, transparency and confidentiality, and the many stages of public procurement meant to comply with public procurement principles. The measures are taken from the Bangladeshi government's procurement policy as it pertains to the principles of public procurement. Putting "localization" issues aside, the public procurement research community now has a comprehensive tool for measuring adherence to public procurement principles.

The study's novel approach to data collection is a third methodological advance. Studies have a never-ending battle on their hands when trying to conduct survey-based studies in the public sector. It is likely one of the reasons why there have been so few large-scale surveys of public procurement. The problem is that the responsibility for purchasing is often spread out across the organization, as opposed to being assigned to a single person or department, as is the case in many public sector organizations (Thai, 2001). Because of this, it is more challenging to identify a survey contact point and key informant. This research project is a prime example of how the "data capture" made possible by the widespread adoption of e-procurement among government agencies can be used to break down this barrier. E-procurement not only streamlines the public sector's overall purchasing processes but also allows for the tracking and documentation of individual procurement officers. In the event that studies are able to gain access to this type of population data, it would be extremely useful for survey purposes. This research was successfully used to conduct a poll among the public procurement officers in Bangladesh. More importantly, there were no issues with the respondent's representativeness, and the total number of responses was adequate. Due to its many benefits, studies should adopt this methodology.

Table 6: 2 Summary of the research actions, contributions, and significances

	Action	Contribution	Significance
Theoretical	Examines public procurement officers' responses to adherence to public procurement principles from the perspective of institutional theory.	The first use of institutional theory is to adhere to public procurement principles.	Aids in advancing research on the adherence of public procurement principles from description to prediction and results.
	Oliver's (1991) conceptual framework is operationalized in order to predict and then verify adherence to public procurement principles.	Oliver's (1991) conceptual framework has been operationalized in public procurement and/or adherence to public procurement principles for the first time.	The validity of Oliver's (1991) conceptual framework in predicting adherence to public procurement principles is demonstrated.
	Identifies public procurement as an important but understudied institutional theory perspective.	Among the few institutionally focused studies on public procurement.	In institutional studies, public procurement has gotten little attention. The findings imply that it is an advantageous context for testing and developing institutional theory.
Practical	Measures the extent to which the public procurement officers adhere to public procurement principles.	Among the most comprehensive assessments of adherence to public procurement principles performed to date in Bangladesh context.	Displays that there are gaps between policy and practice and that public procurement policy is not always implemented as planned.
	Operationalises and tests (institutional) predictors of adherence to public procurement principles.	First, empirical studies on how the institutional context influences adherence to public procurement norms.	Finds the institutional factors that are significant in endorsing and impeding adherence to public procurement principles.
	Operationalises and tests the performances of adherence to public procurement principles.	First, survey-based evidence on how adherence to public procurement principles is associated with public procurement performances.	Identifies the performances of public procurement, which is associated with public procurement performances.
Methodological	Uses a PLS technique to examine predictors and performances of adherence to public procurement principles.	The PLS approach was originally applied in research on public procurement principles.	Inferential statistical analysis of procurement officers' behaviour is inadequate.
	Exploits Bangladeshi's public procurement web portal to survey the procurement officers.	One of the first nationally representative e-surveys of government procurement officers.	Eliminates the barriers to survey-based research using public procurement officers' populations.

6.3 LIMITATIONS

All social inquiry is flawed from the critical realists' point of view (Seale, 1999a). This research is not an exception. It has limitations despite its theoretical, practical, and methodological contributions. In light of the conclusions, some of these have been touched upon and evaluated here. It is usually advised to consider the limits of any study.

First, this study's institutionally derived model explains 37.1% of the variation in adherence to public procurement principles. Additionally, results show that adherence to public procurement principles (mediating variable) and all eight institutional elements (independent variables) can account for 19.8% of variations in public procurement performances (dependent variable). This degree of predictive power compares favourably to that obtained by Gelderman et al. (2006) (12.5%), Hawkins and Muir (2014) (32%), and Mwakibinga and Buvik (2013) (33%), who conducted analogous investigations. Despite the model's importance, this still suggests that between 57.3% and 80.1% of the variance can be attributed to variables and connections that are either internal or external to the institutional environment. The institutional theory is useful for understanding why public procurement officers succumb to institutional influences. However, it is not the final explanation and is more appropriately viewed as a piece of a larger puzzle. Its reification of the external environment at the expense of personal power and the exhaustive quest to comprehend organizational behaviour is most likely where its predictive capacity is limited (David & Bitekine, 2009; Scott, 1987, 2008). It necessarily loses some explanatory depth and clarity in the pursuit of breadth. A certain loss of predictive power may be explained by academics' ongoing struggle to translate high-level institutional notions into operational measurements. These objections do not in any way cast doubt on its ability to account for adherence to procurement principles and the results of public procurement, but they do highlight some of its limitations.

