

Original Article

Service Quality Dimension of the Philippines' Department of Public Works and Highways (DPWH) Guidelines and Procedures on Construction Materials Price Data (CMPD)

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Abstract - The government procurement systems must be reliable and flexible, particularly when it comes to infrastructure projects. The Construction Materials Price Data (CMPD) system is the primary tool used in the Philippines for the Detailed Unit Price Analysis (DUPA) project cost estimation. Since CMPD data is used by National Government Agencies (NGAs), it is crucial to update it frequently to ensure that material prices reflect the state of the local market. This study used the ServQual framework to assess the service quality of the CMPD system. Eleven key stakeholders, including engineers, technical experts, and employees of the Bureau of Construction (BOC) at the Department of Public Works and Highways (DPWH) regional and district offices, were interviewed. The CMPD system is useful to its users because it is reliable and carefully verified. However, the system is updated only once every quarter, which sometimes makes it struggle to keep up with sudden market changes. This could lead to project costs being less up-to-date than users would like. The study adds to public service theory by highlighting important trade-offs in the ServQual model for public procurement. It also shows that in these systems, responsiveness depends on policy choices about reliability, rather than being a separate quality factor.

Keywords - Construction materials, Cost estimation, Data integration, Service quality, System automation.

1. Introduction

The construction industry plays a crucial role in maintaining balance in the country's sustainability spectrum, particularly in its efforts to promote environmental preservation while simultaneously navigating towards economic growth and social development. This entails a more pressing issue in the developing countries, as rapid urbanization and the uncontrolled rise in population stimulate a heightened need for an informed and responsible infrastructure development. In the context of the Philippines, the Department of Public Works and Highways (DPWH) is mandated to handle such essential initiatives. In particular, it is responsible for the strategic planning, legislative policy, delivery of government infrastructure projects, and management and oversight of these projects until completion and turnover to its end users. The Construction Materials Price Data (CMPD) is within the authority of the DPWH. It is important to recognize that the CMPD system is a contributor to the costs incurred in construction development projects, the time of project delivery, and the quality of construction. The CMPD is a centralized database that tracks price changes and

informs pricing of construction materials to improve cost estimates using the Detailed Unit Price Analysis (DUPA). Despite the large contribution of the construction sector of the Philippines - 6.8% of GDP and 4.5 million jobs in 2022 (PSA, 2022) - this implies along standing struggle with cost control, especially in developing countries. Inefficient construction work can mean 30% cost overrun (World Bank, 2021), and the five-year average annual inflation rate for construction costs in the Philippines was 10% (CIAP, 2022).

The CMPD system's quality dimensions are essential to achieving transparent procurement, project management, and cost savings. The quality dimensions of the CMPD system are essentially what will yield transparent procurement, good project management, and cost savings. The NGAs depend on CMPD for price uniformity across materials, but its reliability is weakened by problems that were perceived to emanate from market fluctuation, data integrity, and efficiency in general information collation. It will take a series of robust data collation, validation processes incorporated, and effective information dissemination to all three types of stakeholders



for CMPD to prove its credibility. The present system, however, has some challenges in terms of consistency, quality control, and promptness for changes in industry performance, affecting its effectiveness in reporting base material costs for projects funded by the government (Magno-Ballesteros et al., 2024).

The CMPD system plays an important role, but its challenges highlight a wider issue in public e-government systems known as the 'assurance-responsiveness' paradox (Cembrano, 2025). It is necessary for public sector organizations to be equitable, perform credible audits, and follow standard procedures to remain accountable. However, in rapidly evolving fields such as construction, it is necessary for them to be flexible and work with current data (RICS, 2024). The CMPD system links government policies with market requirements, which emphasizes this point. The current research explores the CMPD system based on the ServQual method (Parasuraman et al. 1985; Parasuraman et al. 1988).

This research explores the key trade-offs between various service quality dimensions in the CMPD system. Although previous research primarily focused on system descriptions, the current research provides more information on why issues occur when reliability is prioritized over responsiveness. It includes perspectives from key stakeholders, looks at conflicts among ServQual dimensions, and offers a new way to understand service quality in public procurement systems.

2. Review of Related Literature

The construction sector plays a fundamental role in driving economic development, particularly in developing countries like the Philippines. The tools and systems need to be available for the varying levels of construction projects - some or all of budget, management, planning, etc. (Arcadis Global, 2024). Viewed like this, the Construction Materials Price Data (CMPD) system developed by the Department of Public Works and Highways (DPWH) becomes easier to understand, as it can contribute to better transparency of the system and help improve efficiency government-wide for infrastructure projects. The functionality of the CMPD database tracks the prices of construction materials and then contributes to the estimating and procurement of construction materials. Previous studies that investigated the price monitoring systems in construction Price monitoring systems can facilitate developing accurate budgets, and the value is inherent (ECC, 2015).

2.1. Best Practices in Global Price Monitoring and Cost Estimation

Cost estimation and monitoring of prices have appeared globally. Firstly, the European Construction Costs Index (ECC, 2015) has furnished data in different regions on the change in materials costs to support more accurate forecasting

of costs. A second example is RSMeans (RSMeans, 2026), which discusses best practice in North America, integrating computerized price databases, combining real-time market analysis, to improve procurement and accurate reflection of costs.

Cost databases have proven invaluable in the Middle East and construction projects, as it's the major aspect of managing costs of projects, which have been increasingly volatile with respect to labor rates and oil prices (Compass International, 2025). Studies have shown that standardized regional pricing models work together with centralized databases in providing more accurate forecasting of costs and procurement models (AECOM, 2018).

