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Bridging procurement gaps in higher education: Addressing challenges, policy reforms, and digital transformation

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ABSTRACT

Government procurement is essential for the effective delivery of public services, especially in higher education institutions. This study examines the procurement challenges at the Nueva Ecija University of Science and Technology (NEUST), focusing on planning, budgeting, creating technical specifications, and following legal requirements. Using a mixed-methods approach, the research identifies key problems such as incorrect cost estimates, limited market research skills, and a lack of knowledge about alternative procurement methods. The results show an urgent need for structured training, updated policies, and the use of digital tools to improve processes and comply with RA 9184. The study proposes a step-by-step digital procurement plan that includes automation, skill development, and policy improvement. These recommendations aim to increase procurement knowledge, improve financial planning, and modernize procurement systems in public universities to support sustainable resource management.

1. Introduction

Government procurement is essential for the effective delivery of public services, particularly in higher education institutions like the Nueva Ecija University of Science and Technology (NEUST). The Philippine Government Procurement Act (RA 9184) aims to enhance transparency, competitiveness, and accountability in procurement processes; however, significant challenges persist. End-users at NEUST struggle with procurement planning, technical specification formulation, and compliance with procurement laws, which can lead to delays and inefficiencies in service delivery (Iyog, 2024; Gabiana et al., 2023). Research indicates that similar issues are prevalent in higher education institutions globally, where bureaucratic procedures and a lack of understanding of procurement regulations hinder effective implementation (Lu et al., 2024). Furthermore, the complexities of procurement processes can exacerbate inefficiencies, impacting the timely acquisition of essential goods and services necessary for academic functions (Masoud, 2023). Addressing these challenges requires a concerted effort to improve training and understanding of procurement laws among end-users and project leaders (Pudjiono et al., 2024; Wardoyo et al., 2020).

Procurement in the public sector is vital for operational efficiency and effective service delivery, particularly in educational institutions like the Nueva Ecija University of Science and Technology (NEUST). Effective procurement planning is crucial, as it directly influences the efficiency of purchasing processes. However, many public institutions, including NEUST, face significant challenges in procurement planning, such as poor coordination among departments, which leads to inconsistencies in procurement requests and difficulties in identifying needs and estimating costs (Ingabire and Dushimimana, 2024). These inefficiencies can result in delays and increased expenditures, ultimately affecting the institution's ability to deliver essential services. Studies indicate that a lack of expertise and limited supplier competition further exacerbate these issues, leading to procurement bottlenecks and compliance risks (Charnor and Quartey, 2024; Wafula and Juma, 2021). The importance of enhancing procurement planning and coordination among stakeholders cannot be overstated, as it is essential for achieving economies of scale and ensuring that public institutions can meet their operational needs effectively (Mkasinyagaize, 2024; Abbas and Hassan, 2023). Defining accurate technical specifications is crucial for ensuring that

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procured goods and services meet the specific needs of institutions like the Nueva Ecija University of Science and Technology (NEUST). Unclear specifications can lead to procurement failures, as suppliers may misinterpret requirements, resulting in mismatched procurements and inefficiencies (Lu et al., 2024). NEUST respondents reported challenges in conducting market research, formulating after-sales requirements, and overcoming brand bias, which further complicate the procurement process (Kweyama et al., 2024). The limited knowledge of technical specifications among end-users is a significant barrier to effective procurement in the public sector. This lack of expertise often leads to difficulties in accurately identifying procurement needs and estimating costs, ultimately resulting in procurement inefficiencies (Aduwo et al., 2020). To mitigate these issues, it is essential to provide training for procurement teams in specification writing and market analysis. Such training would enhance their ability to develop clear, precise specifications that align with institutional needs, thereby improving procurement outcomes and ensuring that acquired goods and services effectively support institutional objectives (Charnor and Quartey, 2024).

Financial planning is a significant challenge in public universities, impacting procurement efficiency and resource allocation. Government agencies often struggle with cost estimation, inflation forecasting, and financial allocations, which can lead to procurement delays and inefficiencies. A study conducted at the Nueva Ecija University of Science and Technology (NEUST) revealed that end-users face difficulties in budget contract determination, cost estimation, and quantity assessments, which adversely affect procurement timelines (Kaaria et al., 2020). The implications of financial constraints on procurement efficiency are profound, as inadequate budgeting and funding delays hinder the timely execution of procurement processes. Additionally, procurement officers must consider inflationary factors and the advantages of bulk purchasing to optimize spending (Kikavets, 2023). Effective procurement planning is essential for ensuring that resources are allocated efficiently and that procurement activities align with institutional needs (Lu et al., 2024). By enhancing financial planning capabilities and training procurement teams, public universities can improve their procurement processes and overall operational efficiency.

