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RISK BEHAVIOUR IN PRICE UNCERTAINTIES AND PROJECT COST PERFORMANCE: A SYSTEMATIC LITERATURE REVIEW

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Abstract — Price uncertainties from inflation can lead to the risk of material price escalation, resulting in poor project cost performance. Risk management by the contractor during this time is essential in addressing price uncertainties and depends on their risk behaviour. Risk behaviour is the willingness of individuals or groups to take risks when making decisions. The research aims to establish the framework of the contractor's risk behaviour on price uncertainties to enhance the performance of construction project costs. This research examines the different contractors' risk behaviours in price uncertainties, the factors influencing risk behaviour, and their effect on project cost performance. Systematic literature review is the methodology used to commence the research. The research also comprises a construction of a conceptual framework indicating three different risk behaviours, which are risk-averse, risk-seeking, and risk-neutral; internal factors indicated, such as organisation culture, financial competency, and contractor experience in risk; and external factors comprising economic environment, the competition level during the tender stage, tendering method, and government policies; and the impacts. The outcome shows the different impacts of risk behaviours during price uncertainties on project cost performance. The result promotes best practices by emphasising risk behaviours that construction contractors should address to accomplish the objectives of the National Construction Policy 2030, which intends to enhance cost efficiency and quality in the construction project performance.

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***Keywords*:** risk behaviour, project cost performance

1.0 INTRODUCTION

Construction projects inherently involve significant uncertainties due to the unpredictable nature of future events and human actions [1]. These projects are unique because of their extended durations, which often lead to changes in circumstances and potential complications. The construction process encompasses several stages, including initiation, preconstruction, execution, and post-construction phases. Long-term projects with several phases are prone to various situations, uncertainties, and hazards, which can either lengthen the project duration or result in monetary losses, negatively influencing the operation and economics of the project [2]. For instance, uncertainties during the preconstruction phase can impact cost estimation processes. During construction, potential uncertainties include material cost escalations and accidents. Uncertainties in post-construction include risks related to statutory compliance, unforeseen events, and the final cost and timing of project completion.

Price volatility is a primary cause of uncertainty in construction, as it results from unexpected circumstances that might affect project costs and clients' budget plans. According to Malaysia Industry Development Finance Berhad Research in 2024, shifts in economic dynamics could lead to Malaysia's overall inflation rate surging to 3.2% in the coming year [3]. Unpredicted changes in the inflation rate are frequent risks in construction projects. The inflation rate significantly affects project budgets, as it can escalate construction material prices during the project. Construction materials, which comprise more than 50% of the construction cost, such as steel and concrete, are particularly prone to inflation, greatly raising overall construction prices [4]. This situation becomes worse by poor risk management practices by contractors. Cost deviations from the initial budget often stem from inadequate risk

management, especially when changes in costs are not efficiently handled. The understanding and use of risk behaviour management, which includes contingencies in cost estimation to cover the risk of cost escalation, are often insufficient. 'Contingency' refers to funds reserved for unexpected difficulties during construction [5]. Unfortunately, cost contingencies are sometimes underestimated, and some projects either lack or possess minimal expected cost contingencies because many contractors disregard them in the final tender price to maximise their chances of obtaining the project [6]. This issue relates directly to the contractors' risk behaviour in managing project risks.

Risk behaviour refers to decision-making in situations involving potential risks and can be described based on the level of risk involved [7]. It also encompasses any action that increases the likelihood of experiencing an objective or subjective loss. Contractors exhibit a spectrum of attitudes toward risk and uncertainties. Some perceive uncertainty as a threat to the organisation, which prompts managers to reduce or eliminate it. Others may disregard it, believing it cannot be controlled. Some contractors may respond to the risk using contingencies. The contractors' behaviour is crucial in affecting the project's cost performance. Studying various implications of risk behaviours is vital in reaching the goal outlined in the National Construction Policy 2030, which encourages the best practices, especially in risk management for construction [8].