DPWH department orders to initiate the CMPD system have demonstrated ongoing progress in the dimensions of service quality. Revisions, which point to DO No. 72, series of 2018, and DO No. 249, series of 2022, were made in managing regional price monitor and data validation issues (DPWH, 2018; DPWH, 2018; DPWH, 2022). Automate and/or connect additions area evidenced in DO No. 226, series of 2024, improves service quality, level of access to CMPD (DPWH, 2024). This research has suggested areas of improvement for CMPD, based on international trends and best practice, that include, for example, greater integration of technology to regulatory framework. Expanded real-time information access, standardization of pricing structures, and improvement of stakeholder collaboration.

2.2. Technological Integration in Service Quality Improvement

The integration of technology, specifically Building Information Modeling (BIM), with cost databases has been shown to enhance accuracy and project implementation efficiency (Basir et al, 2020). Various forms of electronic tools, such as automated price indexing and forecasting estimates based on Artificial Intelligence (AI), have been demonstrated to enhance public works procurement efficiency while simultaneously improving transparency to costs (RSMeans, 2026).

Several National Government Agencies (NGAs) have developed and implemented their own construction cost databases or construction material price databases, such as CMPD, to support their procurement and project planning processes (DPWH, 2024).

The Philippine Statistics Authority (PSA) has a Construction Material Retail Price Index (CMRPI), which is used specifically in monitoring price fluctuation to ensure a reasonable market price. Additionally, the e-Presyo website by the Department of Trade and Industry (DTI) supports the promotion of transparency in construction material prices by presenting price information on materials on a real-time basis (DTI, 2015).

2.3. Public Infrastructure Service Quality (ServQual) Framework

The ServQual framework suggested by Parasuraman, Zeithaml, and Berry (Parasuraman et al. 1985; Parasuraman et al. 1988) is one of the widely used service quality models (Figure 1). It has five dimensions, namely reliability, responsiveness, assurance, empathy, and tangibles. Reliability is the ability of a system to function correctly and repetitively, and responsiveness is the speed and efficiency of the system in responding to user queries. Assurance is the evaluation of trust and believability in service provision, empathy is the quantification of the level of personal attention provided to users, and tangibles are the physical components of the service, such as system interfaces and accessibility.

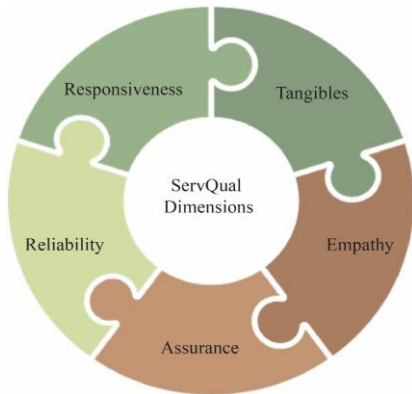


Fig. 1 Service quality dimension factor model by Parasuraman, Zeithaml, and Berry (1985)

Dabestani (2017) used the ServQual model to study public infrastructure projects and found that collecting data effectively and responding in real time helps improve service

efficiency. The study also pointed out that public-sector databases should use automation to make data validation and access easier. DPWH is working to improve these features in the CMPD system.

2.4. Critiquing ServQual in Public E-Government Contexts

The ServQual model (Parasuraman et al. 1985; Parasuraman et al. 1988) is commonly used, but some researchers question whether it suits public sector and e-government contexts. Because the model was designed for private, competitive industries, its five dimensions may not cover every challenge faced by a public monopoly (Magno and Polancios, 2023). In the public sector, for example, 'Assurance' means that employees are knowledgeable and that there are strict rules and regular audits. Some researchers have noted that the ServQual dimensions sometimes overlap. In public e-government systems, trying to improve 'Reliability' by adding more validation steps can slow down data delivery and reduce 'Responsiveness' (Pham et al. 2023). This issue is especially noticeable in public procurement, which has to keep up with fast-changing private markets. This paper uses ServQual to measure quality and to look at how its dimensions interact and sometimes conflict in a public monopoly dealing with a volatile market.

3. Methodology

This section explains the qualitative research design, which follows the conceptual framework shown (Figure 2). The study looks at service quality under the CMPD guidelines of the Department of Public Works and Highways (DPWH) using qualitative analysis. Semi-structured interviews with DPWH officials gave insight into the experiences and views of key stakeholders.

