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Factors Affecting the Integration of E-Procurement in the Public Sector of Pakistan with an Emphasis on Combating Corruption

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ABSTRACT

The aim of study to investigates the role of e-procurement technologies to mitigate corruption within the public procurement sector of Pakistan due to which E-procurement can't be implemented. It examines the factors that contribute to corruption probability in government procurement process. The implementation of E-Procurement, within the public sector represents a significant transformation in the country's governance which serves as a strategic response to enhance transparency, accountability, and efficiency in public procurement processes. In the design of E-procurement adoption, three primary factors were taken into consideration to address obstacles: Monopoly power; Information asymmetry; Transparency and accountability. A survey was distributed to 232 procurement specialists and government suppliers; the approach chosen involves the distribution of a well-structured closed-ended questionnaire to enable quantitative assessment, utilizing a convenience sampling method. Obtained informed consent from participants that ensure participants understand the purpose, procedures, potential risks, and benefits of the research project and voluntarily agree to participate. The SPSS software was employed to compile the results of multiple regression models. The findings reveal a substantial 76.9% impact of various variables contributing to adaptation of E-procurement. The result indicates that all three-independent variable: Monopoly power, Information asymmetry, transparency & accountability are creating major resistance in implementation of E-procurement in the government organizations which are the major cause of corruption. This research provides valuable insights into enhancing the efficiency and effectiveness of resources within the public sector. As one of the few studies on this topic, it serves as a foundational piece of literature that can guide future research and policymaking endeavors in Pakistan's public procurement landscape. Ultimately, the successful implementation of E-Procurement has the potential to transform how public funds are managed, ensuring greater accountability, transparency, and efficiency in public sector operations.

Keywords: E-Procurement, Public Procurement, Corruption Factors, PPRA, Pakistan

INTRODUCTION

The adoption of E-procurement, or electronic procurement, is a global trend that promises increased efficiency, transparency, and accountability in public and private sector procurement processes (Bertot, Jaeger, and Grimes 2010). However, its successful implementation can be challenging, especially in countries like Pakistan. In Pakistan, several factors resist the smooth integration of E-procurement systems into the procurement landscape.(Mahmood 2010) key obstacles that hinder the effective implementation of E-procurement, including the formidable issues of monopoly

power, information asymmetry, and the crucial aspects of transparency and accountability.(Zunk et al. 2014) Assessing the level of adoption and implementation of e-procurement systems in the public sector is crucial. This involves examining the extent to which government agencies have adopted e-procurement platforms and the challenges they have faced during the implementation process. The study evaluates the impact of e-procurement on the efficiency and transparency of public procurement processes. The significant amount of financial resources allocated to Public Works, which is a matter of profound concern. Approximately 20 percent of the annual budget is dedicated to the public procurement sector. Given the substantial reliance on public funds, ensuring transparency and accountability becomes paramount; thereby facilitating the proper utilization of these funds requires the implementation of E-procurement drive in Pakistan.

Monopoly power is a pervasive problem in many developing economies, including Pakistan. Certain influential entities often dominate procurement markets, limiting competition and obstructing the entry of new players. In such a monopolistic environment, the adoption of E-procurement faces significant resistance, as it threatens the established power structures and challenges the status quo (Avianto, Alim, and Tarjo 2019). Information asymmetry, another formidable challenge, arises from the unequal distribution of information among stakeholders involved in the procurement process. This imbalance can lead to favouritism, corruption, and inefficiencies in procurement operations, making the transition to E-procurement more challenging as it seeks to establish a level playing field for all participants. Transparency and accountability are fundamental prerequisites for any successful E-procurement system. In Pakistan, where corruption has been a persistent issue in public procurement, the demand for greater transparency and accountability is particularly urgent. The implementation of E-procurement systems must address these concerns to gain the trust of stakeholders and ensure the integrity of the procurement process.

This paper will delve deeper into these factors, analyzing their implications, and proposing strategies to overcome these barriers to E-procurement implementation in Pakistan. By addressing these challenges head-on, Pakistan can pave the way for a more efficient and equitable procurement landscape, ultimately benefiting the country's economic growth and development.

E-PROCUREMENT IN PAKISTAN

E-procurement, or electronic procurement, refers to the use of technology to conduct procurement activities such as sourcing, bidding, contracting, and payment, through online platforms. E-procurement has several benefits such as improving transparency, efficiency, and reducing corruption in the procurement process (Zunk et al. 2014). In Pakistan, the adoption of e-procurement has been slow, and the public sector still largely relies on procurement which enables organizations to streamline the procurement process, reduce costs, improve efficiency, and enhance transparency (Noor, Khalfan, and Maqsood 2013). In Pakistan, the adoption of e-procurement in the public sector can have several positive implications. Firstly, it can help to reduce corruption by minimizing human intervention in procurement activities and ensuring a fair and transparent bidding process. It can also improve the efficiency and speed of procurement processes by eliminating manual paperwork and reducing processing times. Moreover, e-procurement can help to increase competition among suppliers, leading to better quality and lower prices for goods and services. It can also improve the tracking and monitoring of procurement activities, making it easier to manage contracts and ensure compliance with regulations (Zaidi et al. 2019). It is also essential to ensure that the system is secure and that data privacy is protected. Additionally, there may be challenges in terms of digital literacy and training for procurement staff and suppliers. Overall, while e-procurement has several potential benefits for Pakistan's public sector, it is important to ensure that it is implemented effectively and sustainably to achieve these benefits.