Despite several studies on project cost management, there is not much current literature that particularly investigates how risk behaviour across project teams affects cost performance. While earlier studies have addressed the general impact of cost estimation and risk allocation, such as in Welde and Klakegg [9], few have focused on the psychological or decision-making aspects of risk-taking by contractors. Qazi et al. [10] address the influence of risk behaviour on expected performance, based on contractor predictions, not the actual final project cost.

Moreover, recent advancements in project management tools and methodologies, which may affect risk behaviour, have not been fully integrated into the existing body of research. This creates a critical gap in understanding how modern risk-impacting behaviours impact the overall project costs in today's dynamic project environments. Furthermore, systematic literature reviews on this topic are scarce. Systematic literature reviews are efficient for studying research topics, gathering, organising, and evaluating existing literature in a specific field [11]. They offer a thorough review, consolidating past research to enhance the knowledge base while ensuring transparency and minimising bias. Researchers create a protocol before a review, including research questions, search strategy, criteria for selecting appropriate studies, quality assessment method, data extraction, and analysis and synthesis plan. The critical research questions driving this review are:

"What is the risk behaviour of contractors under conditions of price uncertainties for construction projects?"

"What internal and external factors influence their decision-making processes in adopting particular risk management strategies?", and

"How does the risk behaviour of contractors in price uncertainty impact project cost performance?"

This study conducted a thorough analysis of related studies to fill a gap and provide an in-depth understanding of contractors' risk behaviour under price uncertainty, the factors influencing this behaviour, the impact of risk behaviour on project cost performance, and the development of a conceptual framework.

2.0 METHOD

The methodology section contains the review procedure, the establishment of research questions, systematic finding methods, quality evaluation, and the extraction and analysis of data. The methodology for this study was created in compliance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). PRISMA statement improves the transparency and thoroughness of systematic literature reviews [12]. PRISMA has been applied in numerous research studies in the built environment field, particularly those pertaining to construction risk [13]. Researchers have embraced the PRISMA method due to its structured method to employ keyword and

search strategies to identify extensive databases, screening literature for eligibility in evaluating related studies and conducting an eligibility process to ascertain the suitability of literature for data analysis.

In the first phase, terms linked to this study's primary keyword, 'risk behaviour', pricing uncertainty, contractor and project cost performance, are searched for synonyms and related terms. Two sources, Thesaurus Online and ChatGPT, were used to enhance the core terms. Therefore, the chosen keywords are risk attitude for risk behaviour, price fluctuation for price uncertainties, and project cost evaluation for project cost performance. The study used three databases to find related studies, which are Web of Science, Scopus and Google Scholar. By employing two or more databases, a broader range of citations can be obtained, increasing the likelihood of locating every relevant and accessible studies. The Web of Sciences as well as Scopus are useful for analysing current academic literature and identifying trends. Google Scholar is an excellent resource for research because it provides access to many studies. The authors used a search string that consisted of Boolean operators, such as OR and AND, to combine keywords in their advanced search approach, ensuring more relevant and accurate information retrieval. The author also used manual search strategies, including handpicking and snowballing, to search the databases. Using all the databases used in this study, 738 related studies were found.

The 738 studies found during the first phase were subjected to the screening procedure. The screening which limited studies found in Scopus and Web of Science databases was automated via the 'limit to' option of the respective databases. For studies from the Google Scholar database, the screening process, however, was only partly automated due to the limiting features being confined to the publication year. The process of studies selection consisted of identifying relevant primary studies, removing duplicates, and then a two-phase selection based on titles, abstracts, and keywords. Studies from 2015 to 2024 were considered, covering a sufficient timeframe for a systematic review. Thus, the screening method reduced the quantity of associated studies. This timeline was selected as it encompasses enough studies for consideration in a systematic literature review. The research was related to engineering, construction technology and building. Besides that, the study was conducted exclusively in English, as it is widely regarded as the predominant language for crafting academic or scientific research papers and works. The studies were selected from credible academic publications, including journal articles, conference proceedings, and working paper. For Google Scholar, the Studies were manually curated based on their relevance and compliance within the criteria. The inclusion and exclusion criteria during the screening process are shown in Table 1. The screening reduced the number of studies to twenty-four. The Figure 1 presented overall PRISMA method and study selection process, which illustrates the PRISMA flow diagram from the identification of relevant studies through the screening, eligibility, and final inclusion stages.