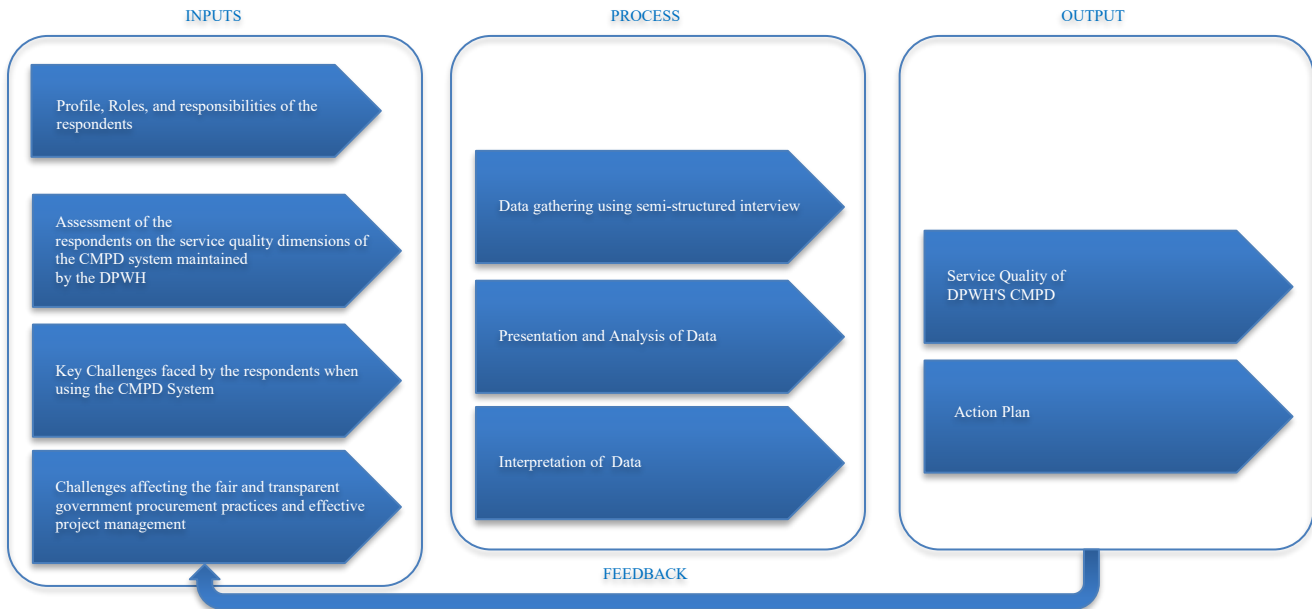


Fig. 2 Methodological framework used in this study

3.1. Research Design

This study employs a qualitative, exploratory research design to examine service quality within the DPWH's CMPD guidelines. A phenomenological approach is used to capture the detailed experiences and perspectives of construction industry professionals as they apply the CMPD guidelines.

3.2. Tradition of Inquiry and Data-Generation Method

Data is gathered through theoretical thinking by DPWH personnel under the authors to obtain CMPD data required by the authors to use for their studies. One of the data collection processes involved getting information via semi-structured Interviews with at least ten (10) individuals from the Bureau of Construction (BoC), Construction Material Price Data Unit (CMPDU), Regional Directors, and District Engineers, and certain personnel who have been involved in the Construction Cost and Engineering for the authors to observe and see whether there were certain observations about how the CMPD system is implemented in DPWH infrastructure projects. Semi-structured interviews provide room for questioning flexibility while guaranteeing that important issues are addressed, and they offer rich insights into personal experiences. The approaches are selected to create holistic and nuanced data that capture the service quality dimensions of the CMPD guidelines (Goldkuhl, 2019).

3.3. Sources of Data

The DPWH - Central Office, specifically the Bureau of Construction (BoC), sampled Regional and District Engineering Offices were the setting for this study, which involved participants selected through purposive sampling to ensure that participants had experience and knowledge of the CMPD processes. The study aims to gather information from a stakeholder group that provides variability and representation in order to gather varied perspectives and experiences to support the validity and reliability of the study (CDC, 2024).

3.4. Instrumentation

The primary means used in data collection is the semi-structured interview guide protocols. This instrument is used to gather elaborate and substantial responses from respondents by prompting or sampling vital service quality dimensions such as reliability, responsiveness, assurance, empathy, and tangibles. Interview guides and protocols are prepared subsequent to a complete review of the literature and pilot-tested for clarity and utility (Teachers College, Columbia University, 2025).

3.5. Data Analysis

This study employed a hybrid thematic analysis approach (Braun and Clarke, 2006) to analyze the interview transcripts. The five dimensions of the ServQual model (Reliability, Responsiveness, Assurance, Empathy, and Tangibles) served as initial deductive codes, representing a 'directed' approach to content analysis (Hsieh & Shannon, 2005). Concurrently, this

study coded inductively to identify emergent themes within these categories and any new themes that fell outside the ServQual framework, such as "Data Integration Challenges" and "Supplier Monopolization." This process involved two authors independently coding three transcripts to develop a codebook. The codebook was then refined and applied to the full dataset using qualitative data analysis software. Discrepancies in coding were resolved through discussion to ensure consistency. Data saturation was determined to be reached after the 10th interview, as the 11th interview yielded no new emergent themes related to the core research questions.

3.6. Ethical Considerations

This study holds ethical considerations of great importance for the safety and welfare of participants involved. All respondents will provide their informed consent to participate by outlining the purpose of the research, procedures, risks, and/or benefits. Participants' Confidentiality is obtained through the anonymity of participant data and by securely storing all data collected. This research abides by the code of ethics, principles, and canons of the profession of Civil Engineering, particularly the Philippine Institute of Civil Engineers (PICE, 2022). In addition, this study abides by ethical practices for qualitative research, which include ongoing reflexivity, responding and accommodating to power relations, and considering participant well-being (Simply Psychology, 2024). Any harm to participants' physical, social, psychological, or otherwise is kept to a minimum.

3.7. Reflexivity

The primary author is a civil engineer with wide experience in government construction projects in the Philippines, which provides a strong understanding of technical terms and processes. To avoid bias, the author kept a reflective journal and often discussed the analysis with the second author, who is an expert in the academic side of construction engineering management. This process made sure the findings were based on data rather than personal experience.

4. Findings

Results of the eleven stakeholder interviews are discussed in this section, categorized by the five ServQual dimensions and themes. The quotes were from people within the DPWH organization, mostly those with CMPD. To ensure that the results reflect authentic experiences and perspectives, the quotes are presented as they were originally spoken. The results are presented as they were spoken to ensure that the observations and experiences of the participants are reflected.