Second, this study used public procurement officers as informants. They were an obvious and justified option, given that the goal of the study is to evaluate the factors that influence how closely public procurement principles are followed. Additionally, there is a prior practice for the use of public procurement officers when examining the adoption of progressive purchasing methods and compliance with public procurement rules (Karjalainen & van Raaij, 2011; Preuss & Walker, 2011). Dependence on rule setters on public procurement officers has some disadvantages of its own. There is no way to verify how accurately public procurement officers have recorded their compliance behaviours or to triangulate the data in the absence of comparable input from a second respondent cohort, such as top management or contractors (Jick, 1979). Their answers must just be accepted as they are. Additionally, it implies that other internal and external stakeholders in procurement, such as end users and elected officers, are not heard. Murray (2009b) claimed that there is an excessive reliance on public procurement officers as respondents and a commensurate lack of focus on all other actors. This study's research approach does little to correct this discrepancy. There is practically nothing that can be done to detect and account for this occurrence in an anonymous online poll. As a result, the impact of the organizational setting is overlooked here.

Thirdly, when planning and carrying out the study's primary research component, correctness and validity are of the utmost importance. Unfortunately, there is room for criticism regarding how the independent and dependent variables were measured. All of the constructs, including institutional factors, public procurement principles, and their performances, were operationalized in this study. However, a group of respectable academics and procurement professionals reviewed and approved the newly operationalized principles. In addition, multi-item measures are employed to operationalize theoretical notions in order to provide a more statistically sound procedure.

Lastly, the impact of temporal and/or environmental factors is not accounted for in this or any other survey (Schwarz et al., 2008). It does not investigate the hidden significances that public procurement officers attribute to their institutional answers or the nuanced complexity of the setting in which public procurement principles are adhered to (Hakim, 2000). Measurement, control, and prediction of policy compliance come at the expense of qualitative insights, engaging anecdotes, and a more granular portrayal of occurrences. The survey approach also makes it impossible to detect public procurement officers' compliance with principles that are beyond the purview of the questionnaire instrument. This approach, in essence, limits consideration of the factors that influence whether or not a company will adhere to procurement practices to the study's preconceived notions. Unexpected but significant factors, linkages, or modes of action cannot enter into the research findings. One such method is inductive inquiry, which can allow for the emergence of the phenomena of interest more naturally (LeCompte & Goetz, 1982; Lincoln & Guba, 1985; Miles & Huberman, 1984).

6.4 RECOMMENDATIONS FOR FUTURE RESEARCH

This research has increased our understanding of the impacts and results of public procurement officers adhering to the principles. There is still a lot more to learn and explore in this area. In this spirit, several suggestions are presented to direct future studies and expand upon the work already done. These suggestions are developed as a means of addressing the study's cautions. They are meant to direct studies toward alternative methodological and theoretical frameworks that may give fresh insights into adherence to public procurement principles and improve the predictive model of policy compliance.

One perspective on meeting public procurement principles is the institutional theory. Studies are strongly urged to look for alternative approaches. Economic utility, public choice, psychology, and socialization theories are viable options (Erridge, 1998; Gelderman et al., 2006). Here, the study highlights one theoretical option that shows a lot of promise. To start, there is the principal-agent perspective. The principal-agent theory is well-suited to any inquiry into government-driven attempts for procurement reform since it is concerned with the manner in which principals attempt to enforce their directives on subordinate agencies. (Eisenhardt, 1989a; Jensen & Meckling, 1976). It has been used in studies of sustainability programs in local authority procurement and investigations of compliance with procurement regulations (Mwakibinga & Buvik, 2013; Soudry, 2007). This result is also applicable to following public procurement principles. It is also one of the most widely referenced hypotheses in studies on government contracts (Flynn and Davis, 2014). The second hypothesis that attempts to explain what drives people at work is Vroom's (1964) expectation theory of motivation. The primary premise is that people are motivated to act because they believe doing so will lead to something positive. It could potentially unfurl public procurement officers' propensity to behave according to public procurement principles. Although the psychological theory has been discussed in studies of public procurement (Maser & Thompson, 2013; Ntayi et al., 2011), its true prospects have not yet been realized.