Table 1 Inclusion and Exclusion Criteria of the Research

Aspect	Inclusion Criteria	Exclusion
Years	2015 - 2024	< 2015
Language	English	Non-English
Research Context	Engineering, construction technology, and building	Unrelated to the construction industry

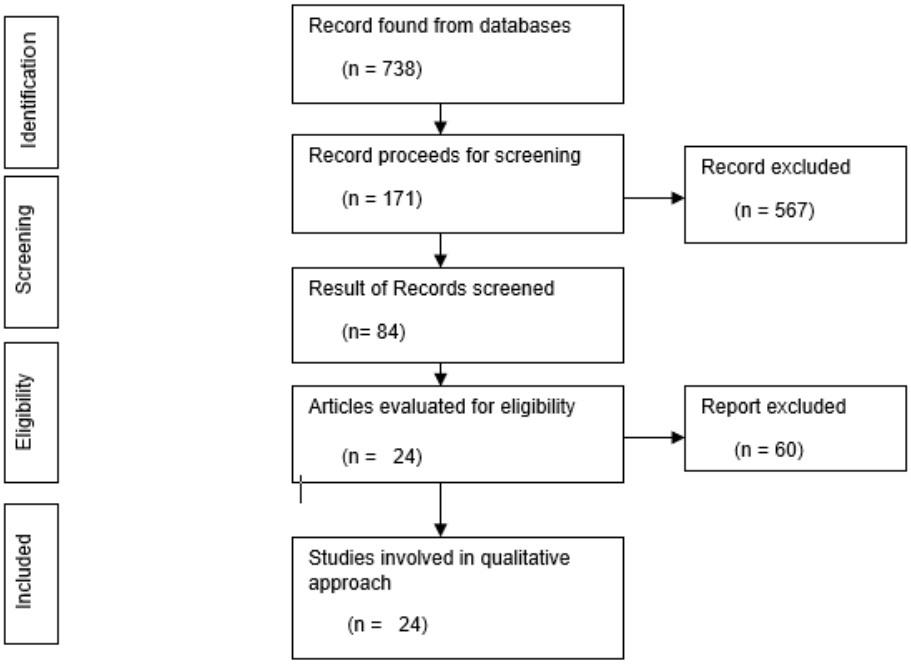


Figure 1 PRISMA research method process

The systematic review approach relies heavily on predetermined eligibility requirements. During the eligibility step, the researcher examines the studies' title, abstract, findings, and debates to determine how well they relate to the study's requirements. The study's criteria were not met by twenty-four studies, which included a general focus on risk management without going into detail contractor's risk behaviour in price uncertainty or discussing other kinds of uncertainties such as geology and uncertainties.

Twenty-four studies were chosen for quality assessment and sorted into themes using qualitative assessment and eye-balling techniques. The studies were also visually inspected, with the complete text of the chosen studies being read to confirm their relevance and alignment with the abstract and research objective, and any duplicate studies were eliminated. The studies were chosen for quality assessment and sorted into themes using qualitative assessment and eye-balling techniques. Two reviewers evaluated the studies, classifying them as poor, average, or high quality based on a qualitative assessment. Only studies with an average or high-quality rating are included in the review. In accordance with the suggestions made by Hong et al. [14], the reviewers evaluated these quality using five criteria as follows:

(1) Are the primary goals of the studies related to SLR methodology?
(2) Does each methodological guideline in the studies have sufficient justification?
(3) Do the studies provide any alternatives or options to their proposed SLR guidance?
(4) Do the studies clearly outline the SLR methodology for the authors?
(5) Do the studies present all necessary methodologies to establish an SLR?

