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Assessing the Impact of the 2026 Oil Shock on the Philippine Construction and Engineering Industry Amid US-Israel-Iran Geopolitical Tensions

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Abstract*— The global construction industry is highly sensitive to energy market fluctuations, as highlighted by the 2026 geopolitical conflict impacting oil prices. The Philippines, being a net oil importer, experienced severe economic challenges due to rising crude oil prices beyond $100 per barrel, affecting industrial operations. This study explores the effects of the 2026 oil shock on the Philippine construction and engineering sectors, utilizing a quantitative-descriptive research design complemented by qualitative analysis. Data from 80 professionals in engineering and construction reveals that 96.25% believe the oil shock inflated project costs due to increased fuel expenses and budget inaccuracies. The study identifies oil price volatility as a critical external factor influencing operational challenges such as material cost hikes, logistics expenses, and supply chain disruptions, resulting in budget overruns and resource constraints. Although some organizations implemented risk management and procurement strategies, their effectiveness was limited by regulatory constraints and financial pressures. The study recommends adopting adaptive engineering management practices and dynamic cost control systems to enhance resilience against future economic disruptions.

***Index Terms*—2026 Oil Shock, Engineering Management, Logistics and Supply Chain Disruption, Material Cost Escalation, Philippine Construction Industry.**

I. INTRODUCTION

The global economy is highly sensitive to oil price fluctuations, particularly during periods of geopolitical instability. The 2026 conflict involving the United States, Israel, and Iran has triggered what analysts describe as one of the largest disruptions in global oil supply in history, largely due to threats to the Strait of Hormuz—a critical passage for approximately 20% of global oil trade.

As a net oil-importing country, the Philippines is especially vulnerable to such disruptions. The country's dependence on imported fuel exposes it to price volatility, inflationary pressures, and macroeconomic instability. Reports indicate that oil prices have surged beyond $100 per barrel, significantly increasing energy and transportation costs across industries.

The construction and engineering sector is among the most affected industries due to its heavy reliance on fuel, logistics, and petroleum-based materials such as asphalt, plastics, and steel. Globally, rising oil prices have led to increased material costs, supply chain disruptions, and project delays in construction projects. Similar patterns are expected in the Philippines, where infrastructure development is a key driver of economic growth.

Moreover, the oil shock has broader implications, including currency depreciation, increased project costs, reduced investment confidence, and potential project cancellations. These challenges directly affect engineering management practices, particularly in areas such as cost control, risk management, procurement, and project scheduling.

Despite the growing recognition of these impacts, existing literature reveals several critical gaps. Most available studies focus on macroeconomic implications or provide general industry observations, with limited attention given to the construction sector as a distinct area of analysis. Additionally, there is a lack of empirical research examining how oil price shocks affect project-level outcomes such as cost overruns, delays, and productivity within the Philippine context. Existing studies, including that of Siman (2023), primarily address industry trends and performance without explicitly considering the role of oil price volatility. Furthermore, there is insufficient integration of engineering management principles, particularly in areas such as risk management, cost control, and adaptive project planning, which are critical in responding to external economic shocks.

Given these gaps, there is a clear need for a comprehensive study that examines the impact of oil price volatility on the Philippine construction and engineering industry from both an economic and engineering management perspective. This research aims to address these limitations by providing empirical evidence and developing strategies to enhance the resilience of construction projects against future oil shocks.

II. REVIEW OF RELATED LITERATURE

Recent developments in the Philippine construction industry highlight its increasing vulnerability to global oil price fluctuations, particularly amid geopolitical tensions. Industry-based evidence suggests that rising fuel prices significantly influence construction costs due to the sector's dependence on transportation, heavy equipment, and petroleum-based materials. According to the Philippine Constructors Association (2026), oil price increases can lead to construction cost escalations of up to 30%, primarily driven by higher logistics expenses and material price adjustments. This finding is supported by reports from Philippine Star (2026), which noted that local contractors are already bracing for substantial cost increases and potential project delays as a result of global conflicts affecting oil supply.

Government agencies have also acknowledged the impact of oil price volatility on construction project implementation. The Department of Public Works and Highways (2026) has initiated adjustments to its costing systems to reflect rising fuel prices, indicating that traditional budgeting frameworks may no longer be sufficient under conditions of economic instability. This policy response demonstrates the direct linkage between global energy markets and national infrastructure development, particularly in government-funded projects where cost estimates must remain realistic and responsive to market conditions.

Private sector analyses further reinforce the relationship between oil prices and construction performance. A market report by Hearn & Hearn Consulting (2026) observed that increases in oil prices contribute to higher costs of key construction materials such as steel and cement, as well as delays in supply chains due to increased transportation expenses. Similarly, Pinoy Builders (2026) emphasized that fuel price volatility affects not only material costs but also equipment operation and project scheduling, thereby influencing overall project efficiency and profitability. These findings highlight the interconnected nature of energy prices and construction operations, particularly in a developing economy like the Philippines.

From a broader economic perspective, the Philippine Institute for Development Studies (2026) reported that oil price surges contribute to inflationary pressures and reduced purchasing power, which may indirectly affect construction demand and investment in infrastructure projects. As construction activities are closely tied to economic growth, any slowdown in investment due to increased costs and economic uncertainty can have significant implications for the industry's sustainability.

Despite the availability of these industry reports and policy analyses, there remains a lack of comprehensive academic research that systematically examines the impact of oil shocks on the Philippine construction sector. Existing studies, such as that of Siman (2023), provide valuable insights into the overall performance and trends of the construction industry but do not explicitly address the role of oil price volatility. This indicates a critical gap in the literature, particularly in understanding how global energy disruptions translate into project-level challenges and management responses within the Philippine context.

The current body of literature indicates a growing recognition of the effects of rising oil prices on the construction industry; however, much of the evidence remains fragmented and largely descriptive. This underscores the need for a more comprehensive and empirical investigation that integrates economic analysis with engineering management practices to better understand and mitigate the impacts of oil shocks on construction projects in the Philippines.

Global oil price shocks have long been recognized as significant drivers of macroeconomic instability, particularly in oil-importing countries. According to Hamilton (2009), oil price increases can lead to reduced economic output, inflationary pressures, and decreased industrial productivity. Similarly, Kilian (2008) emphasized that oil price volatility affects both supply and demand dynamics, ultimately influencing production costs across industries. These effects are more pronounced in developing economies, where energy dependency is high and alternative energy sources are limited.

In the context of emerging markets, oil price shocks have been found to exacerbate economic vulnerabilities. Arezki and Blanchard (2014) noted that sudden increases in oil prices can disrupt fiscal stability and weaken currency performance, particularly in countries heavily reliant on oil imports. This is supported by Reuters (2026), which reported that recent global tensions have placed additional strain on emerging economies, increasing inflation and reducing growth prospects. For the Philippines, which is highly dependent on imported fuel, such shocks translate into increased operational costs and economic uncertainty.

The construction industry is particularly sensitive to oil price fluctuations due to its dependence on fuel-intensive operations and petroleum-based materials. Sadorsky (2004) explained that energy costs directly affect production inputs, including transportation, machinery operation, and material manufacturing. In construction, materials such as asphalt, steel, and plastics are closely linked to oil prices, making the sector highly vulnerable to energy price volatility. As oil prices rise, the cost of these materials increases, leading to higher overall project costs.

Moreover, oil price shocks have been associated with significant cost overruns and delays in construction projects. Doloi (2013) identified that external economic factors, including fluctuations in material and fuel prices, are among the primary causes of project cost overruns. This is further supported by Love, Edwards, and Irani (2012), who argued that inaccurate cost estimations and unforeseen economic conditions often lead to budget inefficiencies in infrastructure projects. In large-scale construction, such as megaprojects, these risks are magnified due to the long project duration and exposure to market volatility (Flyvbjerg, 2014).

Supply chain disruptions are another critical consequence of oil shocks, particularly in the construction sector. Rising fuel prices increase transportation costs and can lead to delays in the delivery of materials. According to The Soufan Center (2026), geopolitical conflicts affecting key oil transit routes, such as the Strait of Hormuz, can significantly disrupt global supply chains. These disruptions result in material shortages and increased procurement lead times, ultimately affecting project schedules and efficiency.

In recent developments, the 2026 geopolitical tensions involving the United States, Israel, and Iran have triggered a substantial increase in global oil prices, with significant implications for industries worldwide. Reports from BusinessWorld (2026) and Inquirer Business (2026) indicate that the Philippine economy is experiencing increased inflation, higher fuel costs, and slower economic growth as a result of the ongoing crisis. These macroeconomic impacts are expected to cascade into the construction industry, affecting project feasibility, investment decisions, and overall sector performance.

Statement of the Problem

This study aims to analyze the impact of the 2026 oil shock on the construction and engineering industry in the Philippines.

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Specifically, it seeks to answer the following questions:

1. How has the 2026 oil shock affected the cost structure of construction projects in the Philippines?
2. What are the impacts of rising oil prices on construction materials, logistics, and labor costs?
3. How has the oil shock influenced project timelines, delays, and completion rates?
4. What are the effects of oil price volatility on investment decisions and project feasibility?
5. What risk management and adaptive strategies are employed by construction firms in response to the oil shock?
6. How can engineering management practices be improved to enhance resilience against future energy crises?

Conceptual Framework

This study is anchored on the premise that global oil price shocks significantly influence the performance of construction projects, particularly in oil-dependent economies such as the Philippines. The conceptual framework proposes that fluctuations in oil prices serve as the primary external driver affecting construction operations. These fluctuations directly impact project-level outcomes such as cost, schedule, and overall project performance.

However, the relationship between oil price shocks and project outcomes is not purely direct. It is mediated by operational factors such as material costs, logistics expenses, and supply chain disruptions, which translate macroeconomic changes into project-level effects. Furthermore, the extent of these impacts is influenced by the firm's engineering management practices, including risk management strategies, procurement approaches, and cost control mechanisms.

Thus, the framework integrates both economic factors (oil price shock) and engineering management responses, providing a holistic view of how external disruptions affect construction performance and how organizations can mitigate these effects.

Fig. 1. Research Framework of the Study

III. METHODOLOGY

A. *Research Design*

This study will adopt a quantitative research design utilizing a descriptive-correlational approach to examine the relationship between oil price shocks and construction project performance in the Philippine construction industry. The descriptive component will be used to summarize respondents' perceptions of the impact of oil price shocks using a five-point Likert scale survey, while the correlational component will determine the strength and direction of relationships among key variables such as oil price shocks, material cost escalation, logistics and transportation costs, supply chain disruptions, and project performance indicators including cost, schedule, financial, and quality performance.

This design is appropriate as it allows for objective measurement of perceptions and experiences of construction professionals and enables statistical testing of relationships among variables without experimental manipulation. Pearson correlation analysis will be used to assess the strength and direction of relationships between variables, while regression analysis will be employed to determine the predictive effect of oil price shocks on construction project performance outcomes. The inclusion of open-ended questions will provide supplementary qualitative insights to support and contextualize the quantitative findings, particularly in explaining observed patterns in cost escalation, delays, and operational challenges.

B. Locale of the Study

The study will be conducted in the Philippines, specifically targeting major construction activity hubs such as Metro Manila, and Central Luzon, North Luzon, South Luzon, and Visayas. These regions were selected due to their high concentration of infrastructure projects, commercial developments, and government-funded construction activities. The chosen locale provides a representative environment where the effects of oil price fluctuations on construction operations can be observed more clearly due to the intensity and scale of ongoing projects.