A well-trained procurement workforce is essential for ensuring compliance and efficiency in public sector procurement. Inadequate training in e-procurement and procurement regulations can lead to errors and inefficiencies. This is supported by findings that indicate procurement training is often insufficient or outdated, resulting in misunderstandings of procurement laws and procedures, which can compromise the effectiveness of procurement activities (Abdulatif et al., 2022). Institutions that implement regular procurement training programs tend to experience improved efficiency and reduced compliance risks. Training end-users in procurement laws, market analysis, and specification writing significantly enhances their procurement competencies, enabling them to navigate complex procurement landscapes more effectively (Obadia and Chole, 2024). Moreover, the establishment of training initiatives is crucial for fostering a culture of compliance and accountability within public procurement frameworks, as it equips personnel with the necessary skills to adhere to regulations and optimize procurement processes (Aduwo et al., 2020).

Advancements in e-procurement technology are transforming procurement processes in public institutions, enabling automation and enhancing transparency. Digital procurement systems streamline activities, reduce paperwork, and improve data accuracy, which is crucial for efficient operations. Respondents from the Nueva Ecija University of Science and Technology (NEUST) suggested that adopting a Procurement and Supply Management System could effectively address existing inefficiencies and improve procurement timelines (Isango, 2024). Institutions that implement procurement automation systems often experience faster transaction processing and improved compliance tracking, which are essential for adapting to evolving procurement requirements (Tripathi and Gupta, 2021; Jain and Gupta, 2024). The automation features of e-procurement systems facilitate secure online exchanges of information and enhance monitoring capabilities, thereby reducing the incidence of errors and inefficiencies (Tran et al., 2021). As public institutions continue to face challenges in procurement, exploring digital solutions will be vital for modernizing operations and mitigating inefficiencies (Kweyama et al., 2024).

The literature indicates that procurement challenges in public universities arise from poor planning, difficulties in technical specifications, budget constraints, and inadequate training. While the Philippine Government Procurement Act (RA 9184) provides a comprehensive framework, implementation gaps persist due to procedural inefficiencies and knowledge limitations. For instance, studies highlight that insufficient training in procurement regulations can lead to misunderstandings and inefficiencies (Awuah et al., 2022). Additionally, budget constraints often hinder effective procurement practices, as noted in research that emphasizes the importance of aligning budget management with procurement processes to optimize resource allocation (Febryanti et al., 2024). To address these issues, enhanced procurement training, policy refinement, and the adoption of digital procurement systems are essential. Training programs that focus on procurement laws, market analysis, and specification writing can significantly improve the competencies of procurement personnel (Laboso et al., 2024). Furthermore, the implementation of digital procurement solutions can streamline processes and improve transparency,

thereby addressing inefficiencies (Adamu et al., 2023; Tuliao et al., 2025). This study builds on existing literature by analyzing procurement challenges at the Nueva Ecija University of Science and Technology (NEUST) and proposing actionable recommendations that align with government policies and best practices. By doing so, it aims to bridge the gaps in government procurement and enhance efficiency in public universities.

2. Methodology

This study employs a descriptive quantitative and qualitative research design to analyze the procurement challenges faced by end-users and project leaders in public universities. A mixed-method approach was used, integrating survey questionnaires and focused group discussions to obtain a comprehensive understanding of the challenges encountered in the procurement process at Nueva Ecija University of Science and Technology (NEUST). The quantitative aspect involved a structured questionnaire designed to measure the extent of procurement difficulties faced by the respondents, while the qualitative component included focused group discussions to gather deeper insights into their procurement experiences and perceptions.