4.1. Profiles, Roles, and Responsibilities of the Respondents

The respondents are civil engineers, technical personnel, and higher-ranking officials of the Price Monitoring Section of the DPWH's Bureau of Construction in the Central Office,

as well as other District and Regional Engineering Offices. Their functions include cost management in construction projects, price monitoring, project estimation, verification of cost information, and adherence to DPWH pricing policies. The respondents have varying levels of experience, ranging

from engineers with less than three years of service to higher-ranking officials with more than four decades of experience. Some are involved in price monitoring and analysis to ensure the correctness of the CMPD system, while others are involved in policy formulation and procurement.

Table 1. Respondents' profile, roles, and responsibilities involved in the CMPD system

Respondent	DPWH Office	Years of Experience	Roles and Responsibilities
S1	BOC	5 ½	Evaluation of documents from various DPWH offices, validation, audits, price monitoring, and ensuring the applicability
S2	BOC	5	Reviewing and analyzing price data from Implementing Offices, evaluating cost estimates of infrastructure projects
S3	BOC	3.5	Checking and reviewing the CMPD for the Regional Offices quarterly
S4	BOC	1	Checking and reviewing the CMPD for the Regional Offices quarterly
S5	RO	5	Regional Office TWG of CMPD, Project Inspector
S6	CO	More than 25	Various roles from draftsman to Undersecretary, including Regional Coordinator, Chief Civil Engineer, Project Manager, and Director
S7	CO	4	Cost estimation, construction material pricing, and coordination with DPWH Offices
S8	RO	7	CMPD Regional Office TWG, Project Inspector
S9	DEO	9	Project implementation oversight, document variation orders, cost monitoring, CMPD-TWG member for price validation
S10	DEO	6	Planning, costing, construction, site inspection, quality inspection
S11	DEO	10	Planning, costing, estimation, supervision, programming

Moreover, there are some who are responsible for monitoring the compilation of price information provided by district and regional offices to ensure the correctness and relevance of cost estimates of different DPWH projects.

The ones who are tasked at the regional and district levels are vital in performing field validation and price canvassing to make sure that the cost of materials is commensurate with market conditions. Senior officials exercise top-level supervision, advising policy updates and ensuring that procurement operations are in compliance with government regulations. Overall, these respondents are integral to upholding the integrity and validity of the CMPD system, resolving issues, and suggesting improvements that improve the service quality aspects of DPWH's cost estimation system.

4.2. Assessment of the CMPD Service Quality Dimensions

4.2.1. Reliability

Reliability in service quality is the ability to deliver services reliably and accurately (Parasuraman et al. 1985; Parasuraman et al. 1988). The respondents overall have the belief that the CMPD system is reliable due to its systematic process of gathering information, verification, and updating.

The Respondent S1 describes that the CMPD system follows a step-by-step procedure with checkpoints to ensure that the data is accurate. The data is regularly updated, checked quarterly, collected at the district level, consolidated at the regional level, and finally checked at the central office.

The Respondent S9 also finds the system generally accurate but mentions the issues with outdated or inaccurate data, particularly for products that are not commonly used or imported. It is important to maintain the accuracy of the data since prices may fluctuate depending on the location and time of availability of the products.

The Respondent S6 states that the DPWH district and regional offices make sure that the data is accurate. If there is any data that appears to be inaccurate, the Bureau of Construction checks it more carefully. This helps to ensure that any pricing problems are corrected before the data is used to estimate project costs.

Respondent S8 believes the system is reliable because it collects price information directly from district suppliers. This approach to collecting information avoids errors and inaccuracies. However, S8 adds that supplier price changes, market monopolies, and supplier control, particularly for common materials such as ready-mix concrete, can affect the information. While the CMPD system is generally reliable, some materials are still affected by market price changes, which can affect cost estimates.

Respondent S10 is concerned about market monopolies and control, particularly for common materials such as ready-mix concrete. While the CMPD system is generally reliable, some materials are still affected by market forces that affect prices and cost estimates.

Most of the respondents believe that the CMPD system is reliable, but it could be improved. The verification system is helpful in maintaining the accuracy of the information, but there are still issues with outdated information for less common materials, supplier price controls, and regional market differences. The system might be improved by adding additional checks and new tools to monitor changes in supplier prices.

4.2.2. Responsiveness

Responsiveness to service quality is the willingness to help customers and provide prompt service (Parasuraman et al. 1985; Parasuraman et al. 1988). The ability of the CMPD system to be responsive to market changes and provide timely information has a direct impact on its usability and performance. The respondents provided critical feedback regarding their experiences with the system's responsiveness.

The reply of interviewee Respondent S2 highlights one of the limitations of the CMPD system-failing to accommodate sharp price moves on account of its quarterly updates.

The respondent explains that sharp price movements of fuel, affecting material costs profoundly, are not registered immediately and, therefore, the price information gets delayed, which makes cost estimates less reliable.

Additionally, respondent S9 highlighted the need to upgrade technology to facilitate further responsiveness. They indicated that there would be the possibility of real-time updates if the system were interfaced with a Cost Estimation Application electronically. This response is relevant in assisting with lag time for the availability of pricing data and usability of the system with project engineers.

On the other hand, respondent S6 also offered the opinion that the CMPD system was already responsive because it was web-based, the major strength as he described it. His response seemed to illustrate that, as much as the system has some downfalls, the regular updating and online nature provide some level of responsiveness of operating offices.

On a similar note, in the last response, respondent S8 also referenced the advantage of the intranet. Even though there are some respondents who reference the delay in the pricing updates, others enjoy the convenience of being able to access the system through DPWH's internal network.

Respondent S10 recognized the slow update in pricing but still sees the relevance of the applicability of CMPD to cost estimation of projects. Their answer illustrates that even with some responsiveness flaws, CMPD is nonetheless useful in managing construction costs.