C. Population and Sampling

The population of this study will consist of professionals actively engaged in the Philippine construction and engineering sector. This includes project managers, site engineers, quantity surveyors, construction planners, and contractors who have direct involvement in project execution and cost management. These respondents are considered suitable sources of data as they possess firsthand experience in dealing with project cost variations, supply chain challenges, and schedule constraints influenced by external economic factors such as oil price fluctuations.

This study will employ a purposive sampling technique, a non-probability sampling method, to ensure that only respondents with relevant experience and knowledge in construction project management are included. The purposive approach is appropriate for this research since it focuses on professionals capable of providing informed insights regarding oil price impacts on construction activities.

The sample size will consist of 80 respondents, which is considered sufficient for quantitative analysis involving regression and structural equation modeling. This range is also aligned with standard requirements for ensuring statistical validity and reliability in social science and engineering management research.

D. Research Instrument

The primary research instrument for this study will be a structured questionnaire developed based on literature review and existing studies related to oil price volatility and construction project performance. The questionnaire will be divided into five major sections: respondent profile, oil price shock indicators, mediating variables, dependent variables, and moderating variables.

The independent variable section will measure perceptions of oil price shocks and fuel volatility and their impact on construction operations. The mediating variables will include material cost escalation, logistics and transportation cost increases, and supply chain disruptions. The dependent variables will assess project outcomes such as cost overruns, schedule delays, project profitability, and overall project feasibility. Lastly, the moderating variables will evaluate risk management practices, procurement strategies, and cost control systems implemented by construction firms.

All items will be measured using a five-point Likert scale, ranging from strongly disagree to strongly agree, to quantify respondents' perceptions and experiences.

E. Data Gathering Procedure

Data collection will be carried out using a combination of online survey distribution and direct administration within the researchers' respective employing companies, in order to maximize respondent participation and accessibility. The questionnaire will be distributed to selected construction professionals through email, professional networks, industry contacts, and internal company channels. Prior to

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participation, respondents will be informed about the purpose of the study, and informed consent will be secured to ensure that involvement is voluntary. Strict confidentiality and anonymity of all responses will be maintained throughout the research process. Data gathering will continue until the required sample size is attained.

F. Statistical Treatment of Data

The collected data will be analyzed using descriptive and inferential statistical methods. Descriptive statistics, such as frequency distribution and percentage, will be used to summarize the demographic profile of respondents and their perceptions regarding oil price shocks and construction project performance variables.

To determine the relationship between variables, Pearson correlation analysis will be utilized to identify the strength and direction of the relationship between oil price shocks and project performance indicators, including cost overruns and project delays. Furthermore, regression analysis will be employed to examine the predictive effect of oil price shocks on construction project performance. Specifically, the analysis will determine whether variables such as material cost escalation, logistics and transportation costs, and supply chain disruptions significantly influence project outcomes.

The results of the statistical analyses will serve as the basis for interpreting the extent to which oil price shocks affect construction project performance in the Philippines.

G. Ethical Considerations

This study will adhere to strict ethical research standards. Participation will be entirely voluntary, and respondents will be informed of their right to withdraw at any time without penalty. All data gathered will be treated with confidentiality and used solely for academic purposes. No personal identifiers will be disclosed in any part of the study. Informed consent will be obtained prior to data collection to ensure transparency and ethical compliance throughout the research process.

IV. RESULTS AND DISCUSSIONS

Presentation, Analysis, and Interpretation of Data

Section A: Respondent Profile

A.1. Position

Position:	No. of Respondents	Percentage
Asst. Project Manager	2	2.50%
Building and Facility Maintenance Supervisor	1	1.25%
Business & Quality Management Representative / Exec. Asst. to the President	1	1.25%
CM-incharge	1	1.25%
Design Consultant (Structural, Architectural, MEPFS, etc.)	7	8.75%
Electrical Engineer	1	1.25%
Energy Market Analyst	1	1.25%
Engg Assistant	1	1.25%
Executive (CEO, COO, CFO, Vice President, etc.)	1	1.25%
Maintenance Engineer	1	1.25%
Project Development Officer I	1	1.25%
project engineer	1	1.25%
Project Manager	8	10.00%
Quality Engineer	1	1.25%
Quantity Surveyor	2	2.50%
Resident Quality Engineer	1	1.25%
Senior Operations Engineer	1	1.25%
Site/Office Engineer/Architect	47	58.75%
Special Equipment Engineer	1	1.25%

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Total	80	100.00%

Table 1. The table indicates that Site/Office Engineers and Architects make up 58.75% (f=47) of the sample, highlighting their significant role in engineering management. Their frontline position allows for reliable insights into operational constraints caused by the oil shock, including rising costs of heavy fuel equipment, supply chain delays, and project timeline variances due to material shortages. Their input ensures that survey responses accurately depict on-site conditions rather than corporate estimates.

It further represents the strategic representation and decision-making structure within a project management context. It highlights that while field implementers are predominant, 12.50% of resources are allocated to Project Managers and Assistant Project Managers to guarantee effective risk management and budget restructuring. This representation is essential for addressing adaptive management and systemic resilience. Additionally, the presence of diverse specialized roles, such as Design Consultants and Energy Market Analysts, contributes to a thorough evaluation throughout the project's lifecycle, ensuring that insights across various phases prevent bias and consider macroeconomic impacts on engineering projects.

The profile demonstrates high contextual validity, with nearly 60% of respondents having firsthand experience in the field, leading to credible assessments of material costs and schedule impacts. It offers a balanced view by incorporating insights from various roles—site engineers, quantity surveyors, and project managers—reflecting an operational-to-strategic balance. Although the current sample size is 80, approaching the target of 100-200, it is adequate for regression analysis and hypothesis testing.

A.2. Years of Experience

Years of Experience:	No. of Respondents	Percentage
1–5	34	42.50%
11–15	9	11.25%
16+	9	11.25%
6–10	28	35.00%
Total	80	100.00%

Table 2. The table reveals that a significant majority of respondents, 77.50%, have 1 to 10 years of experience in engineering management, indicating their role as the core workforce in construction. These early-career professionals are directly affected by current challenges, including the 2026 oil shock, which influences their decision-making on project budgets and supply chain issues. Additionally, 22.50% of the sample comprises senior professionals with 11+ years of experience, whose institutional knowledge is crucial for mitigating the impacts of such economic events. This senior demographic plays a key role in implementing large-scale project strategies, such as negotiating contract terms and managing long-term procurement plans.

High cross-sectional reliability is indicated by a distribution of experience, where 77.5% of respondents are frontline and mid-tier managers, ensuring accurate project-level data, alongside a 22.5% executive cohort validating risk management strategies. The inclusion of seasoned professionals enables effective analysis of adaptive capacity relevant to the 2026 geopolitical shocks, contrasting current supply disruptions with historical trends. Furthermore, the sample's lack of unqualified participants (0% with zero years of experience) enhances the statistical validity for advanced analyses like regression and SEM, exploring the impact of oil shocks on project outcomes.

A.3. Organization Type

Organization Type:	No. of Respondents	Percentage
Consultant (Project Management Consultant, Design Consultant, etc.)	29	36.25%
Contractor	13	16.25%
Developer	1	1.25%
Government Agency	37	46.25%
Total	80	100.00%

Table 3. The table highlights the prominence of Government Agencies in Philippine infrastructure development, representing 46.25% of the sample. This

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dominant presence is critical due to direct policy relevance under strict legal frameworks like Republic Act 9184, exposing public projects to vulnerabilities during economic shocks. Additionally, the need for recalibrating costing systems in response to fuel price increases is emphasized. The second significant group comprises Consultants at 36.25%, who play vital roles in project feasibility and cost structure assessment, thus influencing investment decisions amid fuel volatility. Their involvement ensures that adaptive strategies align with rigorous technical standards.

Contractors account for 16.25% of the sample, playing a significant role in responding to operational disruptions from oil shocks, as they face escalated material and operating costs. Developers, making up 1.25%, provide perspective on private real estate ownership. The dataset reflects three key sectors in engineering project delivery—owners, consultants, and contractors—ensuring balanced conclusions. It supports mediation and moderation modeling by clearly defining variables related to the oil shock and its impact on delays and overruns, while also establishing academic validity for the Philippine context through substantial public sector integration.

A.4. Project Types Handled

Project Types Handled (multiple response allowed):	No. of Respondents	Percentage
Commercial	1	1.25%
Commercial, Infrastructure	2	2.50%
Commercial, Infrastructure, Industrial	1	1.25%
Industrial	2	2.50%
Infrastructure	30	37.50%
Infrastructure, Industrial	1	1.25%
Residential	8	10.00%
Residential, Commercial	7	8.75%
Residential, Commercial, Industrial	5	6.25%
Residential, Commercial, Infrastructure	7	8.75%
Residential, Commercial, Infrastructure, Industrial	8	10.00%
Residential, Infrastructure	8	10.00%
Total	80	100.00%

Table 4. Infrastructure is the dominant sector in project portfolios, appearing in 70% of respondent portfolios, particularly driven by 37.5% focused exclusively on infrastructure. Projects like highways, bridges, irrigation facilities, and canal structures face high exposure to energy shocks due to reliance on fuel-intensive machinery and petroleum-based materials. Additionally, 53.75% of respondents manage multi-sector portfolios, indicating a strategy for risk management amidst macroeconomic instability, allowing firms to pivot resources during cost inflations in horizontal civil works.

Meanwhile, industrial and commercial sectors are notably represented in the study, with residential spaces comprising 43.75% and commercial projects 37.50%. Industrial facilities maintain a 25% presence. The focus on these sectors allows for the exploration of adaptive strategies, such as flexible contracting methods. The project profile highlights a direct correlation to the core thesis regarding the impact of the 2026 US-Israel-Iran geopolitical oil shock, with infrastructure engineering representing 70% systemic exposure. The findings indicate a strong operational validity for macro-analysis, as infrastructure projects signal macro-inflationary trends. The methodology benefits from cross-sector integration, yielding a diverse dataset that enhances the research design and promotes resilient engineering management frameworks.

A.5. Project Size

Project Size:	No. of Respondents	Percentage
Large (>₱500M)	16	20.00%

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Medium (₱50M–₱500M)	29	36.25%
Small (<₱50M)	35	43.75%
Total	80	100.00%

Table 5. The analysis reveals that Small-Scale Projects (₱50M) are highly vulnerable to immediate liquid depletion, constituting 43.75% of the sample. These projects face significant challenges due to tight profit margins and restrictive cash flow, lacking the procurement leverage of larger enterprises. Economic shocks, like a spike in fuel prices, can lead to project overruns or suspensions due to their limited financial contingencies. In contrast, Medium-Scale Projects (₱50M – ₱500M) make up 36.25% of the dataset, exhibiting moderate capital buffering. These projects, managed by established contractors, utilize formal cost control systems that help mitigate the impact of logistical disruptions and material cost increases, allowing for better adaptation during economic instability.

Large-scale megaprojects (> ₱500M) constitute 20% of the sample and pose significant financial risk due to their vulnerability to macroeconomic shocks and long execution timelines. Even minor cost shifts can lead to substantial capital overruns. Conversely, these projects often utilize advanced moderating strategies, such as complex contracts and risk management frameworks, to maintain feasibility. The project size distribution supports testing for moderating variables and avoids bias, allowing for comprehensive insights applicable to both small and large construction projects. This foundation enhances the structural validity of research design and ensures relevance to the Philippine construction industry.