The study targeted teaching and non-teaching personnel involved in procurement processes at NEUST, including end-users, project leaders, and administrative staff responsible for procurement planning, budgeting, and implementation. Respondents were selected using a purposive sampling method to ensure that only individuals with direct procurement responsibilities participated. A total of 60 respondents were surveyed, representing various university departments to provide a balanced and diverse perspective on procurement issues. A structured questionnaire served as the primary data collection tool, utilizing a four-point Likert scale to assess the level of challenges experienced by respondents in procurement planning, technical specifications formulation, budget contract determination, and their understanding of RA 9184 and procurement procedures. To ensure clarity, relevance, and reliability, the questionnaire was validated by procurement experts and faculty researchers. In addition to the survey, focused group discussions were conducted to supplement the results and provide further exploration of key challenges faced by the respondents. Data collection was carried out through both online and printed forms to ensure accessibility and convenience for all participants. Respondents were given sufficient time to answer the questionnaire, and any clarifications were addressed by the research team. Once the survey results were analyzed, focused group discussions were conducted to validate and expand on the findings, allowing for a more in-depth exploration of procurement challenges. The collected data were analyzed using descriptive statistical methods, including frequency and percentage distribution to describe respondent demographics, weighted mean calculations to determine the extent of procurement challenges, and thematic analysis for qualitative data gathered from the discussions. Findings from both quantitative and qualitative methods were compared to provide a well-rounded understanding of procurement challenges at NEUST, forming the basis for recommendations aimed at improving procurement efficiency, policy implementation, and end-user competency. Ethical considerations were strictly followed in conducting this study. Informed consent was obtained from all participants, ensuring that their responses remained confidential and were used solely for research purposes. All respondents were assured that their identities would be protected, and no potential conflicts of interest were identified throughout the study.

3. Results and discussion

3.1. Demographic profile of respondents

The study analyzed the demographic characteristics of the respondents to understand their background and level of experience in procurement-related activities. The majority of the respondents (46.66%) were within the age range of 41 to 50 years, followed by 38.33% in the 51 to 65 age bracket. A smaller portion (15%) belonged to the 31 to 40-year range, while no respondents were in the 22 to 30-year group. This distribution indicates that most of the individuals involved in procurement have substantial experience in their respective fields. In terms of gender, 53.33% of the respondents were male, while 46.66% were female. This slight gender gap suggests a relatively balanced workforce involved in procurement processes. Regarding educational attainment, a significant portion of respondents (73.33%) held a doctorate degree, 31.66% had a master's degree, and only 3.33% possessed a bachelor's degree. This indicates that most of the respondents have an advanced level of education, which should ideally equip them with the knowledge and skills required for procurement tasks. When assessing work experience, 48.33% of the respondents had served for more than 21 years, 28.33% had between 11 and 20 years of experience, and 23.33% had between 1 and 10 years of service.

The findings suggest that a significant portion of respondents at NEUST possess extensive experience in handling procurement-related processes, with 80% belonging to the teaching unit and 20% from the non-teaching unit. This distribution reflects a higher participation of academic personnel in procurement activities, which is critical for ensuring that procurement aligns with institutional needs and academic standards (Lou et al., 2023). The literature emphasizes the importance of involving diverse stakeholders in procurement processes, as their insights can enhance the effectiveness of procurement strategies (Chersan et al., 2020). Furthermore, the integration of e-procurement

systems is highlighted as a means to streamline procurement activities and improve transparency, which is essential in public institutions (Mackey and Cuomo, 2020; Anjum and Khan, 2024). As institutions continue to face challenges in procurement, leveraging the expertise of academic personnel and adopting digital solutions can significantly enhance procurement efficiency and compliance with established regulations (Santos, 2024). This study builds on existing literature by analyzing procurement challenges at NEUST and proposing solutions that align with government policies, procurement best practices, and institutional needs. The expectation is that actionable recommendations will help bridge gaps in government procurement and improve overall procurement efficiency in public universities (Candela and Ulises, 2022).

3.2. Challenges in procurement planning

Procurement planning was identified as one of the most pressing challenges faced by respondents. The study analyzed several key aspects of procurement planning, revealing that respondents consistently encountered difficulties in defining procurement requirements, assessing market availability, and determining the long-term usability of goods and services. Determining the nature of goods to be procured was reported as a significant challenge, with a weighted mean of 3.00. A substantial proportion of respondents, 35%, rated this as a strongly challenging aspect, while 40% considered it challenging, indicating that many end-users struggle with specifying procurement needs accurately. Only 15% of respondents found it moderately challenging, and 10% reported no difficulty in this area. This suggests that unclear procurement requirements and a lack of standardized procedures contribute to inefficiencies in procurement planning. Assessing the availability of goods and services in the market posed an even greater difficulty, with a weighted mean of 3.10. Among respondents, 42% expressed that this was a strongly challenging factor, while 38% considered it challenging, highlighting that sourcing appropriate suppliers and ensuring market compatibility remains a major hurdle. Meanwhile, 12% found this moderately challenging, and only 8% encountered no difficulty in assessing market availability. The data indicate that procurement units struggle with conducting proper market research, which may result in delays, limited supplier options, and inconsistent product availability. The highest level of difficulty was recorded in determining the obsolescence, operation, and maintenance of equipment and non-consumable goods, with a weighted mean of 3.20. The data show that 48% of respondents rated this as strongly challenging, followed by 32% who considered it challenging. Only 15% found it moderately challenging, and a mere 5% experienced no difficulty in this area. These results emphasize a critical gap in procurement planning, where end-users lack the technical expertise to evaluate the lifespan, usability, and maintenance needs of procured items. This can lead to unnecessary expenditures on outdated or incompatible equipment, further complicating procurement operations.