Table 1. Status of E-Procurement implementation in Pakistan

Stages of E-Procurement		Activities Include	Status
Phase 1	E-Tendering	• Information Services • Procuring Agency Registration • Tender Advertisement	Successfully implemented
Phase 2	E-Tendering	• Document Download • Contract Forms	Successfully implemented
Phase 3	E- Portal For Supplier	• Supplier Registration • Catalogue Purchasing	Successfully implemented
Phase 4 a	E-Purchasing	• Bid Qualification • Procedure for online bidding	
Phase 4 b		• Online Bid Submission • Bid Upload • Online Workflow • Bid Processing / Evaluation • Bid Evaluation Results	In Process

Data Source: PAPRA

Table 1 provides insight into the current state of the E-procurement implementation drive in Pakistan, which has been divided into four major stages. However, it is apparent that Pakistan has not yet fully embraced the concept of E-procurement, primarily due to several limitations. While the Public Procurement Regulatory Authority (PPRA) introduced E-procurement technology in 2012, **Table 1** indicates that the project remains in the implementation phase. This prolonged implementation phase raises concerns about the potential for on-going corruption risks.

Research Problem

This research problem addresses the challenges and opportunities associated with the adoption of E-procurement systems within the public sector of Pakistan. It seeks to understand the various factors that influence the adoption of E-procurement practices and technology in this specific context. The research aims to explore both the barriers hindering its implementation and the enablers that can facilitate successful adoption. Additionally, the study will consider the policy implications of E-procurement adoption for the public sector in Pakistan.

There are Total 1056 organizations that are following PPRA rules in Pakistan and according to the recent monthly publication of PPRA August 2019; only 406 organizations have adopted the E-Procurement strategies which is 38% of total organizations. The impact of an organization adopting the E-procurement strategies can be seen in the reduction in the number of violations/ complaints in public procurement details can be seen in **Table 3**. Public procurement in Pakistan has a huge concern approximately 20% of Pakistan budget has been spent on public procurement annually which is all taxpayer money of a common man, transparency and accountability remains the major concern in Pakistan, and thousands of corruption cases reported annually to cope up with the issue Pakistan public procurement regulatory authority (PPRA) has launched the E-procurement program to ensure the maximum output from the public projects. This research is conducted to measure the effectiveness of the E-procurement system and reasons why government organizations are resisting the implementation of E-procurement in the public sector.

Table 2. Violations of PPRA Rules against total Tenders

Period	Tender uploaded	Violations indicated / letters issued	% of Violations
2012 -13	26,121	5,721	21.90%
2013 -14	28,733	5,149	17.92%
2014 -15	31,844	4,304	13.52%
2016 -17	35,028	3,874	11.06%
2017-18	37,923	2,105	5.55%

Data Source: PPRA Annual Reports

Research Questions

The research study aims to investigate the relationship between certain factors and the adaptation of e-procurement systems in the public procurement sector of Pakistan. Specifically, the study will explore the following questions:

Does Monopoly Power Influence the Adaptation of E-Procurement System?

Does Information Asymmetry Impact the Adaptation of E-Procurement System?

Are Transparency and Accountability Related to the Adaptation of E-Procurement System?

Objective of the study

To examine the relationship between monopoly power and the adaptation of e-procurement in public procurement in Pakistan

- By exploring the relationship between monopoly power and E-procurement, the research will uncover insights into the policy implications for the public procurement sector in Pakistan

To investigate the influence of information asymmetry on the adoption of e-procurement in public procurement in Pakistan

- Information asymmetry is a critical factor that can significantly impact the success of E-procurement implementations.

To assess the relationship between transparency, accountability, and the adaptation of e-procurement in public procurement in Pakistan

- Transparency, accountability contributes to a more profound understanding of the factors influencing E-procurement adoption, aligning with the research problem's objective of exploring these factors and their impact on procurement practices.

Significant of Study

The study fills a gap in the existing literature by examining the relationships between monopoly power, information asymmetry, transparency, accountability, and the intention to adopt e-procurement in the public procurement sector of Pakistan. By providing empirical evidence and insights in the context of an emerging market, the study expands the knowledge base and contributes to the theoretical understanding of e-procurement adoption.

Overall, the research study's significance lies in its contribution to the literature, practical implications for managers, policy recommendations, comparative analysis, and potential for future research. By addressing the gaps in knowledge and providing insights specific to the Pakistani context, the study can have a positive impact on both academia and practice in the field of e-procurement and public procurement.

LITERATURE REVIEW

E-procurement, has gained increasing prominence worldwide as a transformative tool for improving public sector efficiency, transparency, and accountability. However, its successful implementation in the public sector of Pakistan faces numerous challenges, including monopoly power, information asymmetry, and issues related to transparency and accountability. This literature review aims to provide a comprehensive analysis of these factors and their impact on resisting the implementation of e-procurement in the public sector of Pakistan.