Each criterion had three possible responses from the reviewers: yes, no, and not sure. The reviewers classified studies as high quality if they met four or five criteria, moderate quality if they met at least three criteria, and poor quality if they met only one or two criteria. The study's reviewers concluded that twenty-four studies met the minimal requirements (high or moderate).

The twenty-four studies picked up were then examined and organised into distinct themes. Finally, after cross-checking with other review studies and verifying themes, the studies chosen were divided into three categories: 'risk

behaviours of contractor' (n = 5), 'internal and external factors influence risk behaviour of contractor' (n = 13), and 'impact of risk behaviour on the project cost performance' (n = 6).

3.0 RESULTS AND DISCUSSION

3.1. Risk Behaviour of Contractor Toward Price Uncertainties in Construction Project

For contractor organisations, understanding risk behaviour is crucial, as it significantly influences their decision-making processes. Contractors' risk behaviours vary widely, depending on their capabilities and approaches to managing risks. In decision-making, risk behaviour can be classified into three main groups: risk-averse, risk-seeking, and risk-neutral [10]. The implication of risk behaviour can be observed in the markup estimates in the tender. Depending on the contingencies sum placed in the tender markup, the risk mitigation does not lose on damage. The contingency refers to risk provisions to cover potential losses, and the risk from the price uncertainty with different risk behaviours directly determines the contingency included in the term markup of the tender. Table 2 summarized the relevant studies of contractors' risk behaviours, including risk-averse, risk-seeking, and risk-neutral behaviours.

Risk-Averse Behaviour

Contractor often adopt risk-averse strategies which are being cautious to navigate price uncertainties and carefully mitigate potential fluctuations. Fateminia et al. [15] use fuzzy ranking methods in which the model can replicate three distinct human attitudes toward risk that consist of risk-averse, neutral, and risk-seeking. This approach reflects a risk-averse decision-making style, prioritising options that minimise risk exposure or potential loss, even at the expense of possible gains. Risk-averse contractors tend to provide conservative estimates in estimating situations [16].

Risk-Seeking Behaviour

Risk-seeking decision-makers focus more on positive outcomes and underestimate the likelihood of losses, leading to a reduced perception of risk. Gosavi et al. [17] present a model for predicting system behaviours such as risk-taking and agility based on prior experiences. Contractors that view high strategic value are inclined to participate in risk-seeking behaviours by giving lower tender price markups. It is because the project's winner is often picked from among the tenderers who submit the lowest tender bid price [18]. Contractor who exhibit risk-seeking behaviour may prioritise risk management less. The risk-seeker contractor's low tender price reduced the possibility of price commitment. As a result, the contractor had the lowest prospect utility, which indicates a high risk associated with tender proposal commitment.

Risk-Neutral Behaviour

Risk-neutral behaviour, as the term suggests, involves a neutral stance towards hazards. Risk-neutral contractor avoid the extremes of over-preparation and underestimation. Such preferences do not lean towards either risk aversion or risk-seeking. Actions of risk-neutral parties are independent of the uncertainty level in each set of possibilities, averaging the highest and lowest contingency percentages used compared to risk-averse and risk-seeking behaviours [19]. Contractor adopting a risk-neutral stance may balance their perception of uncertainties. The contractor proactively balances their tender bids to protect against fluctuating demand from contractors for projects and project risk.

Table 2 Sources for Studies' Risk Behaviour of Contractor in Price Uncertainties

Risk behaviour	Studies
Risk Averse	[15], [16]
Risk-seeking	[17], [18]
Risk-Neutral	[19]

3.2. Factors Influence Contractor Risk Behaviours in Response to Price Uncertainties

These factors influencing contractor risk behaviours in response to price uncertainties are discussed in this section by first confining the factors into either internal or external. The collection of sources for the internal factors of contractor risk behaviour shown in Table 3 while for the external factors shown in Table 4. Internal factors include;

(a) organisation,
(b) competency, and
(c) experience.