To summarize, while respondents generally agree on the trustworthiness of the CMPD system, they also suggest areas

for improvement. The systematic verification process at these different phases provides a high level of trust, but challenges such as old data for rarer materials, suppliers' pricing, and challenges associated with varying geographical markets need to be addressed to improve the system's trustworthiness. Enhancements to the validation and supply-chain verification process may help elevate the dependability of the CMPD system.

4.2.3. Tangibles

Tangibles refer to the physical and digital components of a service, such as facilities, equipment, and materials that facilitate service delivery (Parasuraman et al. 1985; Parasuraman et al. 1988). Regarding CMPD, this refers to the tangible material price data and documentation that may be accessed digitally. The respondents offered their insights on the usability and accessibility of the elements.

Respondent S2 lauded the digital aspect completely and pointed out that digital data operates better with improved efficiency and readability of data in the collection and analysis phase. They note that "simple, easy-to-use digital devices" improve usability and usability.

Respondent S9 considered the benefits of both physical and electronic document management but sees room for improvement. The respondent stated that physical copies can have errors and misplaced documents, and that the digital application could provide a more efficient form of coordinated data with additional applications.

Respondent S5 considered both formats beneficial but noted that since they are both integral to costs within cost management, making a clear, specific suggestion for improvements does not negate the system itself, and digital capabilities serve as a cornerstone of the project planning.

Respondent S6 points out the value of material resources in the CMPD system. This is especially true around cost estimation and due to cost escalation. The fact that data updates are done quarterly is a good aspect, but it will only be beneficial if the updates are timely and accurate.

The respondent S11 observes that there has been an increased use of electronic media in DPWH activities. For instance, the use of digital data entry into project estimating systems such as DUPA shows the advantages of digital access.

Therefore, the respondents see advantages in both the digital and physical components of the CMPD system. While the digital system is popular and convenient, they suggest adding cost estimation programs and reducing errors in physical books to make it even better. Improving digital tools but keeping good copies physically can make the CMPD system efficient and accessible.

4.2.4. Assurance

Assurance in terms of service quality pertains to the competencies, credibility, and reliability of the service provider (Parasuraman et al. 1985; Parasuraman et al. 1988). In this case, in terms of the CMPD system, assurance would involve the accuracy and credibility of the prices in the database. Information was gathered from the respondents on how accurately they perceive the system, or how much it needs to be enhanced, to be.

Respondent S1's answer maintains the systematic process of guaranteeing accuracy in the CMPD system. The respondent again affirms that accuracy is maintained through DOs that are updated from time to time to reflect the most recent policies and pricing methods, with the goal of guaranteeing data reliability.

Respondent S2 affirms that the CMPD system is reliable, but he also notes that it has a drawback in that it cannot instantly record abrupt price changes. Accordingly, data may not accurately reflect the most recent market volatility, even if it is accurate in relation to the current framework.

Respondent S5 says that validation teams make the data more reliable. Staff regularly check prices to prevent mistakes and keep cost estimates consistent. As a result, users have more trust in the CMPD database.

The process of gathering and examining field data prior to sharing it is known as data validation. This increases confidence in the system and the data. Respondent S10 explains how the accuracy of some material costs might be affected when suppliers determine prices. They also indicate that the prices could be less reliable if there is only one supplier for the material. However, they believe that the data in the CMPD is reliable.

Since the CMPD system is transparent and often updated, the respondents believe in the system. However, they have concerns such as monopolistic pricing and a lack of response to market changes. They suggest more frequent price verification and tougher regulations for controlled materials.

4.2.5. Empathy

Empathy in service quality involves providing users with responsive and personalized care that recognizes and meets their needs (Parasuraman et al. 1985; Parasuraman et al. 1988).

Empathy in the context of the CMPD system case refers to how well the system responds to the needs of users, handles various stakeholders, and modifies its specifications in response to changing demands in project cost estimation and procurement. When it comes to addressing their problems, respondents were questioned about how empathetically the CMPD system demonstrates or does not.

The reaction of Respondent S1 shows appreciation for the CMPD system's function of making data gathering and pricing easier for DPWH projects. The respondent indicates that the system offers support to project planning by ensuring that material cost estimation is consistent, which is evidence of consideration for the interests of project implementers.

Interviewee S2 admits that the CMPD system is useful in giving a reference for cost estimation. Although the system does not always give real-time information, it still serves the minimum requirements of users by giving a standardized guide to estimating construction costs, such that users have a credible starting point.

This concise but blunt reply of Respondent S5 supports the CMPD's value in project planning. The system is viewed as a basic tool that enables engineers and planners to make knowledgeable decisions about budget distribution and procurement, showing that it serves an essential requirement of its users.

Respondent S9's comment shows a deficiency in the CMPD system to be able to entirely satisfy user requirements. As much as it is useful, the absence of new or newly added materials in the database causes problems for engineers who use it for cost estimation. That is, even though the system is useful, it is not always necessarily able to fully keep pace with the changing requirements of the industry.

Respondent S11's brief answer ensures that the CMPD system as a whole satisfies users' expectations. Despite some restrictions, respondents' general attitude is that the system is seen as a useful instrument in their job.

Consequently, respondents generally agree that the CMPD approach is useful as a benchmark for project planning and cost prediction with a certain amount of user empathy. To guarantee that the interests of all stakeholders are met, additional enhancements are required, according to worries regarding the dearth of updates for new materials. Improving the system's flexibility and reactivity to user input may help to reinforce its function as a helpful and empathetic resource for DPWH staff.