Role of E-Procurement

E-procurement refers to the use of electronic platforms to manage procurement processes. The implementation of e-procurement systems has been advocated as a means to eliminate inefficiencies, reduce costs, and increase transparency and accountability in public procurement (Pandu Wicaksono, Urumsah, and Asmui 2017). However, several factors must be taken into consideration when assessing the efficacy of e-procurement systems, including corruption, monopoly

power of procurement officers, information asymmetry, to enhance transparency, accountability, and efficiency in public procurement. However, there are several factors that can potentially impact the effectiveness of e-procurement, such as corruption, monopoly power of procurement officers, information asymmetry, and accountability. One of the major concerns with public procurement is corruption, which can occur at various stages of the procurement process, including bid-rigging, kickbacks, and collusion. An e-procurement system can potentially reduce opportunities for corruption by providing an auditable trail of all transactions and activities within the procurement process, making it easier to detect and prevent fraudulent activities.(Andersen et al. 2010) E-procurement, or electronic procurement, has emerged as a transformative approach to modernize and streamline procurement processes in both the public and private sectors. With the advent of digital technologies, organizations are increasingly leveraging e-procurement platforms to improve efficiency, reduce costs, enhance transparency, and foster better supplier relationships (Kumar 2023). One of the primary roles of e-procurement is to significantly improve the efficiency of procurement processes. E-procurement platforms digitize and automate these tasks, eliminating the need for manual data entry, document processing, and approval workflows (Afolabi et al. 2019). This automation reduces administrative burdens and streamlines procurement workflows, resulting in faster and more efficient procurement cycles. Additionally, e-procurement enables real-time communication and collaboration among stakeholders, facilitating quicker decision-making and process completion and build public trust with the government (Faheem and Siddiqui 2020) , E-procurement offers substantial cost savings opportunities for organizations. By digitizing and centralizing procurement activities, organizations can leverage economies of scale and negotiate better prices with suppliers.

Corruption in Public Procurement

There are a large number of public sector organizations whose cases are being investigated all over the world, and this is now a matter of great concern and has reached the point where they need to make a country should be emphasized(Pandu Wicaksono, Urumsah, and Asmui 2017). Corruption in public procurement refers to dishonest and fraudulent practices that occur during the procurement process in the public sector. It involves the misuse of power, influence, or authority by individuals or organizations to gain personal benefits or advantages at the expense of the public interest (Ferwerda, Deleanu, and Unger 2017). Corruption in public procurement undermines fair competition, transparency, and accountability, and leads to inefficiency, waste of resources, and a lack of trust in the procurement process (Neupane, Soar, and Vaidya 2012). One common form of corruption in public procurement is bribery. This occurs when individuals or organizations offer money, gifts, or other benefits to public officials in exchange for preferential treatment, such as awarding contracts, manipulating tender evaluations, or providing confidential information(Rabuzin and Modrušan 2019). Kickbacks, a related form of corruption, involve the payment of a percentage of the contract value to the officials involved in the procurement process (Prakasa, Asis, and Sahid 2022). Corruption can also take the form of collusion or the creation of cartels among suppliers. Collusion occurs when competitors secretly agree to cooperate rather than compete for contracts, often by submitting predetermined bids or dividing the market. Cartels involve formal agreements among suppliers to fix prices, allocate markets, or rig the bidding process, effectively eliminating competition and driving up costs (Lindskog, Brege, and Brehmer 2010). Conflict of interest occurs when individuals in positions of power or influence have personal or financial interests that may compromise their objectivity in the procurement process. For example, a public official involved in procurement may have undisclosed relationships with a particular supplier, leading to biased decision-making in favour of that supplier (Siddiqui et al. 2022). Corruption in public procurement may involve fraudulent practices, such as falsifying documents, inflating prices, or misrepresenting the quality or quantity of goods or services being procured. Fraudulent practices can occur at various stages of the procurement process, including tendering, bid evaluation, contract award, and contract implementation.(Shabbir 2014). The consequences of corruption in public procurement are significant. It leads to higher costs for the public sector, as contracts are awarded based on favouritism rather than value for money. Corruption also undermines public trust and confidence in government institutions, erodes the integrity of the procurement process, and hampers economic development by discouraging investment and distorting market competition.

Factors resisting the implementation of E-Procurement

Monopoly Power

The government procurement agencies perform important activities in the supply of goods and business and are focal points offering products and services directly to the public. They can propose an agreement or proposal open to temporary contractors or preferred bidders. The monopoly power exercised by procurement officers has a significant influence on the success of procurement processes, and their decisions can have a substantial impact on the suppliers

and contractors that are selected (Neupane, Soar, and Vaidya 2012). (Fatimah and Habiburrochman 2020) state that E-procurement can potentially reduce the monopoly power of procurement officers by providing a transparent and objective procurement process guided by predetermined rules and procedures. Government officers with monopoly power can manipulate the procurement process to restrict competition. They may favor certain suppliers or contractors, allowing them to secure a majority of the contracts and effectively exclude other potential bidders. This lack of competition reduces the quality of goods or a service procured and inflates prices, leading to inefficiency and increased costs for the government. Furthermore, (Kumar and Aziz 2022) emphasizes that government officers with monopoly power can manipulate the procurement process to restrict competition, favouring specific suppliers or contractors, which allows them to secure a majority of the contracts and effectively exclude other potential bidders. This lack of competition reduces the quality of goods or a service procured and inflates prices, leading to inefficiency and increased costs for the government. Hence our first hypothesis as under:

H1: Monopoly power has a positive impact on the implementation of E-procurement in the public procurement sector Pakistan.