The analysis of procurement planning challenges indicates that respondents at NEUST face persistent difficulties in defining procurement needs, conducting market research, and assessing product lifecycle considerations. The weighted means for these factors, ranging from 3.00 to 3.20, suggest that procurement planning remains a significant issue, adversely affecting the efficiency and effectiveness of procurement processes in public universities. To address these challenges, enhanced training programs for procurement officers and end-users are essential, as they can improve understanding of procurement regulations and market dynamics. Furthermore, improved coordination between procurement officers and end-users is necessary to ensure that procurement activities align with institutional needs. The integration of systematic market research methodologies can also streamline procurement planning and reduce inefficiencies, enabling institutions to make informed decisions regarding their procurement strategies (Lu et al., 2024).

While data collection remains limited to NEUST, the study addresses generalizability by integrating recent literature from multiple universities and public institutions. Similar procurement planning issues have been reported across various academic institutions in the Philippines and internationally. For example, Dante and Bernabe (2024) highlighted implementation gaps in RA 9184 among Philippine universities due to varied understanding across professional roles, while Agbeka et al. (2024) and Jin et al. (2024) linked procurement inefficiencies to both procedural and staff capability factors. International evidence also aligns, with Laboso et al. (2024) identifying challenges in tendering compliance in Kenya, and Ali et al. (2024) reporting governance and coordination issues in Canadian colleges. These comparative insights strengthen the contextual relevance of the NEUST findings, demonstrating that the procurement planning challenges observed are reflective of systemic constraints faced by state universities globally.

3.3. Challenges in formulating technical specifications

The formulation of technical specifications was identified as a critical challenge among respondents, with varying degrees of difficulty across different aspects of the process. Technical specifications play a fundamental role in ensuring that procured goods and services meet institutional needs, yet the results indicate that end-users often struggle with defining precise and comprehensive requirements. Identifying project objectives recorded a weighted mean of 2.50, suggesting that while respondents

faced moderate challenges, a significant proportion still encountered difficulties in aligning procurement requests with institutional goals. A breakdown of responses shows that 30% of the respondents found this aspect moderately challenging, while 25% considered it challenging. Meanwhile, 20% reported strong challenges, and 25% found no difficulty in defining project objectives. This data indicates that while some respondents have a basic understanding of procurement planning, a notable percentage still struggle with translating project requirements into precise procurement terms. Conducting a market survey emerged as one of the most significant challenges, with a weighted mean of 3.21, highlighting the difficulties respondents face in analyzing product availability, pricing trends, and industry standards. Among the respondents, 45% rated this factor as strongly challenging, while 35% considered it challenging. Only 15% found it moderately difficult, and 5% reported no difficulty. These findings suggest that procurement teams often lack the necessary tools, knowledge, or resources to effectively conduct market research, which can result in suboptimal purchasing decisions, limited supplier options, and potential cost inefficiencies. The elimination of brand names and tailor-fitted specifications received a weighted mean of 2.10, indicating that respondents generally had a better understanding of the prohibition against branding in government procurement. Among the respondents, 20% found this aspect strongly challenging, 22% considered it challenging, while 35% found it moderately challenging, and 23% reported no difficulty. The relatively lower challenge level in this category suggests that most respondents are familiar with the procurement guidelines that prohibit brand-specific procurement to ensure fair competition among suppliers. However, the remaining challenges in this area may stem from the lack of knowledge on how to craft brand-neutral specifications while maintaining quality standards. Formulating after-sales requirements, such as warranties and training provisions, was another area of concern, with a weighted mean of 2.51, indicating moderate challenges among respondents. The data shows that 28% of respondents rated this factor as strongly challenging, 32% considered it challenging, 25% found it moderately challenging, and 15% reported no difficulty. The challenges in this category may be attributed to limited awareness of after-sales provisions and uncertainty in defining post-procurement obligations such as service warranties, maintenance agreements, and supplier-provided training sessions. The results indicate that respondents generally lack the technical knowledge necessary to define accurate procurement specifications, particularly in areas requiring market research, project-specific needs assessment, and post-procurement service considerations. The high weighted mean of 3.21 in market research underscores a significant knowledge gap that, if not addressed, may lead to suboptimal acquisitions and inefficiencies in the procurement process (Gamessa et al., 2022). To enhance the formulation of technical specifications, it is essential to implement training programs focused on procurement best practices, supplier evaluation techniques, and the development of standardized specification templates. Such training would guide end-users in effectively defining procurement requirements and improve their ability to conduct market research and assess project-specific needs (Lin, 2020). Furthermore, incorporating supplier evaluation models can provide a structured approach to selecting appropriate suppliers, which is crucial for optimizing procurement outcomes and ensuring quality in public sector acquisitions (Hartati et al., 2022).