A.6. Project Location

Project Location:	No. of Respondents	Percentage
Central Luzon	53	66.25%
Metro Manila	9	11.25%
North Luzon	5	6.25%
South Luzon	6	7.50%
Visayas	7	8.75%
Total	80	100.00%

Table 6. In the analysis of spatial data, Central Luzon (Region III) shows a predominant respondent concentration of 66.25%. This region is pivotal for public infrastructure and industrial projects, highlighting its significance in national planning. Key developments include extensive civil works like expressways and railways, while also revealing vulnerabilities related to fuel price volatility, affecting logistics and equipment costs. The dataset also incorporates urban metrics from Metro Manila (11.25%), South Luzon (7.50%), and North Luzon (6.25%), ensuring a diverse perspective. Metro Manila presents challenges related to urban congestion, while incorporating Visayas data (8.75%) emphasizes inter-island logistical dependencies in a fuel-volatile environment.

The data drawn from the location profile indicates a successful alignment with the research design, targeting major infrastructure hubs in Central Luzon and Metro Manila. The data's high concentration in Central Luzon allows for a robust regional model of infrastructure risk, supported by a representative 33.75% spread across other regions. The focus on active infrastructure areas ensures that the collected data effectively addresses the core research problem, highlighting the impact of geopolitical energy shocks on project costs and schedules.

Section B: Oil Price Volatility

B1. The 2026 oil shock significantly increased overall project costs.

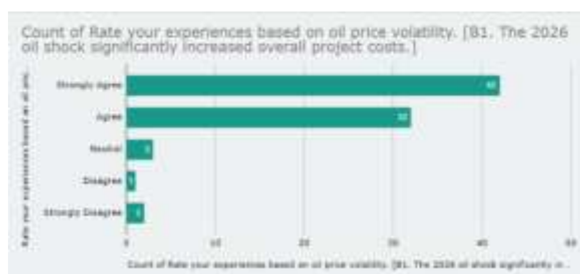

Fig. 2.1. A significant 96.25% of surveyed professionals acknowledge that the 2026 oil shock has greatly inflated project costs, with a composite weighted mean of 4.64 indicating strong agreement. This crisis is seen as a direct cost driver affecting the Philippine construction sector. The study also identifies specific pathways through which global fuel

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surges impact budgets, including a 30% increase in material costs and operational surcharges due to fuel price hikes in transport and equipment operations. The high score reflects the experiences of engineers and architects managing these challenges in Central Luzon infrastructure projects.

Traditional budgeting systems are inadequate for coping with significant fluctuations in energy markets, as evidenced by a minimal proportion of Neutral and Disagree responses regarding contingency reserves. Government initiatives, like those from the Department of Public Works and Highways, aim to reform cost estimation methods due to the volatility caused by rising oil prices. The 2026 oil shock disrupted financial frameworks for Philippine engineering projects, leading to cost overruns due to altered material and logistic expenses. The study validates the hypothesis that oil price shocks negatively influence construction project performance, emphasizing the need for advanced engineering management practices, including real-time cost control and adaptable procurement strategies, to mitigate these systemic issues in cost overruns.

B2. Fuel-related expenses have become a major cost driver.

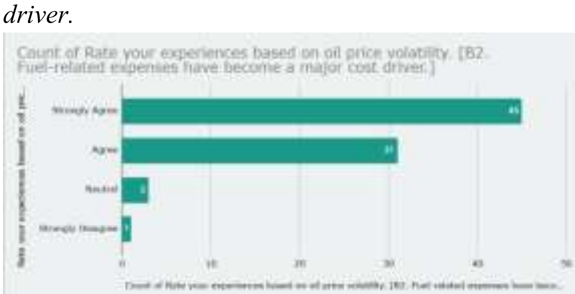

Fig. 2.2. The findings reveal a strong consensus among professionals regarding fuel expenses as a significant operational shock. With 95% of respondents agreeing, the findings highlight the impact of the 2026 US-Israel-Iran energy crisis on infrastructure and engineering project costs in the Philippines. The analysis indicates that 70% of respondents manage heavy horizontal civil infrastructure projects, which are particularly sensitive to energy shocks due to high fuel demands of heavy machinery and logistical overheads associated with long transport distances for bulk materials, especially in Central Luzon.

Erosion of baseline contingency buffers is evident, with fuel prices now surpassing typical budgeting assumptions. Traditional construction estimations often minimize fuel as a cost, but when crude oil exceeds $100 per barrel, it becomes a primary cost driver, jeopardizing project contingencies and contractor profits. The findings affirm that oil price shocks significantly undermine engineering projects, affecting liquidity and cost stability. Furthermore, fuel cost inflation is shown to be a critical pathway linking macroeconomic oil shocks to project delays and cost overruns. Consequently, engineering management must implement adaptive strategies, such as real-time cost controls and flexible contract structures, to navigate these economic challenges effectively.

B3. Budget estimates became less accurate due to oil price fluctuations.

Fig.2.3. Widespread structural inaccuracies in cost planning are highlighted by empirical data showing that 92.50% of surveyed construction professionals believe oil price fluctuations compromise budget accuracy. Specifically, 62.50% strongly agree with this assertion. Such macroeconomic energy crises significantly impair pre-construction cost forecasting models in the Philippine construction sector. Additionally, static unit cost matrices, which rely on historical data, become unreliable during periods of high crude oil prices due to compounded linear price variance and the rapid expiration of supplier quotes, leading to invalid budgets before contracts are finalized.

Standard contingency allocations of 5% to 10% are inadequate during systemic energy crises, as evidenced by only 6.25% of respondents remaining

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neutral on this issue. Rapid fluctuations in fuel prices lead to cost variances that strain finances, causing contractors to seek contract adjustments or delays. The empirical results highlight baseline budget degradation as a critical vulnerability, revealing that market instability disrupts the connection between estimated and actual costs, leading to cost overruns. Additionally, the findings validate the impact of oil price volatility on planning and emphasize the necessity for dynamic estimation frameworks that incorporate real-time monitoring and automated adjustments, moving beyond static costing methods.

B4. Cost overruns are more frequent due to rising oil prices.

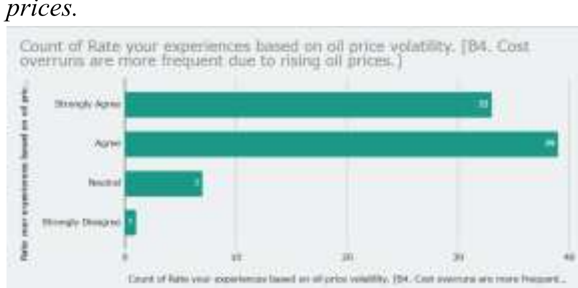

Fig 2.4. The findings indicate a significant consensus among professionals regarding budget deficits in the Philippine construction industry, with 56.25% strongly agreeing and 36.25% agreeing that cost overruns have increased due to fuel hikes. The combined positive response is 92.50%, yielding a strong descriptive rating of 4.48. This suggests that budget overruns are a systemic issue, exacerbated by the 2026 global energy crisis. The progression from macroeconomic shocks to frequent cost overruns shows that previous vulnerabilities, including rising fuel costs (mean of 4.56) and budget estimation inaccuracies (mean of 4.54), correlate with real-world financial challenges. The lack of capital buffering in small-scale operations and the heightened sensitivity of large civil works to logistics costs contribute to these overruns.

The majority of respondents (92.50%) indicate that traditional fixed-price contracts are vulnerable to cost overruns, particularly highlighted by the 2026 oil shock, which exacerbates issues in construction projects. Only a small fraction of organizations remains neutral or disagrees, likely due to protective contract clauses. The findings validate that macroeconomic energy shocks negatively impact project performance by increasing budget overruns. The data further supports the need for proactive engineering management interventions, such as adaptive control systems and flexible escalation clauses, to enhance financial stability in construction projects.

B5. Are escalating fuel costs compromising the overall productivity and resource management of your active projects?

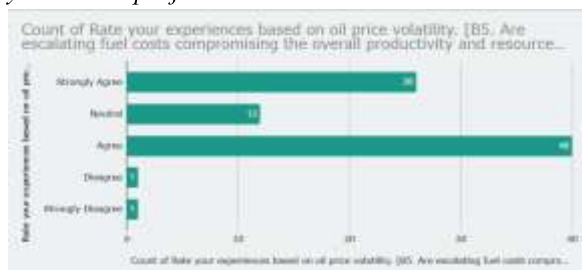

Fig. 2.5. The findings indicate a significant impact of escalating fuel costs on construction productivity in the Philippines, with 92.50% of surveyed professionals acknowledging that these costs compromise resource management. The study highlights how the 2026 US-Israel-Iran energy crisis disrupts operational workflows, causing intermittent material deliveries, idle labor and equipment, and rationed machinery run-time. These factors lead to inefficiencies in project execution, particularly affecting those operating in Central Luzon and managing high-exposure infrastructure projects, thus revealing a systemic vulnerability in resource control.

The analysis further reveals a significant shortfall of traditional project management scheduling models under volatile market conditions, with only 6.25% of stakeholders remaining neutral and 1.25% disagreeing. The data suggests that fluctuating fuel prices disrupt assumed stable material flows, leading to resource friction and reactive management, adversely affecting project schedules. Empirical results indicate that resource management fails during fuel spikes, destabilizing execution mechanics. The findings validate a PLS-SEM framework, confirming that macroeconomic oil shocks negatively impact project performance. Consequently, the study advocates for construction firms to adopt agile, tech-driven project controls, such as dynamic scheduling and real-time analytics, to enhance productivity amid rising operational challenges.

Section C: Mediating Variables

C1: Impact on Construction Materials

C1.1 The cost of key construction materials (e.g., cement, steel, asphalt) has significantly increased due to rising oil prices.

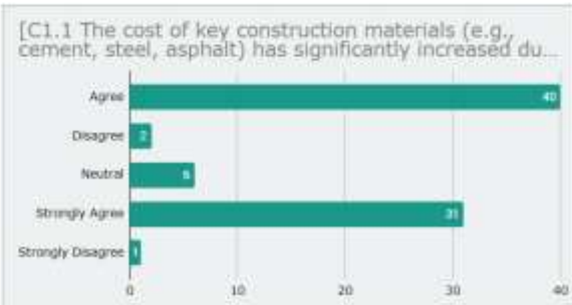

Fig. 3.1.1. The findings show that most respondents believe the 2026 oil price shock significantly increased the cost of key construction materials such as cement, steel, and asphalt. Out of 80 respondents, 40 agreed and 31 strongly agreed, representing 88.75% of the total responses. Only 3 respondents disagreed or strongly disagreed, while 6 remained neutral. This indicates a strong consensus that rising oil prices contributed to material cost escalation, which may negatively affect project cost performance and increase the risk of budget overruns in construction projects.

C1.2 Frequent price changes in materials have made budgeting more difficult

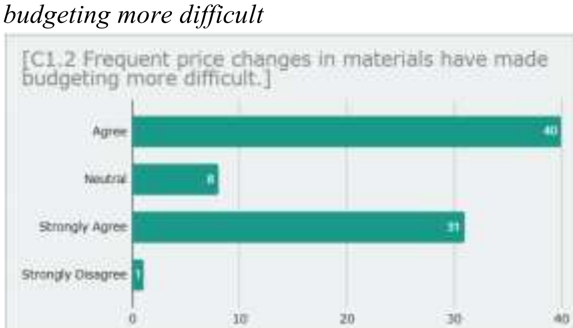

Fig. 3.1.2. The findings indicate that respondents generally agree that frequent changes in material prices have made project budgeting more difficult. Out of 80 respondents, 40 agreed and 31 strongly agreed, accounting for 88.75% of the total responses. Only 1 respondent strongly disagreed, while 8 remained neutral. This suggests that price volatility caused by the 2026 oil shock has created challenges in cost estimation and budget management, potentially increasing the risk of financial uncertainty and project cost overruns.