Information Asymmetry

Information asymmetry is another key factor that can impact the effectiveness of e-procurement. Suppliers may have limited information about the procurement process, making it difficult for them to compete effectively or negotiate favourable terms (Sang-hyun Kim and Netessine 2013). The reduction of data asymmetry is another major factor in open electronic procurement (Fang, Ru, and Wang 2014). Associations exist between public procurement officers and bidders (Dolla, Devkar, and Laishram 2021). Data asymmetry occurs when suppliers possess more data than procurement officers or in agreements between lawmakers and bidders(Sang-hyun Kim and Netessine 2013). E-procurement platforms can improve information dissemination by providing a centralized, accessible, and transparent platform for communication between buyers and suppliers (Kayis, Erhun, and Plambeck 2013). Information asymmetry occurs when the procuring entity has access to confidential or non-public information not available to suppliers or bidders. This may include specific project requirements, evaluation criteria, budget constraints, or even insider knowledge about upcoming procurements. As a result, the procuring entity has an advantage and can shape the procurement process in its favor or provide preferential treatment to certain suppliers(Chaturvedi and Martínez-De-Albéniz 2011). Suppliers or bidders often have limited knowledge about market conditions or the competitive landscape in a particular procurement process. They may lack information about competing suppliers, pricing trends, or the availability of alternative products or services. This lack of market knowledge can put suppliers at a disadvantage when preparing bids or negotiating contracts, potentially leading to exploitation by the procuring entity (Pekuri, Pekuri, and Haapasalo 2014). Therefore, we have reached the conclusion to develop our second hypothesis as follows:

H2: Information Asymmetry has a positive impact on the implementation of E-procurement in the public procurement sector Pakistan.

Transparency and accountability

Transparency and accountability are vital principles in public procurement. They refer to the openness, visibility, and responsibility in the procurement process, ensuring that the actions and decisions of procuring entities and stakeholders are subject to scrutiny and align with ethical and legal standards (Chu and Chiang 2014). A comparative research model, as presented by Chu and Chiang, provides access to comprehensive and relevant information regarding procurement processes, including tender notices, evaluation criteria, contract terms, and results. This information should be easily accessible to all stakeholders, including potential suppliers and the public (Hui et al. 2011). Transparency promotes open and fair competition by ensuring that procurement opportunities are widely advertised and that potential suppliers have equal access to information, requirements, and evaluation criteria. This ensures that all interested parties have a level playing field (Angokho, Juma, and Douglas 2014). Transparency involves clearly documenting and disclosing the procedures and rules followed in the procurement process. This includes outlining the steps, timelines, and evaluation criteria employed to select suppliers. By doing so, it enables stakeholders to understand and assess the fairness and integrity of the process (McGuigan 2011). Thus we reached at the conclusion to develop our third hypothesis as under:

H3: Transparency and Accountability has a positive impact on the implementation of E-procurement in the public procurement sector Pakistan.

Research Framework

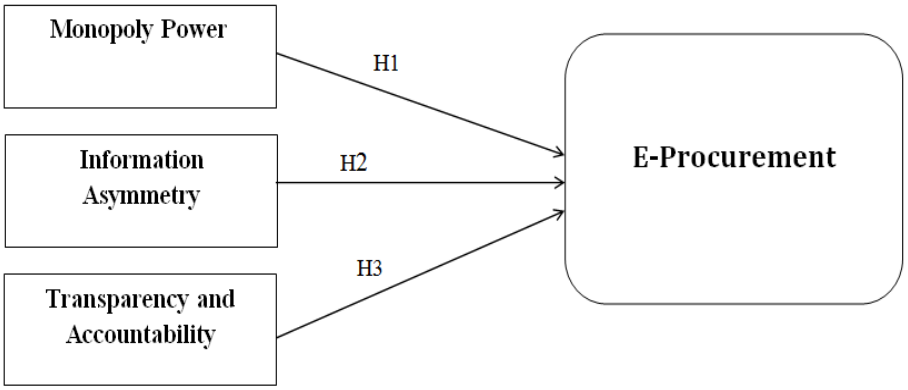

Figure 1. Research Framework of the Study

RESEARCH DESIGN AND METHODOLOGY

Research Design

This research will utilize a quantitative research approach to gather and analyze data. It will involve the use of a structured questionnaire to collect information from individuals who are associated with the Public procurement, such as procurement officer, supplier, or managers.

Research method

The primary data collection method employed in this research is a structured questionnaire. The questionnaire will be designed to collect relevant data on factors affecting satisfaction in the procurement process. The questions will be closed-ended to facilitate quantitative analysis. The questionnaire will be distributed to government procurement officials and contractors who have experience and involvement in procurement activities.

Research approach

The research approach for this study is deductive, as it aims to leverage existing theoretical frameworks, test specific hypotheses, use structured data collection methods, provide objective assessments, and potentially contribute to broader knowledge in the field of E-procurement. It aligns well with the goal of systematically analyzing the factors hindering E-procurement implementation in Pakistan and their impact.