3.4. Challenges in budget contract determination

Budget contract determination emerged as a major challenge for respondents, particularly in cost estimation, quantity determination, financial forecasting, and long-term sustainability assessments. The findings indicate that difficulties in these areas can lead to inefficiencies in procurement decision-making, budget misallocations, and potential compliance risks in government procurement. Estimating the cost or market price of products and services had a weighted mean of 2.52, signifying a moderate level of difficulty among respondents. The data revealed that 30% of respondents found this aspect strongly challenging, 28% considered it challenging, 27% found it moderately challenging, and 15% reported no difficulty. The results suggest that many end-users lack access to accurate market price data, which hinders their ability to estimate costs effectively. This can result in procurement delays, budgeting errors, and over-or underestimations in pricing. Determining the quantity of goods to be purchased, especially in bulk procurement scenarios, posed an even greater difficulty, with a weighted mean of 3.24. Among the respondents, 42% found this strongly challenging, 35% considered it challenging, 18% rated it as moderately challenging, and only 5% reported no difficulty. The results suggest that many procurement end-users struggle with optimizing procurement efficiency, particularly in balancing bulk purchases for cost savings versus avoiding excessive inventory that may lead to waste. Assessing the cost of money in procurement was another major challenge, with a weighted mean of 3.19, reflecting a lack of financial expertise among respondents. The data showed that 40% of respondents found this aspect strongly challenging, 30% considered it challenging, 20% found it moderately challenging, and 10% reported no difficulty. This challenge may stem from limited financial literacy, particularly in evaluating government financing mechanisms, procurement terms, and cost-benefit analyses. Without adequate knowledge in financial management, procurement officers may struggle with structuring contract budgets efficiently. Identifying inflationary factors that influence procurement pricing and financial

planning had the highest weighted mean of 3.25, signifying a substantial challenge for respondents. The data revealed that 45% of respondents found inflationary considerations strongly challenging, 33% considered them challenging, 15% found them moderately challenging, and 7% reported no difficulty. Since government procurement planning is typically conducted in advance, respondents face difficulties in predicting future price fluctuations, market trends, and economic conditions, which impact procurement budgets. Without proper inflation forecasting, underbudgeting or overspending on contracts becomes a risk. Identifying the supply of spare parts and maintenance services received a weighted mean of 2.55, indicating moderate uncertainty among respondents regarding the long-term sustainability of procured goods. The data showed that 28% of respondents found this aspect strongly challenging, 30% considered it challenging, 25% found it moderately challenging, and 17% reported no difficulty. This suggests that many procurement officers lack information on the availability of spare parts, supplier maintenance agreements, and product lifecycle costs, which can impact the efficiency and longevity of procured items. The findings indicate that budget contract determination poses a critical challenge due to limited financial expertise, inadequate cost estimation strategies, and difficulties in forecasting economic conditions. The high weighted means in quantity determination (3.24), cost assessment (3.19), and inflationary factors (3.25) suggest that procurement officers at NEUST require enhanced financial training, access to updated market data, and structured forecasting tools to improve budgeting accuracy (Annisa et al., 2024; Dagohoy et al., 2023). Addressing these gaps through targeted training programs on procurement budgeting, cost analysis methodologies, and economic forecasting techniques can significantly enhance procurement efficiency and financial decision-making. Training initiatives should focus on equipping procurement officers with the necessary skills to accurately estimate costs and assess market conditions, thereby enabling them to make informed financial decisions that align with institutional goals (Dagohoy et al., 2023). Furthermore, integrating systematic approaches to budgeting and forecasting can help mitigate the risks associated with economic fluctuations, ultimately leading to more effective procurement processes (Alshehhi et al., 2023; Hou et al., 2020).