4.3. Key Emergent Challenges Faced by Respondents when using the CMPD System

4.3.1. Data Integration and Usability

Since the accuracy and dependability of construction material price data are directly impacted by successful data integration and usability, these factors are also essential to the CMPD system's success. The system's suitability as a reference for project costing and procurement depends on its capacity to acquire, verify, and update data with ease. Nonetheless, a number of issues that respondents pointed out in this area affect the system's smooth functioning.

Inconsistencies in unit measurement and description were pointed out by respondent S2. Because it requires multiple levels of data gathering, validation, and usability concerns, he emphasizes how challenging it is to obtain canvassing data. Determining the validity and case-relevance of the collected data is a crucial task.

In data collection, respondent S3 notes that different unit standards cause suppliers and the CMPD system to be inconsistent, which causes misestimation and misunderstanding when estimating supplies. To make the system user-friendly, standardized units of measurement and descriptions are necessary.

One major issue mentioned by respondent S6 was the lack of building supplies in certain provinces. Utilizing supplier-provided data presents a problem because pricing fluctuations, supplier availability, and market conditions can all affect how accurate the data is. In order to provide reasonable and representative market prices, the choice of distributors and suppliers is also essential.

Since commodities with different origins will inevitably have additional transit expenses that affect the overall project costs, respondent S9, who voiced concerns about the manual entry of data and the need for automation, brings about pricing inconsistencies and procurement inefficiencies. Additionally, the lack of local resources makes it more difficult to plan and budget for initiatives.

The risk of inaccurate reported prices due to the inefficiencies and human error brought about by manual operations. Update speed and accuracy would be greatly improved by using automated data validation and entry tools more frequently. These issues require a multifaceted approach that includes better supplier involvement, automation tool interfaces, unit uniformity, and data collection methods. DPWH will be able to build the CMPD system as a dependable and effective cost estimation tool by addressing these issues, which will lead to better project execution and procurement processes.

4.3.2. Data Security, Privacy, and Access Restrictions

To preserve the integrity of the CMPD system, privacy, confidentiality, and controlled accessibility must be protected. Private pricing information must be fully regulated and safeguarded by strict security protocols, as the CMPD database will be utilized for government procurement and infrastructure development. The usefulness and openness of the system are impacted by security, privacy, and accessibility concerns raised by respondents.

Respondent S1 claims that strict privacy rules forbid unauthorized access to CMPD data, even in the presence of DPWH's internal security protocols.

According to S2, another respondent, the CMPD system is extremely regulated at the highest level and requires official authorizations before the distribution of any pricing information. Although this rule guarantees the confidentiality of information, it slows authors' and stakeholders' access to current information.

Respondent S3 pointed out problems with the accuracy of the data. According to him, some data may need further validation processes to ascertain its accuracy before being approved into the system, even in cases when access is restricted. Respondent S7 raised accessibility concerns. The respondent explained that while Freedom of Information (FOI) requests are the official method for getting CMPD information, businesses and other outside groups often face delays or restrictions. This makes it harder for them to use the information for cost estimation and bidding.

Respondent S9 noted that field engineers need real-time access, but the intranet system makes this difficult. This slows down procurement and project planning.

To address these issues, it is necessary that authorized users have easier access, but data security should remain the primary concern. Improving the intranet for field engineers, automating FOI requests, and improving information sharing could all work together to improve the system and ensure that it remains secure. These improvements would assist the CMPD in estimating costs and completing projects while maintaining privacy and confidentiality.

4.3.3. Quality Control and Data Validation

In order to ensure that the CMPD system is up to date and accurate, it is necessary to validate and update the information to a certain standard. Validation and update of material prices can help ensure that the cost estimates are accurate and that there are no problems with purchasing. The respondents also identified a number of factors that affect the accuracy and usefulness of the CMPD information.

The respondent S1 stated that the problem of not having enough staff is a major problem. Because of the lack of staff, it is difficult to perform validation checks in all areas.

From respondent S2, the prices are determined differently in different regions. This may cause inaccurate cost estimation and comparison of prices among the regions. A standardized method of recording prices and measurements would make the CMPD system more effective.

Also, from respondent S3, there was a concern about the determination of prices. They pointed out that price data needs to reflect current market rates to prevent project costs from being overestimated or underestimated during budgeting. Checking and comparing prices with the market can help solve this problem.

Factors influencing the price validation were mentioned by respondent S6. The external factors influencing the price validation were mentioned by respondent S6. This illustrates how shifting market conditions might result in discrepancies between CMPD data and project pricing paid, which could raise problems with procurement and auditing.

For validation, Respondent S9 pointed out issues with the supplier. This illustrates how a structured procedure for confirming the supplier is necessary to provide consistency and stability in pricing data.

Adding labor support, standardizing pricing reporting, increasing supplier involvement, and implementing real-time data validation methods are some ways to address these quality control and validation problems. The CMPD system would become a good procurement and project costing guide if automated validation mechanisms were installed and market prices were regularly benchmarked.

4.4. Impact of Challenges on Government Procurement Practices and Project Management

4.4.1. Effect on Fair and Transparent Government Procurement Practices

Fairness and transparency in project costing are guaranteed by the CMPD method, which is crucial for government procurement. However, respondents brought up problems that impact the procurement process, which could result in disparities and ineffective project management. The concerns mentioned include outdated pricing information, irregular price validation, and procurement delays.

Project cost variances are the root source of procurement issues, according to respondent S1. This statement claims that DPWH's operations are decentralized and that the results of procurements rely on multiple divisions managing various facets of cost management and purchasing.