As a second part of the investigation, this study considers the impact of institutional dynamics on the implementation of public procurement principles. Similar studies should be conducted in other developing nations to further understand public procurement concepts. If at all possible, studies should poll public procurement officers in two or more nations at the same time. This will enable a cross-national analysis of the institutional factors that influence public sector procurement practices. For instance, is adherence to public procurement principles significantly predicted by institutional rule consistency in all national contexts? Does the fear of having one's professional judgment limited by adhering to public procurement principles exist in all national contexts? This is now more possible than ever, thanks to the widespread use of e-procurement platforms. This research skillfully demonstrates how this phenomenon may be utilized to conduct quick, cheap, and accurate surveys of national public procurement officers.

Thirdly, one of the most established data collection methods in public procurement studies is to have public procurement officers self-report their actions. One potential drawback of this strategy is that some procurement officials may engage in image management when composing their responses, especially in the case of compliance-related inquiries. This study's use of a best-practice questionnaire design can mitigate this concern of validity (Fowler, 1995). An alternative approach that is less intrusive and more suitable for sensitive research projects is to examine past tender papers to validate whether or not individual procurement officers adhered to public procurement guidelines (Garavan & MacKenzie, 2015). Studies should be aware of the time and effort required for cross-validation and any barriers to participation in the process. It is possible that apart from the viewpoints of the public sector, the perspective of the policy's target beneficiaries should be explored. Their first-hand accounts can provide another reliable basis for assessing the results of policy enforcement. It would be even more intriguing to survey both public procurement officers and small suppliers about the implementation of public procurement principles and compare the findings.

Fourth, the study's model of the predictor of public procurement principles includes eight institutional elements. When there is no empirical precedence, it is better to use a broad rather than a deep approach. Studies may now proceed with a more refined model with fewer variables, having established the validity of the institutional theory in explaining compliance with public procurement principles. Institutional pressures, such as those of coercion, normative, and mimetic nature, could be used, for instance, to foresee compliance behaviour. These three pillars of institution building have been operationalized, tested, and validated in a wide range of settings, from the spread of IT (Teo et al., 2003) to eco-friendly supply chain procedures (Sancha et al., 2015; Zhu et al., 2013). Regarding adherence prediction, the eight-factor institutional model used here could be compared to the three-factor institutional model.

Lastly, the aforementioned four suggestions all include varying degrees of improvement upon or enlargement of the prediction model employed in this investigation. The final suggestion stands for a completely different approach. Studies may use qualitative study designs instead of quantitative methods to assess what factors lead to and the consequences of following public procurement principles. This may entail, among other things, investigating the significance that public procurement officials give to their behaviour of adhering to public procurement principles, empathizing with the choices that they make, and putting the issue of public procurement principles adherence in the context of the larger organizational and social context in which it occurs. In actual design, this calls for extensive, in-depth interaction with study participants through interviews, document collection, and in-the-field observation (Eisenhardt, 1989b). There are already several case studies of public procurement by public procurement officers that might be used to direct future inquiries into adherence to procurement principles (Cabras, 2011; Erridge, 2007; Loader, 2007, 2010, 2011; McKevitt et al., 2014; Walker & Brammer, 2009). Instead of viewing qualitative research as competing with survey design, it could be seen as a useful supplement. The potential for more nuanced studies of public procurement officers' behaviour and motivation is presented. The information gained from this can then be used to guide the development of models and the verification of hypotheses. They can be combined with the results of previously conducted surveys to provide more complete portraits of the extent to which the public sector abides by public procurement norms.