3.5. Challenges in the formulation of the project procurement management plan (PPMP)

The formulation of the Project Procurement Management Plan (PPMP) is a crucial step in ensuring efficient procurement processes, yet the findings indicate that respondents face multiple challenges in developing a well-structured procurement plan. These challenges are primarily related to identifying procurement needs, sourcing alternative solutions, evaluating options, and selecting the most beneficial procurement approach. Identifying the needs of the PMO or end-user unit recorded a weighted mean of 1.76, suggesting that respondents were moderately challenged in this aspect. The data revealed that 22% of respondents found this aspect strongly challenging, 25% considered it challenging, 30% rated it as moderately challenging, and 23% experienced no difficulty. While this challenge appears less severe than others, the results suggest that some procurement officers still struggle with defining procurement requirements clearly, which may lead to inconsistencies in procurement requests. Identifying alternative solutions, products, and services posed a greater challenge, with a weighted mean of 2.51. Among the respondents, 35% found this aspect strongly challenging, 30% considered it challenging, 20% found it moderately challenging, and 15% reported no difficulty. These findings indicate difficulty in market research and supplier evaluation, as procurement officers often lack sufficient knowledge or access to viable product alternatives. This can lead to reliance on limited suppliers, reduced procurement flexibility, and increased procurement risks. Comparing alternative products and services based on qualitative and quantitative factors had a weighted mean of 3.10, indicating significant challenges in procurement evaluation. The data revealed that 40% of respondents rated this aspect as strongly challenging, 35% considered it challenging, 15% found it moderately challenging, and only 10% reported no difficulty. This suggests that respondents struggle with performing value-for-money assessments, conducting risk evaluations, and considering government policies that influence procurement decisions. Without proper evaluation methodologies, procurement officers may face difficulties in selecting cost-effective and high-quality procurement options. The selection of the most beneficial procurement alternative also posed considerable difficulties, with a weighted mean of 3.10, mirroring the challenges in procurement evaluation. Among the respondents, 42% found this strongly challenging, 33% considered it challenging, 15% found it moderately challenging, and only 10% reported no difficulty. The findings highlight the need for improved decision-making strategies in procurement planning, particularly in aligning procurement choices with institutional objectives, budget constraints, and regulatory requirements. The overall results indicate that challenges in formulating the Procurement Plan and Monitoring Program (PPMP) stem from difficulties in identifying procurement needs, alternative sourcing, procurement evaluation, and the strategic selection of procurement solutions. The high weighted means in procurement evaluation (3.10) and selection of alternatives (3.10) suggest that procurement officers require better training in cost-benefit analysis, risk assessment, and supplier benchmarking (Vecchi et al., 2020). Addressing these gaps through capacity-

building programs focused on procurement decision-making, access to market intelligence tools, and enhanced procurement guidelines can significantly improve the efficiency and effectiveness of PPMP formulation in public universities. Training initiatives should emphasize the importance of strategic procurement practices, which can stimulate innovation and improve decision-making processes (Sönnichsen and Clement, 2020). Furthermore, integrating tools for evaluating alternatives and assessing risks will empower procurement officers to make informed choices that align with institutional goals and budget constraints (Rahmani et al., 2021).

3.6. Challenges in understanding procurement law and general principles

Understanding procurement regulations and legal frameworks is essential for ensuring compliance and efficiency in government procurement. However, the study reveals that respondents face significant challenges in interpreting and applying procurement laws, particularly in areas related to bidding procedures, alternative procurement methods, procurement timelines, and purchase request preparation. Comprehension of the governing principles of government procurement had a weighted mean of 2.51, indicating that respondents found this moderately challenging. The data showed that 28% of respondents rated this as strongly challenging, 30% considered it challenging, 25% found it moderately challenging, and 17% reported no difficulty. While this suggests that a basic understanding of procurement laws exists, there is still a notable portion of respondents who struggle with key procurement principles such as transparency, competitiveness, and accountability. Understanding bidding documents and terms of reference was more challenging, with a weighted mean of 3.00. Among respondents, 35% rated this as strongly challenging, 32% considered it challenging, 20% found it moderately challenging, and only 13% reported no difficulty. These findings indicate that many procurement officers and end-users struggle with the complexity of bidding documents, which may result in delays, misinterpretation of requirements, and potential compliance issues. Given that bidding documents serve as the foundation for evaluating supplier proposals, uncertainty in this area can significantly impact procurement outcomes. The most challenging aspect of procurement law was understanding alternative procurement methods, which had the highest weighted mean of 3.37. The data revealed that 45% of respondents found this strongly challenging, 35% considered it challenging, 15% found it moderately challenging, and only 5% reported no difficulty. Alternative procurement methods, such as direct contracting, shopping, and negotiated procurement, are critical for expediting procurement in specific circumstances. However, the high challenge level suggests that respondents lack familiarity with when and how to apply these methods effectively, leading to delays and potential legal risks in procurement transactions. Understanding the procurement timeline and stages also posed substantial difficulties, with a weighted mean of 3.25. Among respondents, 40% found this strongly challenging, 33% considered it challenging, 18% found it moderately challenging, and only 9% reported no difficulty. Given that procurement follows a strict timeline from planning to contract implementation, a lack of knowledge in this area can result in procedural inefficiencies, missed deadlines, and non-compliance with regulatory mandates. Preparing a purchase request was another moderate challenge, with a weighted mean of 2.52. The data showed that 25% of respondents found this strongly challenging, 30% considered it challenging, 28% found it moderately challenging, and 17% reported no difficulty. This suggests that while most respondents understand the basic requirements for drafting a purchase request, challenges remain in ensuring that requests are complete, well-documented, and aligned with procurement regulations. Errors or omissions in purchase requests can lead to procurement delays and rejections from approving authorities. The findings emphasize that respondents require further training and awareness programs to enhance their understanding of procurement law and regulatory compliance. The high weighted means in alternative procurement methods (3.37) and procurement timelines (3.25) indicate a critical gap in procedural knowledge, which can lead to inefficiencies and procurement bottlenecks (De Lara and Santos, 2024). Addressing these challenges necessitates comprehensive training initiatives focused on bidding document interpretation, procurement timelines, and the practical application of alternative procurement methods. Moreover, simplified procurement guidelines and knowledge-sharing sessions with procurement experts can assist end-users in navigating legal frameworks more effectively, ensuring greater compliance and efficiency in procurement processes (Kwening, 2022). Research indicates that improving compliance with procurement regulations is essential for successful project execution and can be significantly enhanced through targeted training and capacity-building efforts (Sarawa and Mas'ud, 2020). By implementing these strategies, public institutions can foster a more knowledgeable procurement workforce, ultimately leading to improved procurement outcomes.