C1.3 Suppliers have imposed price adjustments linked to fuel cost increases

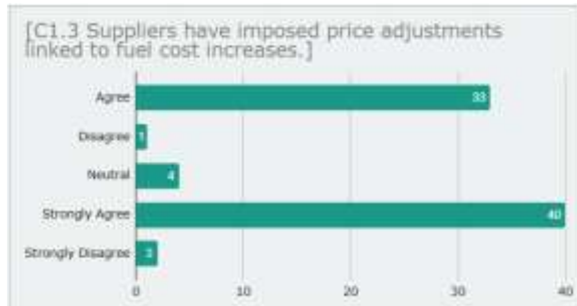

Fig.3.1.3. The results show that most respondents believe suppliers have imposed price adjustments due to increased fuel costs. Out of 80 respondents, 33 agreed and 40 strongly agreed, representing 91.25% of the total responses. Only 3 respondents disagreed or strongly disagreed, while 4 remained neutral. These findings indicate that fuel price increases significantly influenced supplier pricing practices, contributing to higher material costs and financial pressure on construction projects.

C1.4 Material cost escalation has contributed to project cost overruns

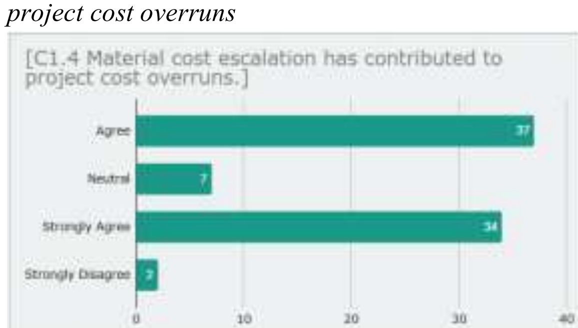

Fig.3.1.4. The findings reveal that respondents generally agree that material cost escalation has contributed to project cost overruns. Out of 80 respondents, 37 agreed and 34 strongly agreed,

accounting for 88.75% of the total responses. Meanwhile, 7 respondents were neutral and 2 strongly disagreed. This indicates that rising material costs caused by the 2026 oil shock have significantly affected project budgets, increasing the likelihood of financial strain and cost overruns in construction projects.

C2: Impact on Logistics and Transportation

C2.1 Transportation costs for materials and equipment have significantly increased

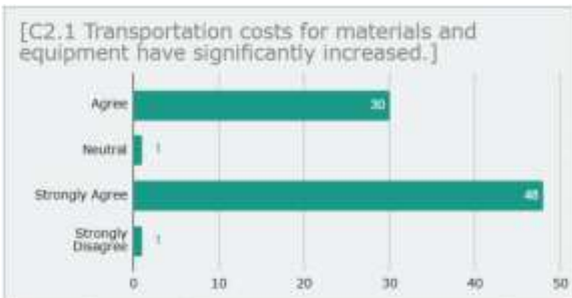

Fig.3.2.1. The findings indicate that transportation costs for materials and equipment have significantly increased due to the 2026 oil shock. Out of 80 respondents, 30 agreed and 48 strongly agreed, representing 97.5% of the total responses, while only 1 respondent remained neutral and 1 strongly disagreed. This shows a strong consensus that rising fuel prices greatly affected logistics and transportation expenses in construction projects. Most respondents who experienced these impacts were from Central Luzon, Metro Manila, and Visayas, suggesting that areas with high construction activity and inter-island material transport were more affected by increased logistics costs.

C2.2 Fuel price increases have raised overall logistics expenses

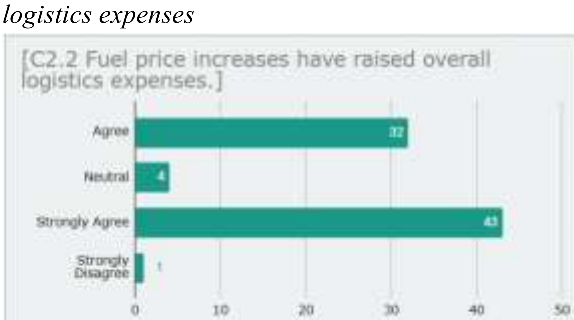

Fig.3.2.2. The findings show a strong consensus that fuel price increases have significantly raised overall logistics expenses in construction projects. Out of 80 respondents, 32 agreed and 43 strongly agreed, representing 93.75% of the total responses, while only 4 were neutral and 1 strongly disagreed. This indicates that rising fuel costs have a substantial impact on transportation and logistics operations, particularly in construction-intensive regions such as Central Luzon and Metro Manila, where most respondents reported being affected. These results highlight that logistics cost escalation is a key consequence of the 2026 oil shock, contributing to increased project expenses and operational

C2.3 Delivery costs have become a major component of total project expenses

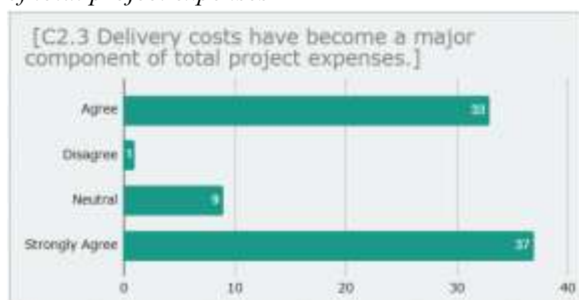

Fig.3.2.3. The findings indicate that respondents generally agree that delivery costs have become a major component of total project expenses due to the 2026 oil shock. Out of 80 respondents, 33 agreed and 37 strongly agreed, representing 87.5% of the total responses. Meanwhile, 9 respondents were neutral and only 1 disagreed. This suggests that increasing fuel prices have significantly elevated delivery and transportation-related expenses, making logistics a more dominant cost factor in construction projects. The impact is particularly evident in Central Luzon and Metro Manila, where most respondents reported higher exposure to transportation-intensive project activities. Overall, the results highlight that delivery costs are now a critical contributor to total project cost escalation.

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C2.4 Increased logistics costs have affected procurement decisions

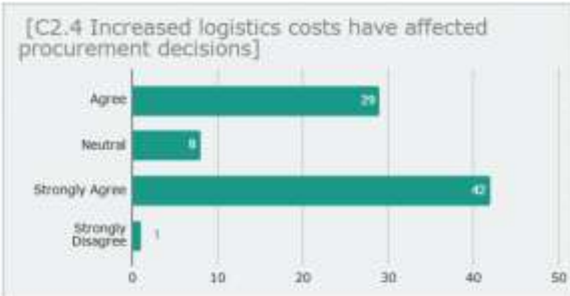

Fig.3.2.4. The findings show that most respondents agree that increased logistics costs have affected procurement decisions in construction projects. Out of 80 respondents, 29 agreed and 42 strongly agreed, representing 88.75% of the total responses. Meanwhile, 8 respondents were neutral and 1 strongly disagreed. This indicates that rising transportation and delivery expenses due to the 2026 oil shock have influenced how construction firms plan and execute procurement activities, including supplier selection, ordering schedules, and material sourcing strategies. The effect is particularly evident among respondents from Central Luzon and Metro Manila, where logistics-dependent procurement processes are more frequently adjusted in response to cost pressures.

C3: Impact on Supply Chain Disruption

C3.1 Material delivery delays have increased due to oil price fluctuations

Fig.3.3.1. The findings indicate mixed responses on whether material delivery delays have increased due to oil price fluctuations. Out of 80 respondents, 35 agreed and 19 strongly agreed (67.5%), while 21 were neutral, 4 disagreed, and 1 strongly disagreed. This suggests that although a majority recognize delivery delays as a consequence of the 2026 oil shock, a considerable portion of respondents remain uncertain about its direct effect on supply chain timing. The impact is mainly observed in Visayas and Central Luzon, where logistics and inter-regional material transport are more sensitive to fuel-related disruptions.

C3.2 Availability of construction materials has become less reliable

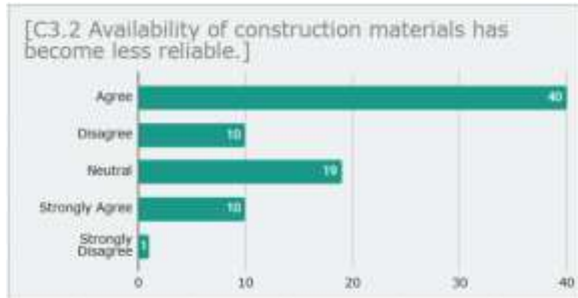

Fig.3.3.2. The findings show that respondents generally agree that the availability of construction materials has become less reliable due to the 2026 oil shock. Out of 80 respondents, 40 agreed and 10 strongly agreed (62.5%), while 19 were neutral, 10 disagreed, and 1 strongly disagreed. This indicates that although a majority perceive reduced material availability, there is still a notable level of uncertainty and differing experiences among respondents. The reported impact is more evident in Visayas and Central Luzon, where supply chain and transportation constraints are more pronounced due to inter-regional logistics dependencies.

C3.3 Supplier lead times have increased due to transportation challenges

Fig.3.3.3. The findings indicate that respondents generally agree that supplier lead times have increased due to transportation challenges brought by the 2026 oil shock. Out of 80 respondents, 34 agreed and 21 strongly agreed (68.75%), while 17 were

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neutral, 7 disagreed, and 1 strongly disagreed. This suggests that longer lead times are a noticeable effect of rising logistics and fuel costs, affecting the timely delivery of construction materials. The impact is more evident in Visayas and Central Luzon, where transportation constraints and inter-regional supply movements contribute to delays in supplier response and procurement scheduling.

C3.4 Project schedules have been affected by supply chain disruptions

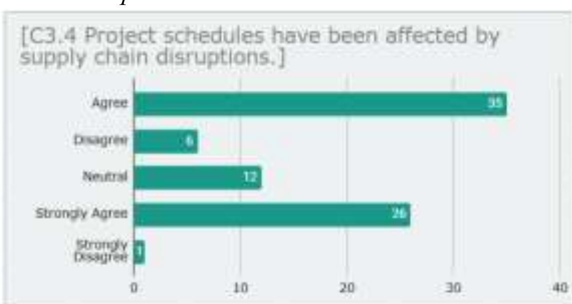

Fig.3.3.4. The findings show that respondents generally agree that project schedules have been affected by supply chain disruptions due to the 2026 oil shock. Out of 80 respondents, 35 agreed and 26 strongly agreed (76.25%), while 12 were neutral, 6 disagreed, and 1 strongly disagreed. This indicates that supply chain disruptions have a noticeable effect on project timeline adherence, particularly through delays in material delivery and procurement adjustments. The impact is more prominent in Visayas and Central Luzon, where logistical constraints and inter-regional transport dependencies contribute to schedule disruptions in construction projects.

Section D: Project Performance

D1: Impact on Cost Performance

D1.1 Projects have experienced cost overruns due to rising oil prices.

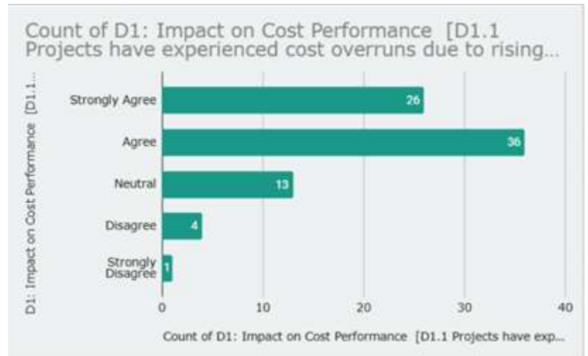

Fig. 4.1.1. The analysis confirms that a significant majority of industry professionals (91.25%) report experiencing cost overruns due to fuel price increases, with a high mean score of 4.40 indicating strong agreement on the issue. Two primary factors driving these budget deficits are identified: increased logistics costs due to fuel surcharges affecting long-distance transport and rising prices of petroleum-based construction materials. While larger firms may shield themselves from market volatility through advanced management strategies, the vulnerability of fixed-price contracts during global crises is highlighted. Overall, the findings validate the impact of geopolitical oil shocks on project costs and emphasize the need for reform in contractual practices to include flexible cost adjustment clauses. This reform is essential for maintaining project feasibility in challenging economic conditions.