6.5 SUMMARY

This study provides empirical evidence of the impact of institutional factors on public procurement principles among the public entities of Bangladesh. In addition, this study also showed the consequence of adherence to procurement principles on public procurement performances. Moreover, this study focuses on the mediating role of adherence to public procurement principles in the relationship between institutional factors and public procurement performances. The results of this study provide some recommendations for public-sector research and compliance studies. This study, like previous studies, has several limitations, which give avenues for future research. However, it improves an understanding of the factors influencing adherence to public procurement principles in the public procurement process of Bangladeshi public entities or agencies that operate within a highly regulated industry.

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APPENDIX 1: THE QUESTIONNAIRE

FACTORS INFLUENCING ADHERENCE TO PUBLIC PROCUREMENT PRINCIPLES AND ITS IMPACT ON PERFORMANCE: EVIDENCE FROM GOVERNMENT AGENCIES IN BANGLADESH

Dear Public Procurement Officers,

I am an Assistant Professor at the School of Business Administration at East Delta University (EDU) Chittagong. As part of my doctoral thesis, I am researching "Factors influencing adherence to public procurement principles and its impact on performance: evidence from government agencies in Bangladesh." This research is intended to measure the extent to which public procurement agencies adhere to the public procurement principles and their predictor and their influence on public procurement performances.

As public procurement officers involved in the public procurement process in Government agencies/entities, you are invited to participate by completing the questionnaire, which will take not more than 20 minutes. This survey comprises the opinion or preferences of respondents. Hence, your honest response to the questions is crucial to have a meaningful research outcome regarding knowledge, practice, and policy. Please be ensure that your answer will be kept confidential and will be used only for academic purposes. The survey performances may be published, but the identity of the respondents will remain anonymous at all times. If you are not the person involved in the public procurement process of your procurement agencies/entities, kindly request the next best individual to respond to this survey.

Your contribution of expertise and information to the successful completion of this survey is greatly appreciated and necessary for my Ph.D. studies at IIUM.

I appreciate your cooperation. Yours sincerely,

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Questionnaire instrument:

Section A: Respondent's background (Please tick your answer)

1. Gender
Male   Female
2. Age
Less than 30 years   30 to 35   35 to 40   40 years & above
3. How many years of experience do you have working in procurement?
1-5 years   5-10 years   10- 15 years   15- 20 years   20+ years
4. In a typical week, how much of your work time is spent on procurement related activity?
0 per cent   1-25 per cent   26-50 per cent   51-75 per cent   76-100 per cent
5. Do you hold a procurement-related qualification (Education/ Training)?
Yes   No
6. Are you familiar with the content of public procurement principles in Bangladesh?
Yes   No
7. How many employees are in your organization?
1-5 years   5-10 years   10- 15 years   15- 20 years   20+ employees
8. How is procurement managed in your organization?
On a centralized basis   On a decentralized basis

Section B: Adherence to Public Procurement Principles (Please tick your answer)

Using a five-point Likert scale, respondents will be required to answer the statements based on the perception of the influence of adherence to public procurement principles on public procurement performances, starting from — Strongly disagree (1), Disagree (2), Neutral (3), Agree (4) and Strongly agree (5).

S.N	Code	Items	1	2	3	4	5
1	AC1	The bid challenge system is usually to assure fairness to suppliers in the procurement process					
2	AC2	There is an adequate measure in place to prevent fraud and corruption in procurement on the part of the suppliers					
3	AC3	Government officers involved in procurement evaluation are committed to high standards for professional conduct or ethical principles (including independence)					
4	TP1	Bidding documents are published in the standard form					
5	TP2	Suppliers do have access to information regarding the practices of					

		procurement					
6	TP3	The tender evaluation criteria are disclosed and accessible to suppliers					
7	TP4	Laws and regulations concerning procurements are easily accessible to the public					
8	TP5	A public announcement is made by the government on the awarded company					
9	EQ1	All acceptable bids are processed fairly based on current rules, policies and procedures					
10	EQ2	Qualification requirements for bidders are fair and appropriate					
11	EQ3	All successful and unsuccessful bidders are promptly informed about the results of the bid at the same time					
12	EQ4	If requested, the government provides unsuccessful bidders with the reasons for the rejection of their bid					
13	CM1	All bidders have similar information on the bidding process					
14	CM2	All bidders are provided with similar information on the tender					
15	CM3	Prior to closing of tender, information submitted by each bidder is kept confidential					
16	CM4	Equal opportunities are given to all suppliers in participating or competing in any procurement activities					

Section C: Public procurement performance (Please tick your answer)

Using a five-point Likert scale, respondents will be required to answer the statements based on the perception of the influence of adherence to public procurement principles on public procurement performances, starting from — Strongly disagree (1), Disagree (2), Neutral (3), Agree (4) and Strongly agree (5).