3.7. Analysis and implications

The findings reveal that end-users and project leaders at NEUST face persistent procurement challenges, particularly in budgeting, technical specification formulation, and compliance with RA 9184. For instance, the difficulty in estimating procurement quantities (weighted mean=3.24) and forecasting inflationary trends (3.25) highlights a

need for improved financial literacy and forecasting tools. Similarly, market research—reflected as a major challenge in technical specification formulation with a weighted mean of 3.21—indicates gaps in supplier knowledge and procurement planning. These findings reinforce the earlier data showing that 80% of respondents were teaching personnel who, despite academic credentials, lack sufficient procurement-specific training. Notably, the highest reported challenge was understanding alternative procurement methods (weighted mean=3.37), underscoring a critical need for legal orientation and practical application guidance. Addressing these concerns requires a systematic training program that integrates financial analysis, procurement law, and digital procurement operations. The complexity of bidding documents and terms of reference (3.00) further contributes to these challenges, indicating a need for comprehensive training programs that focus on legal and procedural compliance. Despite the fact that a large percentage of respondents have extensive work experience and advanced educational qualifications (73.33% hold PhDs, and 31.66% have master's degrees), the results suggest that experience alone is not sufficient to navigate the complexities of procurement. Without targeted procurement training and skills development, even highly educated personnel may face difficulties in executing procurement tasks effectively. This underscores the need for structured training programs tailored specifically to procurement professionals, covering essential topics such as financial planning, legal compliance, supplier evaluation, and strategic procurement management. Addressing these challenges requires systematic procurement reforms at the institutional level. The study highlights the need for regular procurement training sessions for end-users and project leaders, which should be integrated into university capacity-building programs. Policy improvements must also be introduced, ensuring that procurement guidelines are clearly communicated, standardized, and aligned with national procurement regulations. Additionally, the adoption of a digital procurement system could significantly streamline processes, enhance transparency, and reduce manual errors in procurement transactions. If left unaddressed, these procurement challenges will continue to hinder efficiency, cause non-compliance issues, and delay the acquisition of essential goods and services in public universities. By improving procurement literacy, enhancing market research capabilities, and refining institutional procurement procedures, universities can strengthen compliance with RA 9184, optimize resource allocation, and enhance overall procurement efficiency. The successful implementation of these reforms will ensure that public universities can procure goods and services more effectively, reduce inefficiencies, and contribute to improved institutional operations.

3.8. Digital transformation in procurement

Digital technology integration is essential for modernizing procurement in public universities. A four-phase digital transformation framework is proposed to improve efficiency, transparency, and compliance. Fig. 1 illustrates a four-phase process for integrating digital technology into procurement systems in public universities.