External factors include:

(a) economic environment
(b) competition
(c) tendering method, and
(d) government policies.

3.2.1. Internal factors

Organisational culture in contractor firm

There is a direct correlation between internal organisational factors, strong leadership, the culture of an organisation, and efficient communication in anticipating risk behaviour in risk management [20]. Successful project management requires different leadership strategies beyond standard tasks. Active leaders are needed in building projects to take immediate action to prevent issues from worsening. Proactive and decisive leaders can inspire confidence and rally teams to respond effectively to emerging risks, fostering a strong organisational culture. A contractor organisation with solid leadership and management can influence its pricing strategy for risk behaviour management by accounting for material price uncertainties. Conversely, some organisations try to find the middle ground between managing the fluctuations of the price risk and winning the project to keep their profitability. Kissi et al. [21] found by their analytical review that an organisation's price decision has a direct impact on its market performance and profitability. For an organisation neutral to risk, a correctly set-up pricing is the best way to maximise earnings and enterprise viability. This is because elements of value-based pricing, such as building to meet clients' needs, are essential to an organisation's sustainable profit.

Financial competency of contractor's organization

Competency influences contractor behaviour in risk management. Contractor with high professional competencies can execute projects and effectively analyse potential risk. Strong risk management can be achieved by organisations with higher financial competency, enabling them to handle high-risk situations and make informed decisions. According to research by Dumo O. [22], a contractor's financial stability is the most significant factor to consider when deciding on a tender for a building project. Companies with limited financial resources may use market-based approaches that price the tender considering the number of competitors to get the projects at a low cost [23]. To order to obtain the job and increase revenue, the company will consistently engage in risk-seeking by implementing low-tender price approaches.

Experience in handling risk

Risk behaviour management by contractor is influenced by contractor's experience. Bhutada and Maheshwari [24] suggest that risks are frequently managed implicitly via intuition and experience. To correctly manage risks, all contracting professionals must have the necessary skills, capacity, support, and access to reliable information. This can be accomplished by regularly documenting and reviewing project risk activities and utilising historical databases. Those with extensive building project delivery experience are well aware of the risks involved in projects and, for the most part, would rather avoid it [25]. This is owing to the contractor's extensive knowledge of the risks that may develop during a project. The contractor knows best the risks that could arise from a project. It allows them to experience the challenges and unpredictability common within construction projects. This means that experienced contractor will be mindful of the risks and have a higher chance of successfully mitigating risk-based decisions in construction.

3.2.2 External factors

Economic environment that affects the availability of the project

The economic environment significantly impacts the risk behaviour of construction project contractors. Consequently, forecasting construction tender prices depends on economic indicators. Contractors assessed the current economic conditions, including job availability. Economic growth drives investment in infrastructure, leading to increased demand for construction projects [26]. Boonyaperm [27] studies the economies of CLMV countries, particularly Cambodia, Laos, Myanmar, and Vietnam, which are in a phase of expansion. The growing number of infrastructure and construction projects creates chances for Thai contractors to enter these industries. This approach enhances competitiveness for the project.

Market competition of contractors

Competitive tendering is the primary process for allocating construction projects and determining prices. Contractors' behaviour may result in different optimal markup decisions in the tender. Obodo et al. [28] state that competition is a crucial predictor or element that influences small-scale indigenous contractors' decisions in tender bids for Nigerian projects. According to the information, competition is significant in the construction sector, allowing contractors to be on alert in tender bidding and obtain building projects that would help them grow and expand their businesses. The number of tenderers substantially affects contractors' tendering competitiveness [29]. When the tendering process is perceived as more competitive, contractors may reduce their tender markup to increase their chances of winning the project.