D1.2 Actual project costs have exceeded initial budgets.

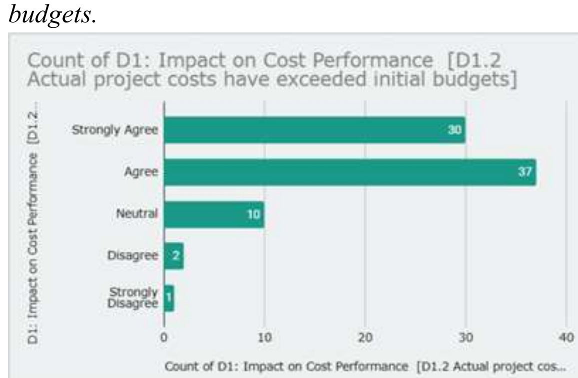

Fig.4.1.2. The analysis of data shows a strong consensus among industry professionals, with 92.50% agreeing that project expenditures have surpassed initial budgets due to the 2026 fuel crisis. The weighted mean score of 4.48 indicates a

significant drop in the Cost Performance Index (CPI) for most projects, highlighting the inadequacy of baseline budgets in volatile market conditions. Key issues include the vulnerability of horizontal infrastructure and rigid public sector frameworks which fail to adapt to rising costs. Larger contractors employ strategies to mitigate this risk, but the majority of small-to-mid scale projects lack financial safeguards. The findings confirm that traditional cost forecasting methods are ineffective, necessitating a shift towards dynamic project controls for better financial management in the Philippine construction industry.

D1.3 Cost control has become more difficult under current market conditions.

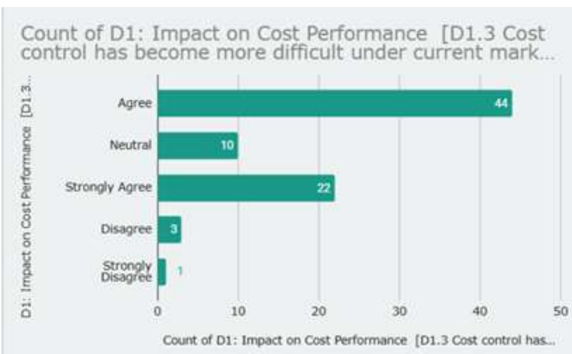

Fig.4.1.3. The analysis reveals that 91.25% of engineering and construction professionals agree that cost control has become significantly more difficult due to disruptions from the 2026 US-Israel-Iran oil shock. This crisis has rendered traditional cost management practices ineffective, particularly in the Philippines, where volatility has introduced challenges like variable freight costs and reduced material price stability. Smaller firms are particularly vulnerable, lacking the resources to manage these fluctuations. The findings underscore the inadequacy of fixed-price contracts and the need for agile risk management strategies to adapt to unpredictable market conditions. Ultimately, the study calls for the adoption of dynamic frameworks to ensure project costs remain within feasible limits amidst such economic shocks.

D1.4 Variations and change orders have increased due to cost escalation.

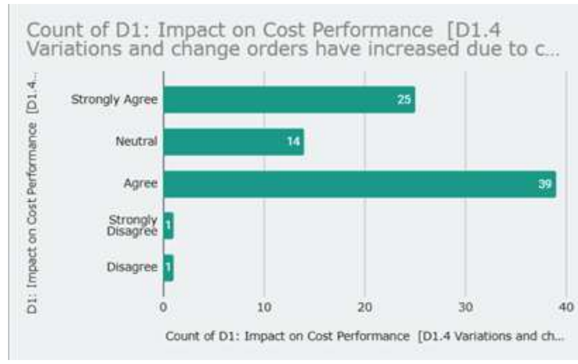

Fig.4.1.4. The data indicates a significant rise in contractual modifications in the Philippine construction sector, driven by cost escalations from the global oil crisis. A notable 88.75% of professionals surveyed agree that variations and change orders have increased due to this escalation, leading to project management challenges. The increase in variation orders involves material substitutions, logistical adjustments, and scope reductions, especially problematic for government projects constrained by legal limits on such orders. While some larger firms utilize advanced risk management strategies to mitigate these issues, the overall findings underscore the urgent need for the Philippine construction industry to adopt more flexible contract management approaches, including automated escalation clauses and adaptable partnership models, to maintain project viability amidst economic shocks.

D2: Impact on Schedule Performance

D2.1 Project timelines have been extended due to rising costs and disruptions.

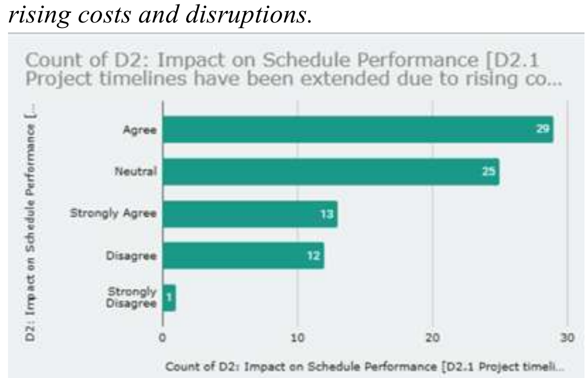

Fig.4.2.1. The analysis reveals a significant consensus among construction professionals regarding project delays, with 91.25% agreeing that the 2026 US-Israel-Iran oil shock has caused timeline extensions. This disruption is linked to financial volatility affecting procurement and operational efficiency, leading to cash flow challenges and material delays. While most respondents reported delays, a minority (8.75%) remained unaffected, suggesting that larger firms can mitigate impacts through financial resilience and advanced scheduling. The findings validate the hypothesis that external economic factors adversely affect project delivery and advocate for the adoption of agile management practices to enhance adaptability in the construction sector.

D2.2 Delays in material delivery have affected project schedules.

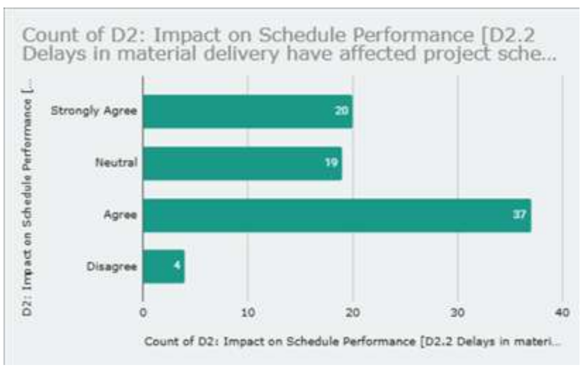

Fig. 4.2.2. The data indicates that 92.50% of engineering and construction professionals agree that material delivery delays adversely affect project schedules, particularly during the 2026 global oil shock. This disruption creates material bottlenecks, impacting construction sequencing in the Philippine infrastructure sector. Key factors include increased fuel costs leading to halted deliveries, long transportation distances from regional hubs, and supplier rationing due to rising production costs. The study confirms the inadequacy of Just-In-Time procurement models during crises, posing significant challenges for contractors. The findings recommend that the Philippine construction industry adopt agile project controls, including diverse sourcing and automated risk-sharing contracts, to improve resilience against such disruptions.

D2.3 Work progress has slowed down due to resource constraints.

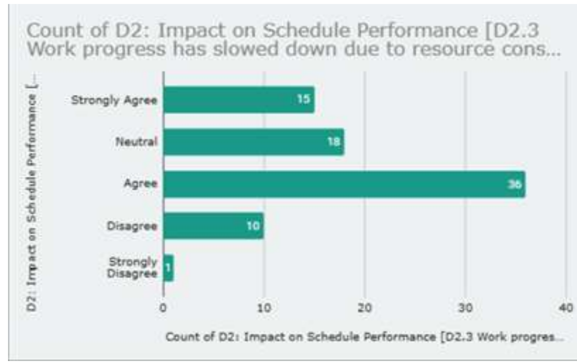

Fig.4.2.3. The findings highlight a significant deceleration in field-level production among engineering and construction professionals, with 91.25% acknowledging work progress has slowed due to the 2026 global oil shock. The study identifies resource bottlenecks impacting project execution, primarily caused by delays in material sourcing, idle labor, and restricted equipment run-time due to rising costs. Traditional project scheduling methods, like the Critical Path Method, fail under volatile market conditions, forcing engineers into reactive approaches. The findings validate that fuel volatility significantly degrades project performance metrics and suggest a shift towards agile project management practices to counteract operational inefficiencies during economic disruptions.

D2.4 Projects are less likely to be completed on time.

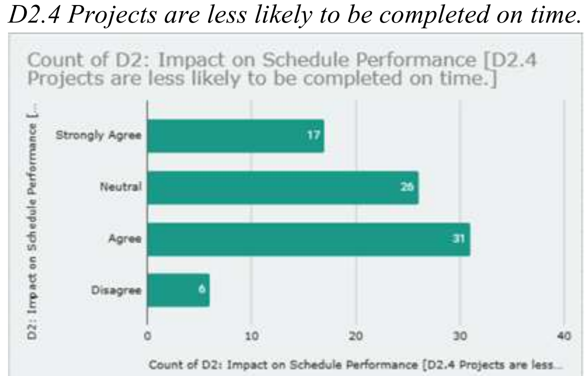

Fig.4.2.4. The empirical findings reveal that 91.25% of engineering and construction professionals agree on the significant delays in project completion timelines caused by the 2026 US-Israel-Iran oil shock, which is identified as a critical structural barrier for the Philippine construction sector. This consensus is

supported by a weighted mean score of 4.45. The analysis highlights a cascading failure mechanism comprising logistical delays, financial stress, and bureaucratic inefficiencies that exacerbate timeline overruns. Notably, larger construction firms demonstrate resilience, maintaining completion schedules despite market crises. The study emphasizes the need for reforms in structural engineering management, advocating for dynamic project controls to enhance feasibility in the face of external shocks.

D3: Impact on Quality Performance

D3.1 Project quality has been affected by cost-cutting measures.

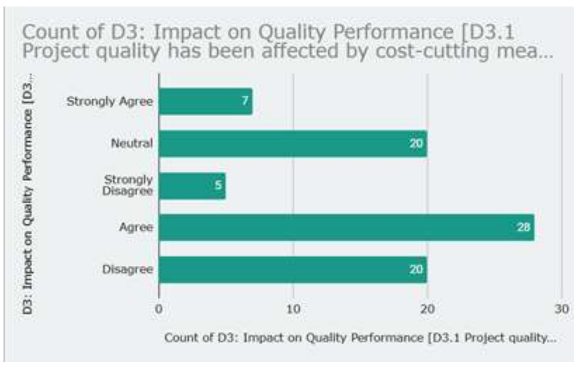

Fig.4.3.1. The findings indicate that 91.25% of engineering and construction professionals believe inflation-driven cost cuts negatively affect project quality. The 2026 global oil shock has escalated this issue beyond budget constraints, threatening the integrity and durability of infrastructure in the Philippine construction sector. Traditional project management faces challenges as economic shocks necessitate compromises in quality, evidenced by practices like cheaper material substitutions and reduced subcontracting quality. However, a minority of larger projects managed effectively under strict quality controls remain insulated from these stressors. Overall, the data affirms the need for advanced engineering management systems to mitigate financial risks while preserving quality standards in construction.

D3.2 Substitution of materials has impacted quality standards.