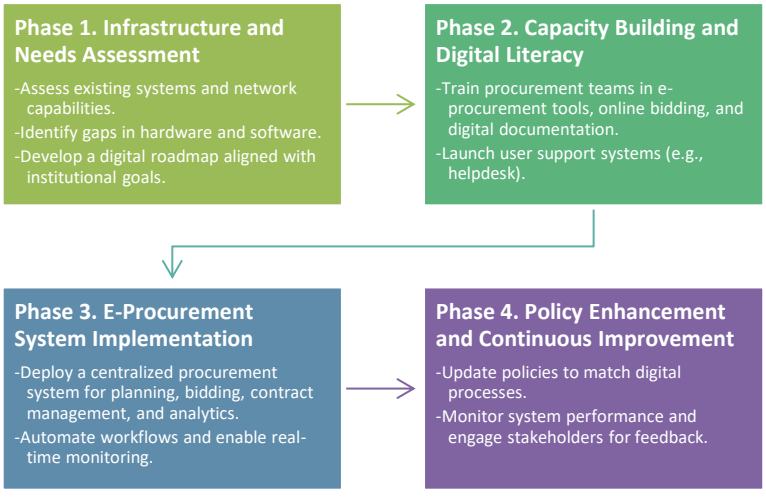

Fig. 1: Digital transformation process in public university procurement

The process begins with Infrastructure and Needs Assessment, identifying current capabilities and gaps to develop a roadmap for digital adoption. In Phase 2: Capacity Building and Digital Literacy, personnel are trained to use digital tools effectively, supported by awareness campaigns and technical assistance. Phase 3: E-Procurement System Implementation involves the rollout of centralized platforms for planning, bidding, contract management, and monitoring. Automation and digital records improve transparency and efficiency. Lastly, Phase 4: Policy Enhancement and Continuous Improvement ensures institutional policies are updated to support the digital shift, while continuous

feedback and system evaluations promote long-term success and compliance with RA 9184.

3.9. Limitations

This study primarily focuses on procurement challenges encountered by end-users and project leaders at the Nueva Ecija University of Science and Technology (NEUST). The findings are based on responses from 60 participants, which may not fully capture the diversity of procurement experiences across other higher education institutions. Although the study employed both quantitative and qualitative methods, it did not extensively consider external influences such as policy reforms, economic fluctuations, or administrative restructuring that may impact procurement practices. Additionally, the reliance on self-reported data introduces potential biases related to personal perceptions and interpretations of procurement issues. The use of descriptive statistical tools and thematic analysis was appropriate for the study's diagnostic purpose; however, it limited the depth of statistical inference. Future research should expand the institutional scope, consider longitudinal data to observe procurement trends over time, and incorporate more rigorous statistical techniques. Applying inferential methods such as regression analysis, correlation tests, or structural equation modeling—alongside larger, randomized samples from multiple institutions—can enhance the statistical robustness and generalizability of findings. Such approaches would allow future researchers to explore variable relationships more deeply and contribute to a more comprehensive understanding of procurement dynamics in the higher education sector.

4. Conclusions

The study highlights persistent procurement challenges in higher education institutions, particularly in planning, budgeting, technical specification formulation, and regulatory compliance. Key issues include cost estimation difficulties, inadequate market research expertise, and limited awareness of alternative procurement methods. Despite respondents' advanced educational qualifications, their experience alone does not sufficiently address procurement inefficiencies, underscoring the need for structured training programs and systematic reforms. Addressing these challenges requires enhanced procurement literacy, policy improvements, and digital transformation to streamline procurement processes, improve financial planning, and ensure compliance with RA 9184. Implementing these measures will significantly optimize resource allocation, reduce procurement delays, and enhance institutional procurement efficiency. To achieve these improvements, institutions must implement comprehensive training programs covering budget planning, supplier evaluation, and regulatory compliance to strengthen procurement officers' and end-users' competencies. Market research capabilities should be enhanced to ensure data-driven purchasing decisions and supplier benchmarking. Developing a standardized procurement manual aligned with RA 9184 will help establish clear guidelines and best practices, minimizing procedural errors. The adoption of digital procurement systems is essential to automate processes, increase transparency, and reduce manual inefficiencies. Regular policy reviews must be conducted to ensure alignment with institutional needs and evolving market conditions. Strengthening collaboration between procurement officers, finance departments, and end-users will improve coordination and procurement efficiency. Furthermore, institutionalizing an annual procurement summit will encourage knowledge exchange among procurement professionals, administrators, and stakeholders, thereby promoting continuous innovation and the adoption of best practices in procurement.

Compliance with ethical standards

Ethical considerations

This study carefully followed ethical guidelines. Informed consent was obtained from all participants, and their responses were kept confidential and used only for research purposes. Participants were assured that their identities would remain anonymous.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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