Tendering method for selecting contractor

The tendering method used in construction projects can significantly influence the risk behaviour of contractor. The nature of tendering, whether open or negotiated, exposes contractor to different levels of risk and a higher degree of competition. Open tendering includes more competition for contractors and results in lower tender costs [30]. The contractors are pricing low in competitive tenders to secure the contract. However, early contractor involvement in negotiated tenders allows for design adjustments during the tender period, resolving anticipated issues upfront.

Government policies

There is a positive relationship between government policies and contractors' risk behaviours. Changes in government regulations will have an impact on construction risk management, particularly the amount allocated in the tender price. Economic variables that contribute to inflation in construction projects derive from basic supply and demand principles as well as government budgetary policies. Asamoah et al. [31] developed an analytical model that stated fiscal policies led to challenges in cost planning, including underpricing and overpricing. Strong

government laws and regulations pertaining to construction will reduce contractors' risk-taking behaviour [32]. The environment reduces competition among contractors' organisations. Contractors may modify their risk behaviour to accommodate the rising cost linked to regulatory compliance, which could result in higher project tender prices and more cautious risk behaviour for risk management in pricing practices to account for any uncertainties.

Table 3 Sources for Studies' Internal Factors of Contractor Risk Behaviour

	Factor	Studies
Internal	Organization culture in contractor firm	[20], [21]
	Financial competency of contractor's organization	[22], [23]
	Experience in handling risk	[24], [25]

Table 4 Sources for Studies' External Factors of Contractor Risk Behaviour

	Factor	Studies
External	Economic environment that affects the availability of project	[26], [27]
	Market competition of contractors	[28], [29]
	Tendering method for selecting contractor	[30]
	Government Policies	[31], [32]

3.3 Impact of risk behaviour on price uncertainties to the project cost performance

Cost performance is vital in project performance, as it indicates if the project is over or under budget. Perfect cost performance is recognised as the situation where actual costs match with budgeted costs and expenditure meets planned cost. Cost performance management is the skill of controlling construction projects within a predetermined budget. Cost performance is influenced by the contractor's conduct of risk behaviours. By comparing different behaviours such as being risk-averse, risk-seeking, and risk-neutral, one can evaluate both price uncertainties and project cost performance caused by it. Table 5 summarizes the sources of study related to the the discussion of the impact of contractors risk behaviours on price uncertainties and project cost performance.

Risk-Averse Behaviour

Uncertainties within a project can significantly contribute to cost overruns. Risk-averse contractor, who ensure that the actual costs do not fall out of the budget, utilise risk mitigation and thorough planning. According to Cavalieri et al. [9], large-scale Norwegian projects were found to have cost underruns, which are perceived as good outcomes for a risk-averse decision-maker. Their approach includes applying more contingencies as a safety net and handling unforeseen circumstances without exceeding the budget. However, Cavalieri et al. [33] argue that this cautious behaviour leads to a persistent overestimation of costs, providing large monetary protection. On the one hand, high contingency costs may result in poor cost control and uneconomic completion of the project. US projects with a

big contingency also tend to experience higher cost overruns [34]. An overly risk-averse contractor may also face cost overruns, as they tend to submit tenders with a high level of cautiousness in their budgeting or have an opportunity for achieving good cost performance if they manage risks effectively to not incur unexpected costs by the amount of contingencies included in their tender.

Risk-Seeking Behaviour

Risk-seeking contractor, focusing on securing projects, tend to underestimate risks, resulting in budget deviations. Chadee et al. [35] also found that the behaviour of decision-makers, which tends to underestimate cost, time, and risks, is a significant source of cost overrun in the public housing programmes. Underestimating costs helps enhance the acceptability of getting a project while competing for limited funds. It also resulted in a low allocation of contingency amounts in the tender markup. Hammad et al. [36] found in their proposed cost contingency methodology that low contingency allocation in tender markup may result in insufficient money for project execution, an unrealistic financial condition, and poor performance outcomes. When there is a price escalation due to uncertainties, the low contingency allocation is often insufficient to cover the increase.