However, Respondent S2 underlined that the issue of pricing fluctuation was the main concern. This is how the delay in renewing the CMPD system results in differences between project and real costs, which in turn generate inefficiencies in budgeting and procurement.

The fairness of bidding may be impacted by outdated pricing information, according to respondent S5. This suggests that variations in the costs of procurement and execution could affect the terms of the contract and the contractor's obligations, possibly resulting in issues.

Respondent S8 highlighted the difficulty of maintaining price validity over time. The fact that pricing data collected during project planning no longer accurately reflects the state of the market at the time of procurement raises severe concerns, as it will affect project viability and equity.

Respondent S9 later highlighted the dangers of inaccurate data. The fact that inaccurate or outdated CMPD information will undermine the integrity of procurement processes and have catastrophic financial repercussions is further supported by this.

An enhanced, dynamic, and responsive data updating process that tracks price variations in real-time is necessary to mitigate these procurement difficulties. Respondents' worries may be allayed by better coordination between price monitoring teams and procurement offices to enable automated data updating and reduce the delay between project planning and procurement. The government procurement system would become more effective, transparent, and egalitarian as a result of these improvements.

4.4.2. Impact on Effective Project Management

For projects to function as planned, timely and accurate information from the CMPD system is essential to effective project management. Problems with inaccurate data inputs, price delays, and procurement delays impact many facets of project execution. The responders explained how the problems impact project management and execution.

Respondent S1 described how price changes will cause delays in projects. This response illustrates how using outdated or inaccurate CMPD prices may result in unsuccessful bids and, consequently, project delays.

Second, respondent S2 described how project timeliness is impacted by quick changes in costs. This suggests that quick pricing changes require project budgets to be realigned, which will take more time to prepare and approve and cause implementation delays.

Interviewee S6 acknowledged that third-market pressures have an impact on how projects are implemented. This implies that appropriate documentation and rationale can lessen the detrimental impact on project implementation and schedules, even in cases when price fluctuation cannot be avoided.

Issues with supplier price disparities were described by respondent S9. This is the problem of price discrepancies between supplier quotations and CMPD records, which results in changes to project activities and cost variances. In addition, S11 associated contractor responsibilities, quality of project, and CMPD pricing. This implies that differences in pricing information affect contractor bids, work schedules, and infrastructure project quality. Solutions to such hindrances involve increased real-time updating of information, accelerating procurement procedures, and enhancing the level of supplier involvement in a bid to get more accurate prices. Adopting such measures will contribute to the successful management of projects, avoiding delay, cost escalation, and wastage of time to build infrastructure.

5. Discussion

This study used the ServQual framework to assess the DPWH's CMPD system and found a key paradox in its design. This section examines the paradox, relates the findings to wider academic research, and discusses their implications in theory and practice.

5.1. The Assurance-Responsiveness Gap

The findings show that the CMPD is designed for accountability rather than flexibility. Its strengths in Reliability and Assurance, and its weaknesses in Responsiveness and Empathy, are closely connected and reflect different aspects of the same system. The system uses several layers of validation, set out in Department Orders, along with regular quarterly updates. These processes ensure that cost estimates are more accurate, consistent, and verifiable, and this helps to gain public confidence. However, the process may be slowed down by reviews that check for errors and ensure that everything is fair. It is only normal to strike a balance between careful consideration and swift action. This does not mean that there is anything wrong.

This inherent conflict can sometimes be frustrating for the stakeholders. Lag time (S9) occurs because the system has to check or confirm information. If new materials (S9) are not available, it may appear as if the system is slow, but this is normal for a process that concentrates on standard materials. The system may have difficulties with unusual materials (S9). Manual entry of data (S9) and dealing with integration problems (S2, S3) are genuine problems, but they also demonstrate that the system emphasizes careful and separate data over speed and integrated information.

5.2. Dialogue with the Literature

These results help in the discussion on ServQual in public e-government. The results show that there are overlapping ServQual dimensions (Magno and Polancios, 2023; Pham et al. 2023). In public monopolies like the Department of Public Works and Highways (DPWH), it is up to the policy to decide which quality dimensions are to be prioritized. The CMPD system focuses on Reliability and Assurance but ignores Responsiveness.

One of the largest challenges in public procurement is finding a balance between market flexibility and accountability, as observed in the "assurance-responsiveness gap." The ECC (ECC, 2015) and RSMeans (RSMeans, 2026) are two examples of international standards that are now being used in the process of computerized price databases and real-time market analysis. However, based on this study, most of the current processes are still fixed and auditable.

5.3. Theoretical Implications

The study makes two important theoretical contributions. First, the study investigates whether the conventional

ServQual method is valid in the context of public procurement in unstable markets. The results show that in unstable markets, the method must be adjusted to accurately represent the interplay of the method's components. These components, especially Reliability, Assurance, and Responsiveness, are not simply items to be ticked off on a list. Sometimes, these attributes can be at odds with each other, so that enhancing one will decrease the others.

Second, the findings suggest that "Responsiveness" in this context should be re-conceptualized. For the CMPD's users, responsiveness is not about "willingness to help" (Parasuraman et al. 1985; Parasuraman et al. 1988), but about the data's temporal alignment with market reality. This study suggests that for public data systems, a 'Data Responsiveness' or 'Market Agility' dimension may be a more appropriate measure than the interpersonally-focused "Responsiveness" of the original ServQual model.

5.4. Practical Implications and Recommended Action Plan for Improving the CMPD System

These problems require proactive actions with a mix of well-defined plans of action to enhance the service quality dimensions of CMPD. Interviews provided a number of lessons, each proposing organizational measures to consider improvements to methods of information gathering, automation procedures, coordination with supporting agencies, and workforce increases.

