

# **An Analysis of Risks in Contractor Bidding Strategies within the Sri Lankan Construction Sector**

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## **Abstract**

Competitive bidding is widely employed by construction firms to secure projects, often by identifying optimal opportunities and submission strategies. However, certain bidding approaches may result in adverse outcomes, such as the "winner's curse." This research investigates the key factors and strategies influencing bid decision-making and contractor behavior within the Sri Lankan construction sector. It evaluates the relevance and limitations of theoretical bidding models in real-world applications, with emphasis on risk management and market-responsive strategies. A critical literature review is structured around two principal themes: bidding strategies and associated risks. A thematic and critical review methodology synthesizes existing knowledge and highlights gaps. The study identifies and classifies various risky bidding strategies, ranking them based on their level of risk. Repetitive job bidding emerged as the least risky approach, while intuitive manipulation was identified as the most hazardous. Corresponding risk-mitigation techniques are outlined, offering valuable insights for practitioners and policymakers aiming to enhance the effectiveness and resilience of bidding practices in the construction industry.

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*Keywords:* Bidding strategies, Risk, Bid Decision-Making, Risk Management, Winner's Curse, Bidding Models

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## **Introduction**

Competitive bidding is crucial for contractors in the construction industry (Boussabaine, Lewis, & Wanous, 1999). Bruke (1999)'s, but the bidder's dilemma arises when submitting a tender figure that is low enough to win the competition but high enough to cover costs, service, and overhead.

Decision-making at the corporate level is therefore pivotal. Passer (2011) highlights that senior managers decide whether to bid, the mark-up to apply, and the competitive posture to adopt. Empirical studies in Sri Lanka confirm that factors such as project size, current workload, and capital availability dominate bid/no-bid deliberations (Perera & Pathirana, 2024). Because construction projects are uniquely long, bespoke, and risk-laden, bidding decisions must integrate a structured approach to risk management. Tang's (2004) synthesis shows that contractors either load an overall contingency percentage onto cost estimates or analyse individual risk events and price them separately mirroring the four classic responses of risk retention, reduction, transfer, and avoidance (Uher & Zantis, 2011). Despite an expanding body of global scholarship, the integration of bidding strategy and systematic risk valuation remains underexplored in the Sri Lankan context, particularly in the aftermath of the 2022 economic crisis (Weerakoon et al., 2023).

Passer, R. (2011) emphasizes the importance of corporate level decision-makers in construction firms in determining the best bidding strategy for each project. This involves decisions on bid selection, mark-up level, and winning strategy. Tarek and Tang (2004) argue that deciding on a suitable strategy is challenging due to competition and the high risk associated with construction projects. Tarek (as

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cited in Tang, 2004) suggests two methods for assessing and accounting for project risks: estimating a percentage mark-up to total cost and analyzing risky components, probability, and expected damages for appropriate contingency allowances.

Risk management is a systematic approach to identifying and addressing potential risks in construction projects. It involves risk classification, identification, analysis, and response, which can be divided into four actions: retention, reduction, transfer, and avoidance (Uher & Zantis, 2011). This process is crucial for achieving project objectives in terms of time, cost, quality, safety, and environmental sustainability, (Zou, Zhang, & Wang, 2006).

Tarek and Tang (2004) argues that strategy involves making competitive decisions, especially in the construction industry, where competitive pressures are intense. Contractors must use strategies like unbalanced bids, repetitive jobs, labor components, and statistical models to win bids, but avoid a winner's curse. Ariyaratna, E. S. (2012) emphasize the importance of identifying major value opportunities and key risks early in a project to ensure the best overall value for money. However, research on the integration of bidding strategies and risk valuation techniques in the construction sector, particularly in Sri Lanka, is limited. Therefore, further research is needed to understand how these strategies minimize contractor risks in the construction industry.

This research aims to explore and critically analyze the factors, strategies, and risks influencing bidding decisions in the construction industry, with the aim of understanding how theoretical models and practical approaches are applied in real-world bidding practices aiming to bridge the gap between theory and practice.

## **Literature Review**

One of the consequences of the bidding strategy. Drew et al. (2001) suggest that, three important factors influencing contractor- bidding behavior have been identified in the literature as (1) type of client, (2) type of construction work and (3) size of construction work.

### ***Factors Influencing the Development of Bidding Strategies***

To remain competitive and profitable, construction firms must formulate effective bidding strategies tailored to market conditions, client expectations, and project-specific characteristics. Strategic pricing plays a central role in this process. For instance, contractors entering or maintaining a presence in a competitive market often opt for aggressive pricing tactics to secure work, even at lower profit margins (Perera & Pathirana, 2024).