S.N	Code	Items	1	2	3	4	5
		By adhering to public procurement principles,					
1	CT1	My agency /entity has substantially reduced the costs of procurement activities.					
2	CT2	My agency /entity has substantially reduced the costs spent on products and services purchased.					
3	CT3	My agency /entity has substantially reduced the costs of coordinating procurement with suppliers.					
4	PQ1	My agency /entity has increased stakeholders' satisfaction with public procurement activities.					
5	PQ2	My agency /entity has substantially increased the quality of supplier relationships.					
6	PQ3	My agency has substantially increased the quality of the public procurement process.					

7	PQ4	My agency /entity has substantially increased the quality of the procuring agencies' overall performance.					
8	PT1	My agency /entity has substantially reduced the duration of procurement planning.					
9	PT2	My agency has substantially reduced the duration of sourcing works/goods/services.					
10	PT3	My agency /entity has substantially reduced the duration of contract execution.					
11	PT4	My agency has substantially reduced the duration of the internal administrative process.					
12	PI1	My agency /entity encourages technological innovation in procurement.					
13	PI2	My agency /entity procures R&D projects for knowledge creation in science, technology, and innovation.					
14	PI3	My agency /entity places a strong focus on using innovation-friendly procurement techniques.					
15	PI4	My agency /entity places a strong focus on performance specifications.					
16	PI5	My agency /entity focuses on using innovation in the competitive dialogue.					
17	PF1	My agency /entity can adapt to the rapid changes in public procurement planning.					
18	PF2	My agency /entity can adapt rapidly to changes in production volume in public procurement.					
19	PF3	My agency /entity can adapt rapidly to changes in schedules in public procurement.					
20	PF4	My agencies can adopt new technology in public procurement.					
21	PF5	My agency /entity can participate in new product creation in public procurement					
22	PS1	My agency /entity confirms that the supplier´s processes are environmentally friendly.					
23	PS2	My agency /entity encourages SME participation in Government procurement.					

24	PS3	My agency /entity emphasizes ensuring safe working conditions for employees.					
25	PS4	My agency /entity ensures that all of its suppliers maintain human rights.					

Section D: Predictors of adherence to public procurement principles (Please tick your answer)

Using a five-point Likert scale, respondents will be required to answer the statements based on the perception on the predictor of adherence to public procurement principles, starting from ―Strongly disagree (1), Disagree (2), Neutral (3), Agree (4) and Strongly agree (5).

S.N	Code	Items	1	2	3	4	5
1	SL1	Adhering to public procurement principles in procurement activities is prestigious for my agency/entities.					
2	SL2	Adhering to public procurement principles in procurement activities is a social obligation for my agency/entities.					
3	SL3	Adhering to public procurement principles in procurement activities is right for my agency/entities.					
4	SL4	Adhering to public procurement principles in procurement activities is ethical for my agency/entities.					
5	EG1	Adhering to public procurement principles in procurement activities can ensure the quality of public services.					
6	EG2	Adhering to public procurement principles in procurement activities can ensure efficient use of public expenditure.					
7	EG3	Adhering to public procurement principles in procurement activities can promote competition in a public contract.					
8	EG4	Adhering to public procurement principles in procurement activities is crucial for poverty reduction.					
9	PC1	The public procurement act is consistent with the public procurement principles of my agency/entities.					
10	PC2	The public procurement regulation is consistent with the public procurement principles of my agency/entities.					