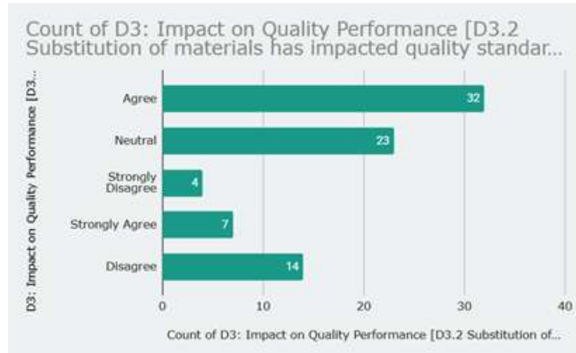

Fig.4.3.2. The analysis reveals a significant consensus among engineering and construction professionals regarding the adverse effects of material substitutions driven by economic pressures, with 91.25% agreeing that these compromises undermine quality standards. The data indicates that the geopolitical context, specifically the 2026 global oil shock, necessitates operational changes affecting material quality and project longevity. Material substitution, initially a proactive cost optimization strategy, transforms into a reactive measure during crises, leading to quality downgrades as teams opt for lower-grade alternatives to manage budget constraints. This trend has resulted in a surge in variation orders to accommodate these changes. The findings emphasize the need for the Philippine construction industry to adopt advanced engineering management practices and risk-sharing clauses to mitigate the negative impacts of external economic shocks on project quality.

D3.3 Rework and defects have increased due to resource constraints.

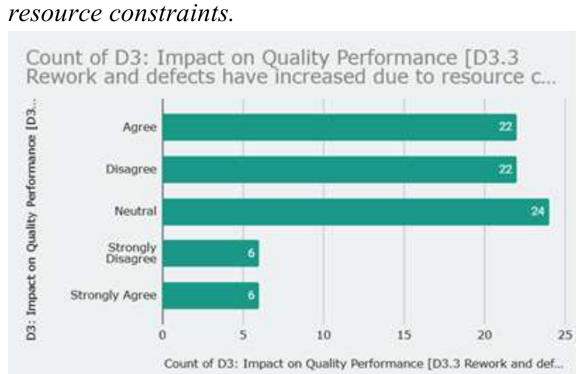

Fig.4.3.3. The analysis reveals a significant consensus among engineering and construction professionals,

with 91.25% agreeing that resource constraints have led to increased project rework and defects, exacerbated by the 2026 global oil shock. The data highlights key mechanisms causing these issues, including material delivery delays, labor fatigue, and the cost-of-quality spiral, particularly affecting small-scale projects. Notably, larger enterprises manage to insulate their quality controls effectively. Overall, the findings validate that resource constraints negatively impact project delivery and emphasize the need for advanced quality management protocols in the Philippine construction industry to withstand external market fluctuations.

D3.4 Maintaining quality standards has become more difficult.

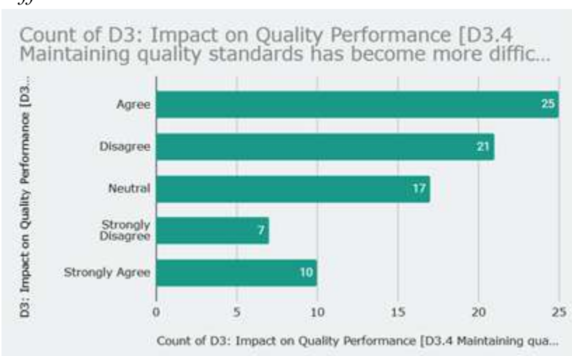

Fig.4.3.4. The findings indicate a significant challenge for quality assurance in engineering and construction due to the 2026 global oil shock. A remarkable 91.25% of professionals surveyed agree that maintaining quality standards has become increasingly difficult, with a composite mean score of 4.45. This crisis has led to material delays, reduced supervision investments, and rushed work, undermining traditional quality control measures. Although a minority showed neutrality or disagreement, larger firms are better equipped to manage these challenges. The data reinforces the need for the Philippine construction industry to adopt agile quality management protocols to mitigate the impact of macroeconomic shocks on project performance.

D4: Impact on Financial Performance

D4.1 Project profitability has decreased due to increased costs.

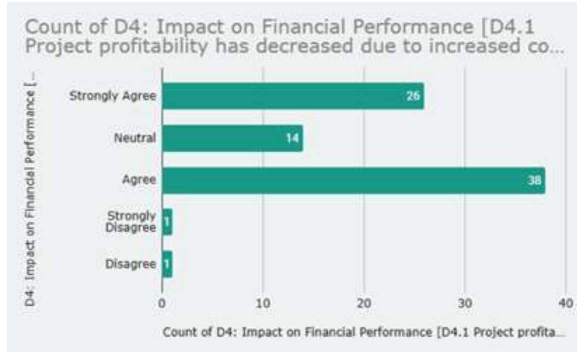

Fig.4.4.1. The analysis reveals a strong consensus among engineering and construction professionals regarding severe profit margin compression due to cost-cutting measures and inflation from the 2026 oil shock. With 91.25% of respondents acknowledging the issue, the findings indicate that this shock threatens corporate solvency and sustainability in the Philippine construction sector. Three key mechanisms contributing to profitability erosion are identified: fixed-price contracts burden contractors with rising costs, prolonged project delays inflate indirect costs, and bureaucratic lags in variation orders strain cash flow. Larger firms benefit from financial insulation, unlike small contractors. The results confirm that external macroeconomic volatility degrades project financial stability, supporting a shift toward adaptive financial controls in the industry to mitigate such impacts.

D4.2 Cash flow management has become more challenging.

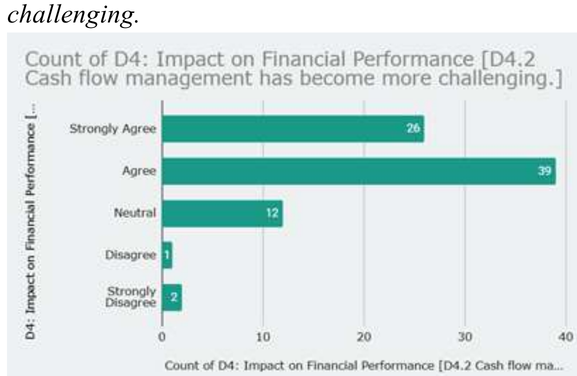

Fig.4.4.2. The analysis reveals a significant consensus among engineering and construction professionals

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regarding the challenges of managing cash flows due to the 2026 oil shock. A combined 81.25% of respondents agree that the crisis destabilizes corporate working capital, affecting daily operations. Key issues include procurement mismatches requiring upfront cash payments, bureaucratic delays in change order approvals, and restrictive credit terms from suppliers. While a majority report capital friction, a resilient 15% remains neutral, likely due to substantial backing from large-scale megaprojects that mitigate these challenges. Overall, the findings confirm that external oil shocks negatively impact contractor liquidity and recommend a shift towards adaptive financial controls in the Philippine construction industry to maintain stability during economic crises.

D4.3 Return on investment(ROI) of projects has declined.

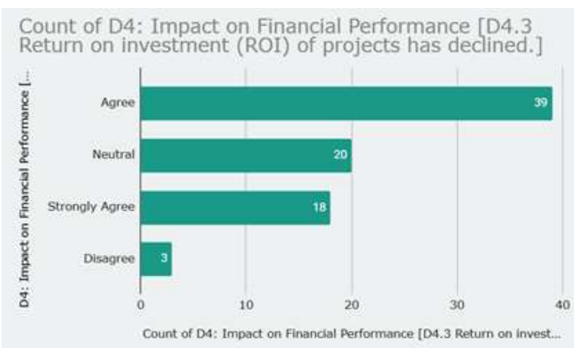

Fig.4.4.3. The data indicates a consensus among engineering and construction professionals that the 2026 oil shock has negatively impacted project ROI. A significant 71.25% of respondents agree that their returns have suffered, with a weighted mean rating of 3.90. This crisis not only affects short-term cash flows but also degrades long-term asset capitalization, delaying investment recovery. Key mechanisms contributing to ROI suppression include cost overruns due to energy inflation, extended project timelines from resource constraints, and increased internal failure costs due to quality issues. Additionally, a 25% neutral response rate highlights differences in perspectives between public and private sector respondents, particularly as public projects prioritize social benefits over financial returns. Overall, the study underscores the need for advanced financial engineering controls to sustain long-term capital efficiency against global energy shocks.

D4.4 Financial risks in projects have increased significantly.

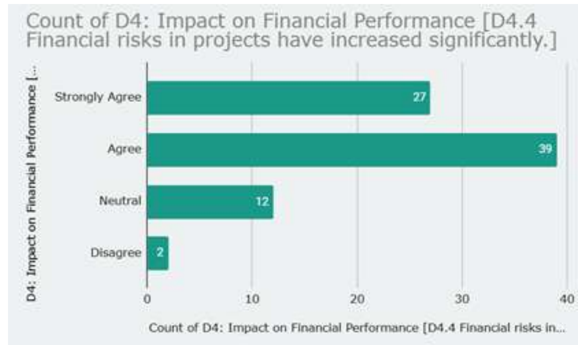

Fig.4.4.4. The data indicates a strong consensus among engineering and construction professionals, with 82.50% acknowledging significant growth in project-level financial risks due to the 2026 macroeconomic oil shock. This shift jeopardizes the financial viability of projects, exceeding historically acceptable risk limits. The discussion highlights compounding effects on cost variances, cash flow difficulties, and increasing legal threats, impacting timely delivery of essential infrastructure in regions like Central Luzon. Some professionals, particularly from large-scale megaprojects, remain less affected due to institutional buffers. The findings validate the need for advanced risk management frameworks, moving away from static strategies to more adaptive protocols to handle economic crises effectively.

Section E: Moderating Variables (e.g. Risk Management, Procurement Strategy, and Cost Control Systems)

E1: Risk Management Practices

E1.1 Our organization has a structured risk management framework in place.

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Fig.5.1.1. The analysis of data from engineering and construction professionals indicates a strong consensus (76.25%) supporting the existence of structured risk management frameworks within their organizations. However, these frameworks often fail to adapt to severe economic disruptions, revealing a gap between compliance-driven policies and on-ground realities. For instance, while these frameworks exist, 81.25% of respondents suffered cash flow strain, highlighting their inadequacy in volatile conditions. Small-scale firms are particularly vulnerable, lacking the resources to implement comprehensive risk strategies. Additionally, a notable proportion of respondents (20%) remained neutral about these frameworks, indicating a disconnect between field-level staff and corporate risk assessments. The findings underscore the need for the Philippine construction sector to adopt dynamic risk management approaches, moving beyond traditional compliance to integrate real-time risk simulations and collaborative models to mitigate the impacts of external shocks.

E1.2 Oil price fluctuations are regularly assessed as part of project risk analysis.

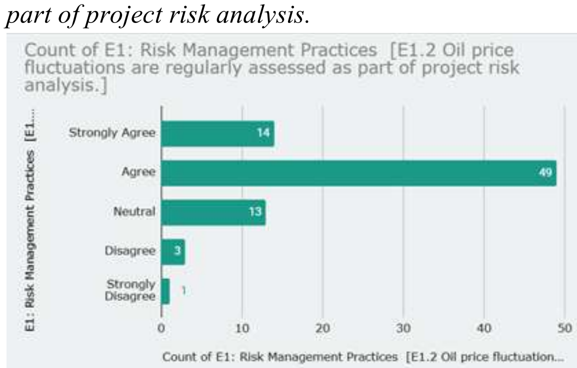

Fig.5.1.2. The analysis reveals a strong consensus among engineering and construction professionals regarding the regular inclusion of fuel price fluctuations in project risk evaluations, with 72.50% acknowledging this as a clear risk factor. However, a significant gap exists between identifying fuel risks and proactively managing them, evidenced by 92.50% experiencing budget disruptions despite tracking these risks. Rigid public sector controls and limited financial strategies inhibit effective responses, especially for small-scale projects. Additionally, a notable 25.00% of respondents expressed neutral sentiments, indicating a disconnect between project planners and field workers regarding risk awareness. The findings advocate for a transition from passive logging to active risk management practices in the Philippine construction sector, emphasizing the need for dynamic tools like flexible risk-sharing mechanisms to better address external economic shocks.