Time horizon

It is stated that the research approach used in the study is cross-sectional in nature. A cross-sectional research design is a pragmatic choice for this study, considering the need to assess the current status, efficiently collect data from various sources, compare different aspects, address resource constraints, and provide timely insights for policy relevance. It will allow us to comprehensively examine the factors hindering E-procurement adoption in Pakistan as of the present moment.

Unit of analysis

Since our research objective to find the impact of factors that resist the adaptation of E-procurement, therefore, we consider the organization as a unit of analysis.

Population

This research is based on the public procurement industry, therefore, we consider the organizations which are following the PPRA rules in Pakistan and according to PPRA Official there 1056 organizations in Pakistan which are following the PPRA rules and 630 organizations are based in Karachi, therefore, we consider the local organization as our total population.

Sampling technique

Convenience sampling approach is used for this study because Pakistan has a high power distance culture it makes challenging to approach government officials, and that is the rationale for the selection of our sampling method. By utilizing convenience sampling, the researchers were able to collect a sufficient number of completed questionnaires in a quick and cost-effective manner. However, it is important to acknowledge that convenience sampling may introduce some limitations to the generalizability of the findings, as the sample may not be representative of the entire population of interest. Therefore, the results of the study should be interpreted with caution and may not be applicable to the broader population. Future research can consider employing probability sampling methods to enhance the generalizability of the findings.

Instrument

Following are the major instruments that contributes the resistance in adaptation of public procurement sector (Neupane et al. 2012)

Monopoly Power

The questionnaires gather the data from public procurement officers, or relevant stakeholders to assess the extent of monopoly power in a Pakistani market. Questions are designed to inquire about market concentration, pricing practices, and perceptions of market competition.

Information Asymmetry

Surveys collect the information from participants about their knowledge and experiences regarding information asymmetry in specific contexts, such as financial transactions or accessibility of information to all the stakeholders, and audit records.

Transparency and Accountability

Surveys assess perceptions of transparency and accountability in organizations or government agencies. Questions address issues like disclosure practices, communication with stakeholders, or perceptions of accountability mechanisms.

Data analysis

The use of both primary and secondary data in your research project provides a comprehensive approach to data collection and analysis. The primary data collected through the questionnaire allows for specific insights into the variables and relationships of interest in your study. The research has applied multiple regression models using SPSS for analysis. On the other hand, the inclusion of secondary data, particularly quantitative data, offers an opportunity to describe trends and provide a broader context for your research findings. This secondary data can help establish a baseline, compare and validate your primary data, and provide additional evidence to support your research objectives.

Descriptive analysis

Descriptive statistics involve summarizing and describing the observed data, while inferential statistics involve making inferences and drawing conclusions about a population based on sample data. In terms of data screening, it is essential to ensure the quality and integrity of the collected data. By distributing the questionnaires and receiving 232 responses, you have a substantial sample size for analysis. Cleaning the data by eliminating missing values, outliers, and duplicate entries helps to ensure the accuracy and reliability of the dataset. Regarding the measurement model, the primary data collected through the questionnaire will be analyzed using SPSS.

RESEARCH RESULT AND FINDING

In this chapter, we will interpret the data collected and analyze it using the selected statistical analysis techniques. The data analysis was performed using the SPSS software, and the results obtained will be presented in this chapter. The analysis includes descriptive statistics to summarize the data and simple linear regression to examine the relationships between variables.

Demographic Description

The **Table 3** provides a summary of demographic factors for a group of individuals, including their gender, managerial position, experience, and education level.

Gender:

59.7% of the respondents are male, while 40.3% are female. The "Cumulative Percent" shows the cumulative percentage of responses. In this case, after considering both male and female respondents, the cumulative percentage is 100%, indicating that all respondents are accounted for in these two gender categories.

Managerial Position:

The majority of respondents are in executive positions (52.8%), followed by clerks (19.1%).

Experience:

Respondents' experience levels are distributed across five categories. The highest proportion falls into the "06 to 10" year's category (36.68%). The cumulative percentages show the progressive accumulation of respondents' years of experience. For example, after considering those with "Below 5" years of experience, the cumulative percentage is 35.68%. This means that 35.68% of respondents have 5 or fewer years of experience.

Education Level:

The majority of respondents have a bachelor's degree (56.28%).The "Valid Percent" column indicates the percentage of valid responses within each category. The cumulative percentage shows the cumulative distribution of education levels. After considering secondary, diploma, and bachelor's degree categories, the cumulative percentage is 98.98%, meaning that almost 99% of respondents fall into these three education level categories.

Table 3. Demographics of the Respondents

Demographic Factor	Description	Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	139	59.7	59.7	59.7
	Female	93	40.3	40.3	100
Managerial Position	Manager	35	15.1	15.1	15.1
	officer	30	13.1	13.1	28.2
	Executive	122	52.8	52.8	81
	Clerk	44	19.1	19.1	100
Experience	Below 5	83	35.68	35.68	35.68
	06 to 10	85	36.68	36.68	72.36
	11 to 15	24	10.55	10.55	82.91
	16 to 20	26	11.06	11.06	93.97
	21 and above	14	6.03	6.03	100
Education Level	Secondary		45	19.6	19.6
	Diploma		54	23.1	42.7
	Bachelor		131	56.28	98.98
	Post graduate		2	1.01	100

Data Screening

In the data collection process, a total of 240 questionnaires were distributed to potential respondents. However, only 232 questionnaires were completed and returned, resulting in an 8-questionnaire non-response or incomplete response rate. These incomplete responses were excluded from the research analysis to ensure data accuracy and reliability. To ensure data quality, a data cleaning procedure was conducted. This involved checking for missing values, outliers, duplications, and repetitions in the collected data. Any missing values were handled according to established procedures, and outliers that significantly deviated from the expected patterns were removed from the dataset. Additionally, efforts were made to identify and eliminate any duplicated or repeated entries to prevent data duplication.