11	PC3	My institutional environments are consistent with the rules and demands of individuals and organizations.						
12	DP1	My agencies/entities are heavily dependent on institutional rule setters.						
13	DP2	My agencies/entities cannot oppose the standard given by the institutional rule setter.						
14	DP3	My agency/entity's survival is strongly dependent on the sponsor's cooperation and faith.						
15	CP1	The public procurement principles are compatible with my agency/entity's objectives.						
16	CP2	The public procurement principles are motivating towards my agencies/entities objectives.						
17	CP3	The procurement executives of my agencies/entities undertake their behavioral indications from the established public procurement principles.						
18	PD1	The public procurement principles limit my wisdom as a procurement professional.						
19	PD2	The discretionary powers of procurement professionals are in strain by the requirements of public procurement principles.						
20	PD3	My professional discretion is being hampered by a "one-size-fits-all" attitude to principles.						
21	CO1	Adherence to public procurement principles is mandatory for my agencies/entities in public procurement activities.						
22	CO2	Some circulars require my agencies/entities to adhere to the public procurement principles in procurement activities.						
23	CO3	There are instruction letters that require my agencies/entities to adhere to the public procurement principles in procurement activities.						
24	CO4	Non-adherence to public procurement principles in procurement activities has consequences in my agencies/entities.						
25	DF1	Many agencies/entities have already adhered to the public procurement principles in their procurement activities.						
26	DF2	In the public sector, agencies that do not readily adopt public procurement principles will be left behind.						

27	DF3	The agency will be considered non-compliance if we do not adopt public procurement principles.					

APPENDIX 2: MEASURES OF NORMALITY BASED ON SKEWNESS AND KURTOSIS

Items	Mean	Std. Deviation	Skewness/SE	Kurtosis
AC1	3.77	0.93	-4.94	0.15
AC2	3.95	0.87	-7.66	1.26
AC3	3.93	0.85	-9.14	1.79
TP1	3.99	0.73	-5.55	1.17
TP2	3.89	0.72	-7.95	1.88
TP3	3.87	0.72	-4.91	1.02
TP4	3.81	0.82	-2.99	-0.02
TP5	4.05	0.76	-6.31	1.25
EQ1	4.24	0.82	-10.16	1.68
EQ2	3.95	0.90	-6.62	0.37
EQ3	3.93	0.83	-6.28	0.83
EQ4	4.04	0.83	-7.73	1.10
CM1	3.95	0.85	-10.36	2.29
CM2	3.82	0.94	-9.43	1.37
CM3	3.74	0.98	-7.84	0.57
CM4	3.77	0.93	-7.70	0.92
CT1	3.87	0.82	-6.38	0.76
CT2	3.89	0.85	-5.98	0.54
CT3	3.93	0.86	-5.34	0.28
PQ1	4.04	0.85	-7.58	0.92
PQ2	4.00	0.85	-7.53	1.07
PQ3	4.05	0.88	-6.90	0.51
PQ4	3.93	0.69	-8.73	3.11
PT1	4.06	0.87	-7.27	0.66
PT2	4.03	0.85	-7.06	0.74
PT3	4.05	0.83	-7.61	1.11
PT4	4.01	0.79	-6.70	0.99
PI1	4.02	0.82	-5.91	0.39
PI2	4.04	0.77	-5.95	0.71
PI3	4.05	0.84	-5.64	0.13
PI4	3.80	0.82	-3.48	-0.21
PI5	3.95	0.80	-4.51	0.01
PF1	3.80	0.87	-6.75	1.04
PF2	3.97	0.93	-7.79	0.85
PF3	3.92	0.94	-7.43	0.67
PF4	3.80	0.83	-7.11	1.13
PF5	3.94	0.91	-7.53	0.88