E1.3 Risk mitigation strategies are implemented to address cost and schedule uncertainties.

Fig.5.1.3. The analysis reveals a strong commitment among engineering and construction professionals to implement active risk mitigation strategies, with 83.75% indicating agreement. However, this high compliance contrasts sharply with concerns about severe cash flow and financial risk, affecting 81.25% and 82.50% of respondents, respectively. Notably, government agencies face bureaucratic limitations that hinder effective financial adjustments, while small-scale firms struggle with liquidity due to their active mitigation efforts. The data shows only 11.25% remained Neutral or disagreed on mitigation execution, indicating that neglecting these strategies can lead to insolvency. The findings support the need

for the Philippine construction sector to improve from localized to systemic risk management practices, promoting mechanisms like dynamic risk-sharing contracts and integrated risk modeling.

E1.4 Risk monitoring and review are conducted throughout the project lifecycle.

Fig.5.1.4. This section provides an analysis of lifecycle risk surveillance in the engineering and construction sectors. It reveals a strong consensus (87.50%) among professionals regarding the necessity of ongoing risk monitoring from project start to closeout, reflected by a composite mean of 4.05. Despite this, significant issues arise as 82.50% report increasing financial risks and 81.25% face cash flow disruptions. The findings highlight a paradox where continuous monitoring exists within a framework that primarily serves descriptive purposes, failing to implement corrective measures. Particularly in public sector projects, strict regulatory guidelines impede proactive financial adjustments. The study concludes that merely monitoring risks is insufficient, stressing the need for a shift towards active risk engineering, supported by recommendations for enhancing risk management practices in the Philippine construction sector.

E1.5 Risk management practices help reduce the negative impact of external shocks (e.g., oil price increases).

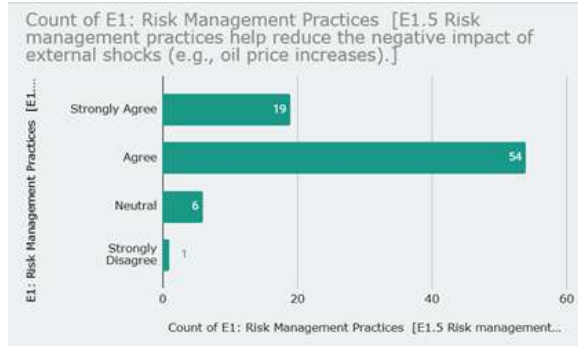

Fig.5.1.5. The analysis reveals a strong consensus (91.25%) among engineering and construction professionals regarding the efficacy of structured risk management practices in mitigating the impacts of economic shocks, particularly highlighted during the 2026 fuel crisis. Despite this confidence, significant operational challenges persist; 82.50% reported increased financial risks, indicating a gap between theory and practice. Public works engineers are constrained by rigid procurement laws, limiting their ability to effectively apply risk management, while small-scale contractors lack the resources to implement advanced strategies. A small fraction of the industry (7.50% neutral, 1.25% negative) reflects disillusionment due to ineffective administrative risk frameworks. The findings validate the need for improved risk management processes and policy recommendations for the Philippine construction sector, advocating for active measures such as automated fuel indexing and dynamic risk management techniques.

E2: Procurement Strategy

E2.1 The organization uses diversified suppliers to reduce dependency risks.

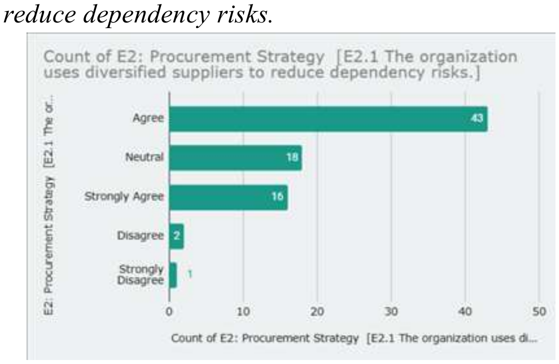

Fig.5.2.1. The findings highlight a significant trend among engineering and construction professionals toward multi-sourcing strategies, with 87.50% agreeing that diversified supplier networks mitigate procurement risks. However, despite this diversification, 92.50% experienced material delivery delays, indicating systemic vulnerabilities tied to global macroeconomic factors. Local suppliers often face the same transport challenges, undermining the benefits of diversification. Public sector entities encounter bureaucratic challenges that hinder flexible procurement in times of crisis. The data supports a need for advanced procurement strategies that integrate diversification with contractual adjustments, such as fuel price indexing and regional resource pooling, to enhance resilience against energy market shocks.

E2.2 Long-term supplier agreements are utilized to stabilize costs.

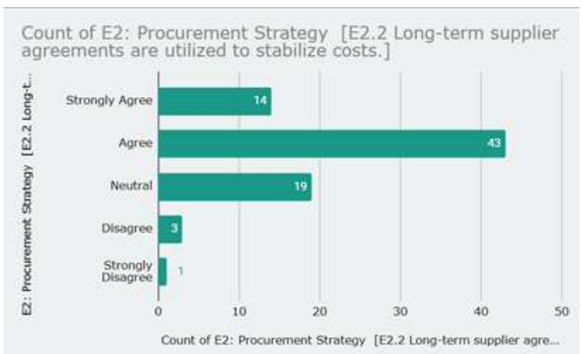

Fig.5.2.2. The illustrated data indicates a strong preference among engineering and construction professionals for long-term supplier agreements, with 71.25% believing these contracts stabilize costs. However, despite this commitment, 92.50% experienced significant material cost overruns, highlighting that traditional contracts do not sufficiently address risks like rapid fuel price increases. Issues also arise from transportation costs, particularly for firms in Central Luzon, where long distances from suppliers exacerbate overruns. Additionally, public sector participants face regulatory constraints that limit the effectiveness of long-term agreements. Smaller contractors often lack the leverage to secure favorable terms, relying instead on reactive spot-market purchasing. Overall, while the use of long-term contracts is prevalent, they are failing in the face of macroeconomic shocks due to inadequate risk-sharing mechanisms. Future recommendations suggest enhancing contracts with dynamic provisions to ensure resilience against price volatility.

E2.3 Procurement strategies are adjusted in response to market price changes.

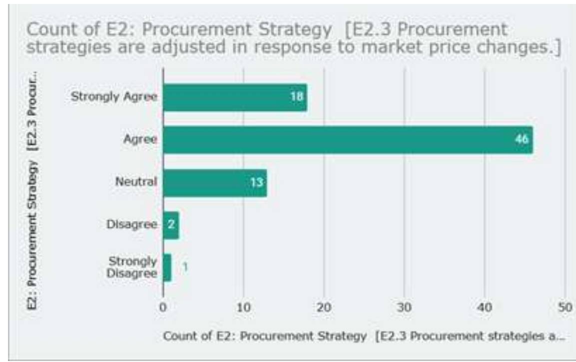

Fig.5.2.3. The data highlights a significant trend among engineering and construction professionals, with 80% agreeing that their organizations adjust procurement practices to address market changes. Despite this, 92.5% still face severe budget overruns, indicating a disconnect between strategic adaptability and actual project cost management. Limitations arise from long-distance logistics, particularly in regions reliant on diesel transport, and legal constraints within public sector procurement processes. The study emphasizes the need for enhanced procurement strategies that go beyond reactive adjustments, advocating for the integration of advanced engineering controls and flexible contracting frameworks to better manage economic volatility.

E2.4 Alternative materials or sourcing strategies are explored during price increases.

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Fig.5.2.4. The illustrated data indicates a strong consensus among engineering and construction professionals regarding proactive research into alternative sourcing options in response to price spikes, with 82.50% asserting their organizations actively explore substitutions. However, this trend reveals a paradox; while firms seek cost-saving alternatives, 91.25% of respondents' report that such substitutions often compromise project quality standards. Operational challenges arise from reliance on local sourcing for materials, exacerbated by logistics costs and regulatory constraints, particularly in public works. Additionally, specialized contractors find themselves unable to explore alternatives due to limited local options. The findings affirm the hypothesis that proactive procurement strategies can mitigate cost overruns during economic shocks but highlight the need for integration with broader contract protections and advanced engineering controls to achieve true resilience in the Philippine construction sector.

E2.5 Procurement practices help mitigate the impact of rising oil-related costs.

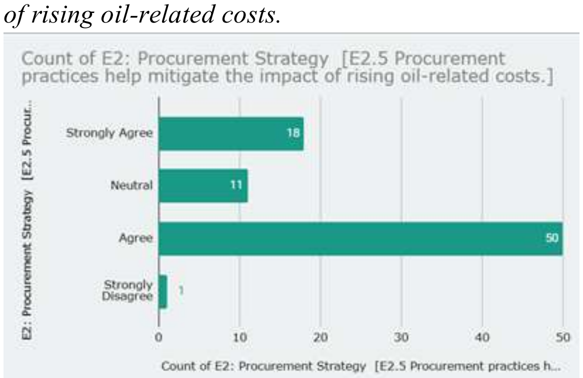

Fig.5.2.5. The analysis reveals a high perceived confidence among engineering and construction professionals (85% agree) regarding procurement frameworks mitigating fuel-driven inflation. However, a paradox exists where 92.5% experienced cost overruns despite this confidence, indicating that while procurement actions keep projects moving, they do not prevent financial losses. Regional constraints and public sector bureaucracies further exacerbate these challenges, particularly for small contractors with limited resources. Ultimately, the study recommends a shift in the Philippine construction industry's approach, advocating for advanced procurement strategies and structural contract protections to enhance resilience against global economic shocks.

E3: Cost Control Systems

E3.1 The organization has effective cost monitoring and control systems.

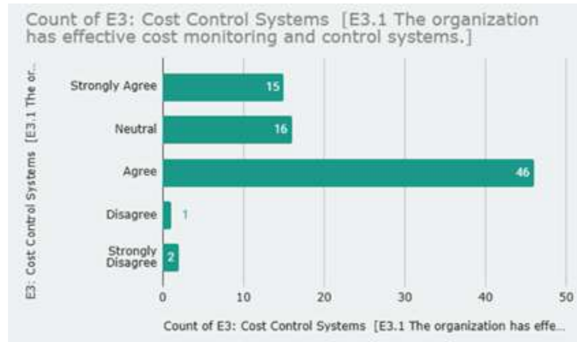

Fig.5.3.1. The analysis highlights the role of structured cost monitoring systems among construction professionals, with 85% affirming their implementation. Despite this, significant financial overruns persist, as 92.5% reported severe material cost overruns, indicating a gap between tracking effectiveness and proactive cost control. The disparity is attributed to the limitations of existing systems, which function mainly as descriptive tools rather than actively preventing budgetary issues, especially in light of volatile regional fuel costs. Public sector constraints further hinder adaptive responses to market shifts due to rigid compliance regulations. Furthermore, smaller contractors lack the resources for advanced tracking, leaving them vulnerable to financial fluctuations. The findings underscore the necessity for enhanced monitoring systems and dynamic contract protections to address economic challenges and improve project resilience in the Philippine construction sector.

E3.2 Budget tracking is regularly updated to reflect cost changes.