Measurement Model

Validity

Face validity refers to the extent to which a measurement instrument or questionnaire appears to measure what it intends to measure, as judged by individuals familiar with the subject matter. In this study, the face validity of the questionnaire developed for data collection was assessed by presenting it to domain experts in the field of Supply Chain Management.

Reliability

Reliability is a measure of the consistency and stability of a measurement instrument or questionnaire. In this study, the reliability of the questionnaire was assessed by calculating Cronbach's alpha, a commonly used statistic for estimating the internal consistency of a set of items. The questionnaire was distributed among 30 respondents, and their responses were used to calculate Cronbach's alpha for each variable included in the study. Cronbach's alpha measures the extent to which items within a variable are correlated and provide consistent measurements of the underlying construct. Typically, a Cronbach's alpha value above 0.60 is considered acceptable for research purposes (Taber, 2017). However, it is important to note that the acceptable threshold may vary depending on the specific research context and the nature of the constructs being measured.

Table 4. Reliability Analysis

Constructs	No of Items	Cronbach's Alpha
Monopoly Power	5	0.866
Information Asymmetry	5	0.799
Transparency & Accountability	8	0.835
E-Procurement	6	0.944
Overall reliability	**24**	**0.86**

It is noted that all the variables, including both the independent and dependent variables, have Cronbach's Alpha coefficients above 0.70. This indicates a satisfactory level of internal consistency and reliability among the items within each variable. A Cronbach's Alpha coefficient value above 0.70 is generally considered acceptable for research purposes, indicating that the items within each variable consistently measure the same underlying construct. This suggests that the questionnaire used in the study is reliable in terms of measuring the intended variables.

Hypothesis Testing

Table 5 presents the results of hypothesis testing for three different hypotheses one related to Monopoly Power, another related to Information Asymmetry, and the third related to Transparency and Accountability. These hypotheses are all being tested with respect to their impact on "E-procurement," which is likely the dependent variable or outcome of interest in the study.

The Beta Values, mentioned in **Table 5** represents the estimated regression coefficients for each hypothesis. These coefficients indicate the strength and direction of the relationship between the independent variable (Monopoly Power,

Information Asymmetry, or Transparency and Accountability) and the dependent variable (E-procurement). For example, in the first row, the beta value is 0.6 for the hypothesis related to Monopoly Power. This suggests that a one-unit increase in Monopoly Power is associated with a 0.6-unit increase in E-procurement, assuming all other variables are held constant.

The T Values, in **Table 5** shows the t-statistic for each hypothesis. The t-statistic measures the significance of the estimated regression coefficient. Higher absolute t-values indicate greater significance. In all three rows, the t-values are relatively high. For instance, in the first row, the t-value is 13.75, suggesting that the relationship between Monopoly Power and E-procurement is highly statistically significant.

P Values, in **Table 5** provides the p-values associated with each hypothesis. The p-value indicates the probability of observing the estimated relationship between the independent and dependent variables by random chance. In all three cases, the p-values are very low (close to zero), which typically leads to the rejection of the null hypothesis (assuming a significance level of 0.05 or lower). This means that the relationships between Monopoly Power, Information Asymmetry, and Transparency and Accountability with E-procurement are statistically significant.

Table 5. Hypothesis Testing

Hypothesis	Beta Values	T Values	P Values	Decision
Monopoly Power ->E-procurement	0.6	13.75	**0.000**	**Accepted**
Information Asymmetry ->E-procurement	0.14	3.088	**0.00**	**Accepted**
Transparency and Accountability ->E-procurement	0.133	3.474	**0.00**	**Accepted**

Therefore based on the results summarizes the decision made based on the p-value. In this case, the "Accepted" decision is made for all three hypotheses. This means that the null hypotheses for these hypotheses are rejected, indicating that there is a statistically significant relationship between Monopoly Power, Information Asymmetry, Transparency and Accountability, and E-procurement.

In summary, the **Table 5** demonstrates that the study has found strong statistical evidence to support the hypotheses that Monopoly Power, Information Asymmetry, and Transparency and Accountability have a significant impact on E-procurement.

Multiple Linear Regression Analysis

Table 6. Multiple Regression Analysis

Model summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std Error of Estimates**
1	0.87	0.769	**0.756**	**0.491**

a. Predictors: (Constant), E-procurement

In the table above, the "adjusted R" column shows 0.791 (79.1%). This value indicates that the three independent variables - Monopoly power, Information asymmetry, transparency, and accountability - are the primary factors contributing to the resistance faced by government organizations in implementing E-procurement. This implies that 75.6% of the variance is explained by these three independent variables, while the remaining 24.4% remains unexplained. In other words, 75.6% of the impact on the adaptation of E-Procurement can be attributed to Monopoly power, Information asymmetry, transparency, and accountability, while the remaining 24.4% may be influenced by other factors. Based on the results presented above, the model is highly significant and accepted because the p-value of the F ratio is less than 0.05. This suggests that the three independent variables - Monopoly power, Information asymmetry, transparency, and accountability - in the regression model can effectively guide their influence on the implementation of E-procurement in public procurement organizations.