PS1	3.97	1.00	-11.66	2.20
PS2	3.95	1.00	-11.28	2.07
PS3	3.92	1.05	-10.33	1.40
PS4	3.88	1.02	-10.93	1.76
SL1	3.91	1.04	-11.16	1.82
SL2	3.87	1.08	-10.20	1.23
SL3	3.83	1.05	-10.72	1.52
SL4	3.80	1.06	-9.16	1.07
EG1	3.74	1.07	-5.43	-0.44
EG2	3.89	1.02	-5.98	-0.38
EG3	3.73	1.01	-5.05	-0.41
EG4	3.79	0.96	-5.88	-0.07
PC1	3.93	0.85	-8.26	1.51
PC2	3.85	0.83	-8.43	1.76
PC3	3.87	0.86	-6.91	1.13
DP1	3.93	0.88	-9.61	1.65
DP2	3.87	0.86	-9.86	1.89
DP3	3.80	0.88	-8.19	1.08
CP1	4.03	0.91	-8.28	1.10
CP2	4.01	0.89	-8.22	1.23
CP3	4.04	0.93	-8.48	0.95
PF3	3.92	0.94	-7.43	0.67
PF4	3.80	0.83	-7.11	1.13
PF5	3.94	0.91	-7.53	0.88
PS1	3.97	1.00	-11.66	2.20
PS2	3.95	1.00	-11.28	2.07
PS3	3.92	1.05	-10.33	1.40
PS4	3.88	1.02	-10.93	1.76
SL1	3.91	1.04	-11.16	1.82
SL2	3.87	1.08	-10.20	1.23
SL3	3.83	1.05	-10.72	1.52
SL4	3.80	1.06	-9.16	1.07
EG1	3.74	1.07	-5.43	-0.44
EG2	3.89	1.02	-5.98	-0.38
EG3	3.73	1.01	-5.05	-0.41
EG4	3.79	0.96	-5.88	-0.07
PC1	3.94	0.78	-6.16	0.91
PC2	3.87	0.76	-6.48	1.26
PC3	3.85	0.81	-5.68	0.84
DP1	3.93	0.89	-9.61	1.65
DP2	3.87	0.86	-9.86	1.89
DP3	3.80	0.88	-8.19	1.08

CP1	4.03	0.91	-8.28	1.10
CP2	4.01	0.89	-8.22	1.23
CP3	4.04	0.93	-8.48	0.95
PD1	3.70	1.11	-6.67	-0.04
PD2	3.78	1.05	-8.21	0.57
PD3	3.78	1.07	-8.17	0.45
CO1	3.81	0.96	-10.46	1.87
CO2	3.84	0.96	-9.25	1.50
CO3	3.65	0.99	-6.40	0.57
CO4	3.95	0.97	-11.30	2.19
DF1	3.88	0.82	-9.03	2.02
DF2	3.79	0.81	-8.66	1.69
DF3	3.77	0.85	-5.99	0.78
DF4	3.91	0.82	-8.17	1.68

Note: AC = Accountability, TP = Transparency, EQ = equality, CM = Competition, CT = Cost saving, PQ = Better quality, PT = Time saving, PF = Allowing flexibility, PI = Promoting innovation, PS = Fostering sustainability, SL = Social legitimacy, EG = Economic Gain, PC = Rule consistency, CP = Policy compatibility, PD = Professional discretion, DP = Dependency on rule setters, CO = Coercive power, DF = Diffusion of practice.

APPENDIX 3: APPROVAL OF SURVEY

RECEIVED
26 APR 20??
Central Procurement Technical unit, IMED

Date: April 26, 2022
Director General
Central Procurement Technical Unit (CPTU)
IMED
Ministry of Planning
Peoples Republic of Bangladesh.

Subject: To Inform the intention to conduct a survey from Public Procuring Agencies about Public Procurement Principles.

Dear Sir,

I am an Assistant Professor of the School of Business Administration at East Delta University (EDU) Chittagong. As part of my doctoral thesis, I am researching ***"Predictors and Outcomes Of Adherence To Public Procurement Principles By The Government Agencies In Bangladesh."*** This research is intended to measure the extent to which public procurement agencies adhere to the public procurement principles and their predictor and its influence on public procurement outcomes.

As public buyers involved in the public procurement process in Government agencies/entities, their perceptions is very important to have a meaningful research outcome regarding knowledge, practice and policy.This survey comprises the opinion or preferences of respondents, which will take not more than 20 minutes.

Please ensure that perceptions of respondents will be kept confidential and used only for academic purposes. The survey outcomes may be published, but the identity of the respondents will remain anonymous at all times.

Please be informed about the conduction of the survey where response will be collected from the public buyers. Your cooperation to conduct the survey will greatly appreciate and necessary for my Ph.D. studies.

Yours sincerely

26.6.2022

Md. Asaduzzaman,
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Kulliyyah of Economics and Management Sciences, International Islamic University Malaysia,
Jalan Gombak, 53100 Kuala Lumpur. H/P: 019-915 1234;
Email: asadsafs8@gmail.com or asaduzzaman@eastdelta.edu.bd

Attachment: The Survey Questionnaire