Before they described the action plans for improving the service quality dimension of the CMPD system, respondents initially described the proactive measures that they believe should be implemented to address the current challenges of the CMPD system.

Some pointed out that CMPD rules needed to be updated to reflect better changing market conditions and to improve the effectiveness of data collection and verification. The system must be kept current by routinely reviewing and revising current policies, such as those outlined in earlier Department Orders (DO 71, DO 72, DO 249, and DO 226 s. 2024), according to Respondent S1. Updating the guidelines ensures that pricing strategies stay in line with current market trends.

The proposal of respondent S2 is to coordinate more with other government agencies to make the price data more accurate. Respondents S3 and S4 proposed to coordinate with the Department of Trade and Industry (DTI).

Respondent S5 proposed to check the CMPD data regularly to keep it updated. Respondent S6 stressed the importance of explaining changes in the recorded prices. Respondent S7 stressed the importance of having good communication among all DPWH offices to ensure consistency in processes, not only in compliance and

validation. Respondent S8 stressed the importance of updating information more frequently and having more flexibility.

Respondent S9 offered detailed suggestions, including adding more automation and expanding the database. They also highlighted the need to increase the supplier network and improve the reliability and effectiveness of the CMPD. Respondents also discussed ways to improve the overall service quality of the CMPD system.

Respondent S1 said a new CMPD application is being developed. Respondent S2 suggested moving fully to digital processes. Respondents S3 and S4 agreed, stating that this digital shift supports the development of an automated CMPD module with additional features. Respondent S5 also noted that accessibility and data integrity are important.

According to respondent S6, several respondents suggested creating formal agreements with other organizations to improve material availability and pricing control. Respondent S7 did, however, emphasize the need for ongoing regulatory changes.

Respondent S8 also suggested that an inter-agency agreement be set up in order to foster closer working relationships between suppliers. Respondent S9's second important recommendation was to incorporate CMPD into a cost-estimating tool. Finally, in accordance with respondents S10 and S11, a real-time monitoring and gathering method was proposed.

The action plans from the respondents indicate that there is a need for coordination, automation, regular updates on policies, and enhanced data validation. Implementing the CMPD system on a completely digital platform, incorporating real-time monitoring, and establishing agreements among agencies can make its services much better. Ensuring that DPWH projects remain transparent, affordable, and market-responsive will help construct a stronger infrastructure for the country in the long run.

5.5. Limitations and Future Research

This research is based on feedback from 11 internal stakeholders of the DPWH and provides a snapshot of the system. It does not include feedback from external sources. In the future, feedback from contractors and suppliers would be useful, as they are an important part of the data system. It might also be useful to compare the CMPD and procurement databases with other ASEAN nations, such as Malaysia or Thailand, to identify innovative solutions to the assurance-responsiveness gap.

6. Conclusion

This study focuses on the Construction Materials Price Data (CMPD) system of the Department of Public Works and

Highways (DPWH) from a theoretical point of view. Although the CMPD system is viewed as reliable, it is difficult to maintain reliability while being able to make quick adjustments to market changes. The quarterly validation of the system makes it accountable, but it is also difficult to make adjustments to real-time price changes. As a result, cost estimates can be outdated, and projects can be delayed.

This study contributes to the theory of public administration by providing evidence that service quality variables in public procurement are interrelated and often require trade-offs.

The emphasis on assurance has made the system more reliable, but it is often not up-to-date. It is essential to be aware of this issue in order to implement actual change. A combination of a two-system approach, one of which is an auditable database and the other a real-time cost estimation system, may help the DPWH remain accountable and implement efficient and on-budget infrastructure projects.

Conflicts of Interest

The authors state that no conflict of interest exists over the publication of this paper. All conclusions and findings presented here are based on objective research and professional judgment devoid of any monetary or personal agendas that may distort the validity and integrity of the study.

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Glossary

Assurance: The confidence and trust users have in the service provider's ability to deliver quality services.

Automation: The use of technology to perform tasks with minimal human intervention, aimed at increasing efficiency and accuracy.

Construction Materials Price Data (CMPD): A comprehensive database maintained by the DPWH that tracks prices and trends of construction materials.

Cost Estimation: The process of predicting the costs associated with a construction project, including materials, labor, and overhead.

Cost Control: The practice of managing project costs to ensure they remain within budgetary limits.

Data Validation: The process of ensuring that data collected is accurate, reliable, and consistent before it is used for decision-making.

Department of Public Works and Highways (DPWH): The Philippine government agency responsible for planning, designing, and maintaining public infrastructure projects.

Detailed Unit Price Analysis (DUPA): A method used to determine the cost of individual construction items based on material prices, labor, and equipment.

Empathy: The level of personalized attention and care given to users of a service.

Market Volatility: Fluctuations in market prices for materials and labor that can affect construction costs and project budgets.

Price Monitoring: The process of tracking changes in the prices of construction materials to inform budgeting and procurement decisions.

Reliability: The ability of a system or service to consistently perform as expected and deliver accurate data.

Responsiveness: The speed and efficiency with which a system or service addresses user inquiries and needs.

Quality Assurance: A systematic approach to ensuring that products or services meet specified requirements and standards.

ServQual: A service quality framework developed by Parasuraman, Zeithaml, and Berry that measures service quality across five dimensions: reliability, responsiveness, assurance, empathy, and tangibles.

Stakeholder Engagement: The involvement of individuals or groups who have an interest in the outcome of a project, including contractors, government agencies, and the community.

Tangibles: The physical aspects of a service, including facilities, equipment, and the appearance of personnel.

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