Table 7. Structural Model Summary

Model	B	Std Error	Beta	t	Sig.
(Constant)	4.445	0.409		10.87	0
Monopoly Power	-0.94	0.069	-0.6	-13.75	0
Information Asymmetry	-0.22	0.07	-0.124	-3.088	0
Transparency & accountability	0.207	0.059	0.133	3.474	0

Dependent Variable: E-procurement

In **Table 7**, it is shown that all the independent variables - Monopoly power, Information asymmetry, transparency, and accountability - are creating significant resistance to the implementation of E-procurement in government organizations, as indicated by the equation ($P < 0.05$). The beta values computed from the table reveal that monopoly power has the highest Beta ($\beta = 0.600$). This indicates that monopoly power is the strongest barrier to the adoption of E-procurement in public sector organizations, followed by information asymmetry with $\beta = 0.227$, and lastly transparency and accountability with $\beta = 0.133$.

The un-standardized coefficients' t-values indicate the impact of the independent variables on the dependent variables. Monopoly power (-13.750) and Information asymmetry (-3.088) exhibit a negative relationship with the adaptation of E-procurement, while Transparency and accountability (3.49) show a positive relationship.

DISCUSSION

Does the monopoly power is related to the adaptation of E-procurement system in Pakistan public procurement sector?

(Avianto, Alim, and Tarjo 2019) argue that monopolistic entities within the public procurement sector may be more inclined to adopt E-procurement systems. The rationale behind this perspective is that monopolies have greater financial resources and are better positioned to invest in expensive technology infrastructure. (Goyal 2019) suggests that E-procurement adoption may be positively correlated with monopoly power as it can help curb corruption. Monopolistic entities might adopt E-procurement systems to increase transparency and reduce opportunities for graft and favouritism, leading to a more level playing field for suppliers and contractors. On the contrary, some argue that monopolistic entities may have less incentive to adopt E-procurement systems. (Fatimah and Habiburrochman 2020) In a monopolistic environment, where competition is limited or non-existent, there may be less pressure to improve operational efficiency. Monopolies may perceive E-procurement adoption as a costly and unnecessary investment when they already have a strong market position. Research has also highlighted that monopolistic structures can create barriers to entry for new suppliers and contractors. (Pandu Wicaksono, Urumsah, and Asmui 2017) These barriers may hinder the implementation of E-procurement systems, as monopolies may resist efforts to open up the procurement process to more competition, fearing the erosion of their market power.

Does the Information Asymmetry is related to the adaptation of the E-procurement system in Pakistan public procurement sector?

(Quesada et al. 2010) argue that information asymmetry can act as a catalyst for the adoption of E-procurement systems. In a context where information is not equally accessible to all stakeholders, E-procurement systems can level the playing field by providing transparent and easily accessible data. This can lead to a reduction in information asymmetry, as both buyers and suppliers have equal access to procurement-related information. (Pekuri, Pekuri, and Haapasalo 2014) suggests that reducing information asymmetry through E-procurement can foster competition among suppliers. When suppliers have access to comprehensive information about procurement opportunities, bidding processes, and contract terms, they are more likely to participate in competitive bidding, potentially leading to cost savings for the public sector. (Chaturvedi and Martínez-De-Albéniz 2011) argue that information asymmetry may hinder the adoption of E-procurement systems. In a procurement ecosystem where certain entities benefit from information disparities, they may resist changes that level the information playing field. Entities with privileged access to information may perceive the adoption of E-procurement as a threat to their advantage and may resist it. In a country like Pakistan, where there might be a digital divide and limited access to technology, the adoption of E-procurement systems can exacerbate information asymmetry. (Fatimah and Habiburrochman 2020) Smaller suppliers or those without access to

the necessary technology may face challenges in participating in E-procurement processes, potentially widening the information gap. (Pandu Wicaksono, Urumsah, and Asmui 2017) The presence of information asymmetry might not be solely responsible for the slow adoption of E-procurement systems. Regulatory challenges and bureaucratic inertia can also play a significant role. In such cases, even if information asymmetry is reduced through technology, these other factors may continue to impede adoption.

Do transparency and accountability is related to the adaptation of thee-procurement system in the Pakistan public procurement sector?