Risk-Neutral Behaviour

As for risk-neutral behaviour, it is different from other behaviours' perceptions toward risk. Compared to risk-averse contractor, risk-neutral contractor is not sensitive to any risk related to cost savings or overruns. According to Andersen [37], risk-neutral organisations choose tender amounts to maximise their expected return, balancing the goal of raising profits after obtaining the contract in the condition of the risk of losing out owing to tender exclusions, which exclude lower bids. Contracts granted by tender exclusion have fewer and smaller cost overruns, but the hidden costs might be significant. Additionally, contractors with neutral risk behaviour also have only a 50-50 chance of construction cost overrun risk [38]. In summary, risk-neutral contractors may face a balanced probability of cost overruns in case of price uncertainties.

Table 5 Sources for Studies Impact of Contractor Risk Behaviour to The Project Cost Performance

Impact of Risk behaviour	Studies
Risk averse	[9], [33], [34]
Risk-seeking	[35], [36]
Risk-neutral	[37], [38]

4.0 CONCEPTUAL FRAMEWORK

This part presents a conceptual framework as a summary of the key findings and correlations between the variables under the study. The study focuses on contractors' risk behaviours and their effects on project cost efficiency, as well as the importance of price uncertainty reduction. These behaviours are driven by a complex interplay between internal and external forces.

Contractors need to change and create new types of risk management due to ongoing internal and external factors. Organisational risk behaviour significantly impacts project success by influencing cost performance and determining project outcomes. Identifying risk behaviours of contractors can help in improving the risk management programmes to address the risks in a manner which reduces cost overruns. Different risk mitigation methods correspond to varying contingency costs aimed at addressing price uncertainties. Figure 2 presents the conceptual framework developed for this study.

Uncertainty is the gap between the necessary information to make a decision and the information that is now accessible. Price uncertainty poses significant risks to project planning and execution due to fluctuations in labour, material, and resource costs. Effective risk management is crucial in mitigating these risks to ensure more consistent and controlled project costs. The efficiency of risk management largely depends on the risk behaviour that contractors exhibit.

Risk-averse contractor tend to overestimate the risk of price uncertainties, which provides conservative estimates in estimating situations. The contractor might be well-experienced, so they widely know the risk associated with the project, and they generally choose to prevent it by estimation [25]. Strong government policy in the form of laws and regulations also will cause the contractors to behave cautiously [32]. These contractors inflate their expenditure estimates to ensure they remain within budget. Using contingencies can increase the likelihood of savings in costs and limit project cost overruns from price uncertainties. However, the behaviour also tends to overestimate costs to build a buffer against uncertainties. Large contingencies are more likely to result in cost overruns due to constant cost overestimation, which provides excessive monetary protection while leading to ineffective cost control and uneconomic project completion [34].

Furthermore, risk-seeking behaviour involves underestimating project costs in the pursuit of potential opportunities. Economic growth stimulates infrastructure investment, which leads to increased demand for building projects as contractors assess job availability [26, 39]. This results in tight competition among contractors to secure the job. Competitive tendering results in a low allocation of contingency amounts in the tender markup, resulting in low tender pricing, causing cost overruns [36]. The contingency allowance is frequently insufficient to offset the increased cost from price uncertainties.

As for risk-neutral behaviour, it is different from other behaviours' perception toward risk. In comparison to risk-averse contractor, risk-neutral contractor are not sensitive to any risk related to cost savings or overruns. Contractor organisations that focus on maximising profits and ensuring the success of their business will take a risk-neutral strategy [21]. The contractor has a neutral attitude towards risk, which possible contractor possess the necessary abilities, and the financial result of a project is stated relative to a desirable benchmark or objective set by the owner. They are more likely to effectively manage costs without being overly cautious or excessively optimistic. This combination helps them determine costs for projects and how to allocate resources while avoiding most instances of underestimating costs. Contractors that adopt a risk-neutral strategy may lessen the likelihood that project costs would exceed budget [37, 40].