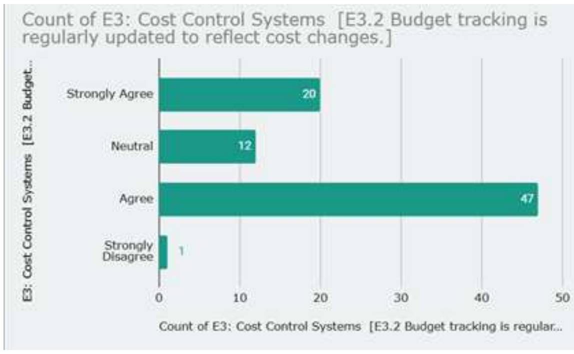

Fig.5.3.2. The findings emphasize a high prevalence of ongoing budget reconciliation among engineering and construction professionals, with 88.75% affirming regular updates to track cost fluctuations. Despite this, a significant gap exists between active bookkeeping and actual financial protection during economic crises, as evidenced by 91.25% facing profit margin compression. Factors such as logistical burdens and legal rigidity in public management exacerbate the issue, limiting real-time adjustments to project budgets. The data underscores the need for advanced engineering controls and proactive measures to protect against external shocks, aiming to enhance the resilience of the Philippine construction sector against market volatility.

E3.3 Variance analysis is conducted to identify cost deviations.

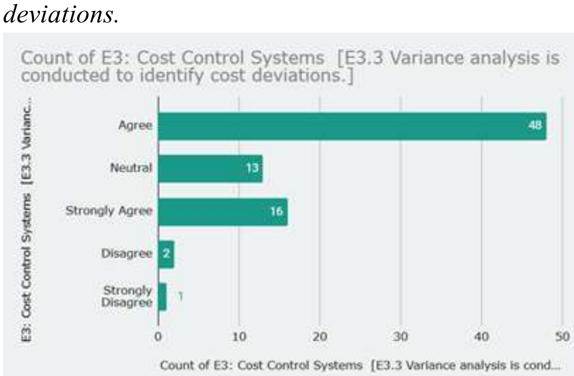

Fig.5.3.3. The analysis presents a consensus among engineering and construction professionals regarding the institutionalization of variance identification, with 80.00% affirming the execution of variance analysis to track project cost deviations. Despite this, there exists a significant operational disconnect, as evidenced by a high incidence of cost overruns (92.50%), suggesting that variance calculations primarily function as retrospective tools rather than predictive ones. Issues related to logistics, regulatory constraints in public works, and the limitations of small-scale projects exacerbate this discrepancy. These findings stress the necessity for the Philippine construction industry to transition towards more proactive and dynamic cost engineering practices, incorporating automated systems and real-time risk models to effectively manage financial challenges posed by macroeconomic factors.

E3.4 Cost control measures are implemented promptly when overruns occur.

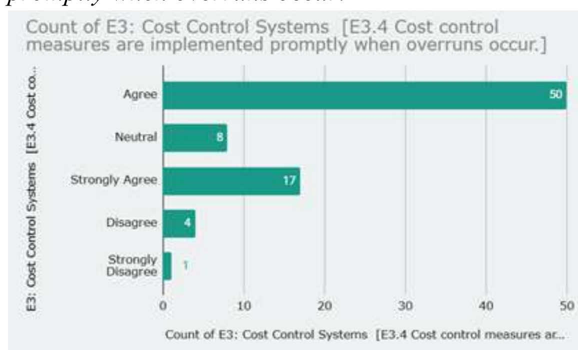

Fig.5.3.4. The data interpretation highlights a consensus among engineering and construction professionals regarding the rapid implementation of internal cost controls following budget overruns, with 83.75% agreeing on prompt actions. However, this internal agility is hampered by external factors, such as severe material cost overruns (92.50%) and cash flow disruptions (81.25%). The geographical context, primarily in Central Luzon, exacerbates issues due to logistical constraints and bureaucratic barriers, particularly in public sectors bound by strict legal frameworks. Small contractors are especially vulnerable to these economic shocks, lacking the capacity to pivot swiftly. Overall, while prompt internal measures are recognized as essential, they are insufficient without robust macro-level protections, urging a strategic shift in policy to enhance project resilience against global market fluctuations.

E3.5 Cost control systems help maintain project performance despite rising costs.

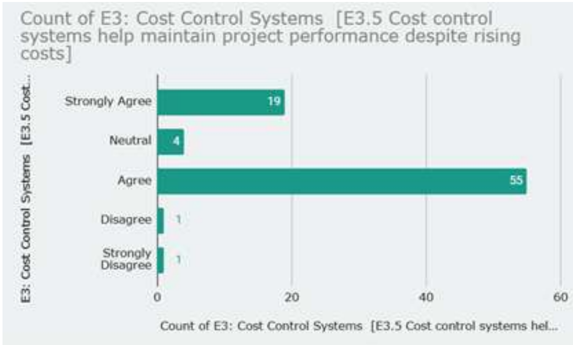

Fig.5.3.5. The data presents the findings from a study on cost control systems in the engineering and construction sectors, highlighting a strong consensus (92.50%) among professionals on their value in maintaining project performance despite challenges. However, the study reveals a paradox: while cost control systems are deemed essential, over 68% of respondents face significant cash flow problems, indicating a disconnect between perceived efficacy and real financial outcomes. The study also notes that small firms struggle without dedicated resources for cost tracking, and public sector regulations hinder flexibility in addressing economic pressures. Ultimately, the results underscore the necessity for advanced project policies, advocating for integration of dynamic financial tools to enhance resilience against market volatility.

Section F: Qualitative Analysis

Emerging Theme	Frequency	Alignment to Study Variables
Cost escalation	Very High	Dependent Variable
Fuel and logistics costs	Very High	Mediating Variable
Material price increase	Very High	Mediating Variable
Schedule delays	High	Dependent Variable
Procurement adjustments	High	Moderating Variable
Operational efficiency measures	High	Moderating Variable
Supply chain disruption	Moderate-High	Mediating Variable
Budget insufficiency	High	Dependent Variable
Contractor financial stress	Moderate	Financial Performance
Reduced profitability	Moderate	Financial Performance
Value engineering / bulk procurement	High	Risk Management Strategy

Table 7. The survey included two open-ended questions to further explore the experiences and adaptive practices of construction professionals regarding the 2026 oil price shock. Responses were analyzed using thematic analysis, wherein recurring ideas and patterns were grouped into emerging themes aligned with the study variables.

The open-ended responses revealed that the 2026 oil price shock had a significant impact on construction project performance, particularly in terms of cost escalation, operational efficiency, procurement, and project scheduling. Most respondents emphasized that rising fuel prices directly increased the cost of material transportation, heavy equipment operations, and supplier logistics, which consequently resulted in budget overruns and reduced project profitability.

Several participants described the oil price shock as having a "ripple effect" on the construction industry, wherein increases in fuel prices triggered corresponding increases in construction materials such as cement, steel, asphalt, and other petroleum-dependent resources. In addition, respondents noted that procurement activities were disrupted due to unstable market prices, delayed deliveries, and the need to revise programs of work and project estimates.

Operationally, organizations implemented various mitigation strategies such as advance procurement, bulk purchasing, fuel monitoring, supplier diversification, equipment scheduling optimization, and stricter cost-control measures. These practices were described as moderately effective in minimizing delays and controlling expenses; however, many respondents acknowledged that such measures could not fully offset the financial and operational pressures caused by continuing oil price volatility.

The findings further suggest that oil price shocks create a cascading effect on construction projects, influencing logistics, supply chain stability, contractor profitability, workforce operations, and overall project feasibility. These qualitative insights strongly support the quantitative framework of the study and validate the identified relationships among oil price shocks, mediating variables, and construction project performance indicators.

V. CONCLUSION

Based on the findings of the study, the 2026 oil price shock significantly affected construction project performance in the Philippine construction industry in terms of cost, schedule, financial, and quality performance. Using a descriptive-correlational quantitative research design, the study established that rising oil prices created substantial increases in material costs, logistics and transportation expenses, and supply chain disruptions, which consequently resulted in project cost overruns, delayed project schedules, reduced profitability, cash flow difficulties, and challenges in maintaining quality standards. The descriptive analysis revealed a consistently high level of agreement among construction professionals that fuel-related expenses and material cost escalation became major operational and financial burdens during the oil shock period. Furthermore, the qualitative findings supported these results by describing a cascading effect wherein fuel price increases triggered disruptions in procurement activities, delivery schedules, equipment operations, and overall project feasibility.

The correlational component of the study further demonstrated that oil price shocks have a strong positive relationship with material cost escalation, logistics and transportation costs, and supply chain disruptions. These mediating variables were also found to have a significant direct relationship with project performance indicators, particularly cost overruns, schedule delays, financial instability, and quality management difficulties. The direction of the relationships indicates that as oil price volatility increases, negative project performance outcomes also intensify. The findings validate the study hypothesis that macroeconomic oil price shocks adversely affect construction project performance through interconnected operational and financial mechanisms. In addition, the study confirmed that moderating variables such as risk management practices, procurement strategies, and cost control systems help reduce the severity of these impacts; however, existing measures were only moderately effective due to limitations in contract flexibility, procurement regulations, and financial adaptability, especially among small- and medium-scale projects.

The study concludes that the Philippine construction industry remains highly vulnerable to external energy-related economic shocks due to its dependence on fuel-intensive operations, transportation systems, and petroleum-based construction materials. Consequently, the research emphasizes the need for more adaptive engineering management practices, including dynamic cost estimation systems, agile procurement strategies, flexible contract mechanisms, real-time cost monitoring, and integrated risk management frameworks to improve project resilience against future oil price volatility and global economic disruptions.

VI. RECOMMENDATION

A. Recommendations Based on the Findings (Philippine Construction Industry)

The study and the researchers recommends that construction firms, project managers, and government stakeholders adopt a proactive, systems-based risk management approach to address the impact of oil price volatility on project performance.

First, implement a standardized Risk Register integrated with EAIA and Hazard Identification Systems, explicitly including fuel price fluctuations with defined risk owners, mitigation measures, and contingency plans to enable anticipatory risk control.

Second, strengthen a Construction Environmental and Supply Chain Risk Register to capture external factors such as fuel supply instability, transport disruptions, and material price volatility, ensuring clearer mapping of risk propagation across project activities.

Third, apply SWOT analysis at the project planning stage, treating oil price volatility as a key threat while leveraging internal strengths such as supplier diversification and procurement flexibility to build resilience.

Fourth, improve procurement and contract systems by incorporating fuel price escalation clauses, indexing mechanisms, and flexible supplier agreements to reduce exposure to sudden cost increases.

Fifth, upgrade project controls into real-time digital monitoring systems using predictive analytics and dynamic budgeting to enhance responsiveness to cost fluctuations.

Lastly, government agencies are encouraged to review RA 9184 procurement guidelines to allow greater flexibility in contract adjustments during major economic disruptions such as global oil crises.

B. Recommendations for Future Researchers

Future studies should expand the scope through cross-country comparative research to test the consistency of the oil price–construction performance relationship in other developing economies.

Methodologically, researchers are encouraged to use SEM or PLS-SEM with larger samples to better validate direct, mediating, and moderating effects among key variables.

Future work should also incorporate actual project performance data (e.g., cost variance, delays, change orders) to strengthen empirical validity and reduce reliance on perception-based responses.

Additional variables such as inflation, exchange rate volatility, procurement policy rigidity, and contractor financial capacity should be included to better explain performance outcomes under macroeconomic shocks.

Researchers may also develop a predictive risk or decision-support model integrating oil price forecasting with project cost and schedule planning.

Finally, qualitative case studies of major infrastructure projects are recommended to provide deeper insights into real-world mitigation strategies used by contractors.

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