The research has proved that transparency and accountability is the strongest barrier in implementing the E-procurement application in public sector organizations whereas the idea was also supported by (Seongcheol Kim, Kim, and Lee 2009) (Fatimah and Habiburrochman 2020) who explained that E-procurement application can enhance the transparency and accountability in every transaction. (Neupane et al. 2012) finds that the information technology provides the platform to procurement authorities to make it more transparent and accountable whereas (Andersen et al. 2010) described that E-government has proven a positive on transparency in the public sector, Transparency and accountability are the important factors for management of procurement process and helps to reduce the corruption (Pandu Wicaksono, Urumsah, and Asmui 2017) have facilitated moderation in reducing political and bureaucratic involvement and encouraged participation of more suppliers and maintaining standards of integrity and trust. Open-source electronics can facilitate continuous access to data, computer-based buying methods, more consistent bidding methods, and can significantly reduce a person's mediation in the form of bidding. Our study shows that these anti-corruption factors reduce the likelihood of compromise. (Chu and Chiang 2014) find that the main obligation of electronic procurement is to improve the public procurement structure and improve the efficiency and quality of tax institutions, as well as enhance their capabilities and accountability (Hui et al. 2011)

Contribution

Overall, the research study's significance lies in its contribution to the literature, practical implications for managers, policy recommendations, comparative analysis, and potential for future research. By addressing the gaps in knowledge and providing insights specific to the Pakistani context, the study can have a positive impact on both academia and practice in the field of e-procurement and public procurement.

Contribution to literature

The study fills a gap in the existing literature by examining the relationships between monopoly power, information asymmetry, transparency, accountability, and the intention to adopt e-procurement in the public procurement sector of Pakistan. By providing empirical evidence and insights in the context of an emerging market, the study expands the knowledge base and contributes to the theoretical understanding of e-procurement adoption.

Managerial Contribution

The findings of the study have practical implications for supply chain managers and decision-makers in the public sector of Pakistan. By understanding the impact of factors such as monopoly power, information asymmetry, transparency, and accountability on e-procurement adoption, managers can formulate effective strategies for implementing and promoting e-procurement systems. This can lead to improved procurement processes, enhanced transparency, reduced corruption, and better value for public funds.

Limitation & Future Research Direction

Certainly, there are limitations to consider in the current research study, and recommendations for future researchers can be made to address these limitations and further contribute to the literature. Some of these limitations and recommendations include:

Generalizability: The study's findings are limited to the context of Pakistan's public procurement sector. Future research should consider conducting cross-country studies to provide a comparative analysis and a broader understanding of the relationships between monopoly power, information asymmetry, transparency, accountability, and e-procurement adoption in different contexts. International Comparisons: Compare the experiences of Pakistan with

other countries that have implemented E-procurement systems. Examine the strategies used in successful cases to mitigate the negative impact of monopoly power and information asymmetry.

Methodological Rigor: Future researchers can enhance the study's rigor by employing more advanced statistical methods and robust research designs. This can include longitudinal studies, experimental designs, or quasi-experimental approaches to establish causal relationships and strengthen the validity of the findings.

Additional Variables: The current study examined three dependent variables (monopoly power, information asymmetry, transparency, and accountability). Future research could consider incorporating additional variables that may influence e-procurement adoption, such as organizational culture, technological infrastructure, legal frameworks, and financial resources.

Qualitative Investigations: Conduct in-depth qualitative research, such as case studies and ethnographic studies, to uncover the nuances of how these factors operate within specific organizations or regions. Qualitative research can provide rich insights into the motivations and challenges faced by stakeholders.

By pursuing these future research directions, scholars and policymakers can work together to deepen our understanding of the intricate dynamics surrounding E-procurement adoption in Pakistan's public sector. This knowledge can inform evidence-based policies and strategies to enhance transparency, accountability, and competition while mitigating the negative effects of monopoly power and information asymmetry.

CONCLUSION

This research study provides valuable evidence regarding government procurement agencies in Pakistan and highlights the potential of e-procurement to reduce corruption in government organizations. Monopoly power, as elucidated throughout this study, wields substantial influence over procurement practices in Pakistan. The concentration of market power in the hands of a few dominant suppliers not only stifles competition but also deters the seamless integration of E-procurement systems. Monopolistic entities, vested in preserving their established market positions, often resist the adoption of innovative technologies and standardized procurement processes that might level the playing field and introduce much-needed competition. Information asymmetry, too, casts a long shadow over the efficacy of E-procurement. Disparities in access to information among stakeholders contribute to opacity in procurement operations, enabling favouritism, rent-seeking behaviour, and, regrettably, corruption. This information imbalance erodes trust, impedes the potential benefits of E-procurement, and perpetuates an environment ripe for corrupt practices. Moreover, our research underscores the vital role of transparency and accountability in combatting corruption and fostering E-procurement adoption. Transparency initiatives, such as the open publication of procurement-related data and standardized procedures, are essential for eroding the advantages enjoyed by monopolistic entities and for increasing overall accountability. Without these measures, corruption can thrive in the shadows, with limited oversight or consequence. As we contemplate the disconcerting rise in corruption, it becomes evident that the adoption of E-procurement in the public sector of Pakistan stands as a critical imperative. It is not merely a technological upgrade but a systemic transformation aimed at curbing the nefarious influences of monopoly power and information asymmetry while promoting transparency and accountability. By embracing E-procurement, Pakistan can disrupt the status quo, enhance competition, and restore faith in its public procurement processes. Overall, this research study contributes to the existing literature by providing valuable insights into the potential of e-procurement to combat corruption and improve efficiency in government procurement agencies in Pakistan. The findings of this study hold applicability beyond the specific context of Pakistan and can offer valuable insights and lessons to the wider world, particularly in the realm of government procurement and e-procurement systems.

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