In short, the risk behaviour of contractors varies and mounts and influences the cost estimation and project success. Up to national construction policy 2030, there is an imperative approach to having contractors in the construction industry adapt best practices as a target achievement, and to make it happen, there is visible gain for contractors to adapt best practices exercised during construction. Moreover, it is suggested to improve procedures for cost estimation so that the link between the risk behaviour of contractors, project costs and price uncertainty is signified more. Construction professionals should plan for an in-depth knowledge of the uncertainties of price and how those uncertainties can be managed ahead of the project. This will enable contractors to maximise the performance of projects in terms of cost and quality across the construction process [8].

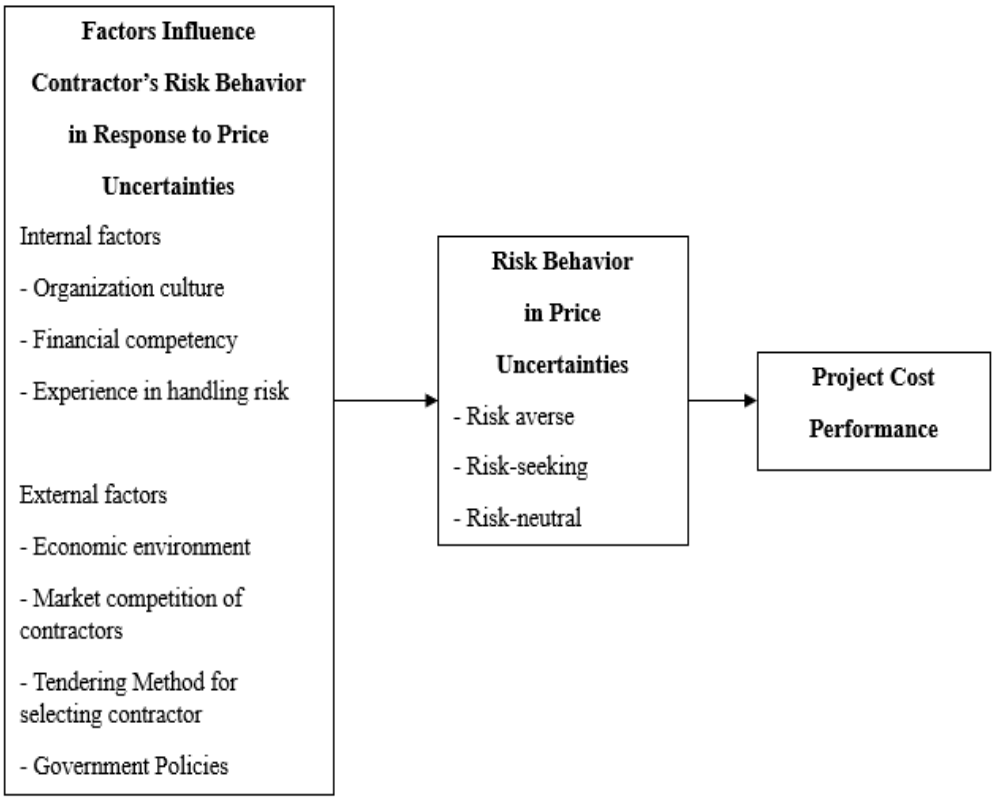


Figure 2 Conceptual framework of the study

5.0 CONCLUSION

To sum up, contractor risk behaviour under an uncertain price envelope is a vital factor influencing the cost performance of construction projects. The systematic review outlined substantial gaps across the literature and provided direct recommendations on how to improve surrounding risk management. Studying all of the internal and external factors that drive contractors to act in certain ways can provide insight into how project costs may be controlled or why they often exceed initial estimates. Further research is specifically needed to provide insights into these dynamics that allow for more tailored and holistic strategies for managing construction risk.

Conflicts of Interest

The authors declare that they have no conflicts of interest in the publishing of this paper.

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