### ***Theoretical Classifications of Bidding Models***

Recent literature classifies bidding models into three primary categories based on methodological orientation (Zhou et al., 2022)

- a) Probabilistic Models: which apply game theory and statistical distributions to optimize bid outcomes.
- b) Regression-Based Models: utilizing historical data to forecast competitor behavior or bid-success probability.
- c) Econometric or Market-Based Models: which integrate macroeconomic indicators into pricing forecasts.

Expanding on earlier frameworks, contemporary classifications group bidding models into:

- a) Mathematical Approaches: Relying on algorithms, simulations, and optimization tools (e.g., Monte Carlo, linear programming).

- b) Judgmental Approaches: Based on managerial experience, heuristics, and historical knowledge.
- c) AI and Data-Driven Approaches: Using machine learning, neural networks, or fuzzy logic systems to refine pricing decisions (Mollah et al., 2023; Hu & Zhang, 2021).

Despite these advancements, practical uptake remains limited due to the complexity of models and the difficulty in replicating dynamic site conditions and market fluctuations (Tang et al., 2021).

### ***Need for Practical Bidding Models***

Friedman's classic profit-maximization model catalysed decades of bidding research. However, many such models remain confined to academic use due to several constraints:

- a) Oversimplified assumptions that fail to reflect real-world uncertainties.
- b) Reluctance among practitioners to adopt complex mathematical models over intuitive decision-making.
- c) Limited consideration of multiple contractor objectives, such as relationship building or market expansion beyond profit alone (Tang et al., 2021; Zhang & Olaniran, 2022).

This gap between theoretical development and industry application necessitates hybrid models that integrate structured logic with experiential insights.

### ***Bidding Strategies in Practice: Current Industry Approaches***

Drawing from regional studies and industry case analyses (Rasanthi et al., 2021; Uduwage-Don et al., 2023), the following are prominent bidding strategies adopted in the construction sector:

#### ***Bid Unbalancing***

In discussing bid unbalancing categorized as

1. Mathematically unbalanced bids (based on pricing misalignment with quantities),
2. Materially unbalanced bids (exploiting early cash flows or anticipated variations).

#### ***Front-End Loading (FEL)***

Allocates higher prices to early-stage items, aiding contractor cash flow during mobilization (Karunasena & Weerasinghe, 2022).

#### ***Back-End Loading***

Prices are inflated for work scheduled later in the program, often linked to escalation risks or projected quantity increases.

#### ***Individual Rate Loading***

Adjusts prices for specific items based on expected scope changes, often derived from project design gaps or historical variation patterns.

#### ***Equally Distributed Mark-Up***

Adds uniform mark-up across all items as a simplified method of risk adjustment (Ariyaratna, 2012).

#### ***Winning Price Criteria***

Bidders estimate prices using historical benchmarks such as cost/m<sup>2</sup> from similar past projects (Pathirana & Rajapakse, 2021).

#### ***Planned or Tiered Mark-Up***

Applies pre-set mark-up ranges aligned with corporate profit targets, adjusted dynamically to market competition levels.

***High-Low Range Criteria***

Establishes a pricing corridor between minimum and maximum acceptable bid levels based on strategic capacity and workload (Jayasinghe & Liyanage, 2023).

***Intuitive Manipulation***

Relies on subjective judgment or “gut feeling” in bid pricing, lacking structured analysis—considered high-risk and error-prone (Rasanthi et al., 2021).

***Discount After Submission***

Allows the highest-priced bidder to win by offering post-submission discounts (Gunawardena & Fernando, 2020).

***Miscellaneous Section Strategy***

Larger firms may assign small works to separate internal divisions with lower overheads to improve cost competitiveness.

***Market Diversification***

Contractors shift bidding focus between public, commercial, and residential sectors based on project availability and policy shifts (Weerakoon et al., 2023).

***Repetitive Job Bidding***

Targeting clients with a record of awarding recurring projects to existing contractors to increase winning probability.

***Labour Resource Management***

Focuses on minimizing labor costs through direct supervision and productivity improvements, assuming material costs remain similar across bidders.

***Standard Fee Strategy***

Contractors set a non-negotiable profit threshold. If the project cannot accommodate this within the bid, they opt out (Barr, 1990).

***Standard fee in bidding***

According to Barr (1990) contractor has a standard fee that he will not go below. If he does not think he can win a bid with that standard fee included, he will not bid the job. He must include overall company overhead in the bid. This makes him less competitive on relatively smaller jobs. When he varies his bid price, he only adjusts his fee up or down.

***The Winner’s Curse***

First introduced by Wilson (1969), the “Winner’s Curse” refers to scenarios where a contractor secures a project with an unrealistically low bid, only to face losses during execution. This remains a persistent threat in competitive markets, particularly where aggressive pricing is used without adequate risk assessment (Zhang & Olaniran, 2022).

***Defining Risk in Construction***

Risk in this context is defined as any deviation from the expected cost or outcome due to internal or external factors. Reiss (2006) states that risk is not inherently negative—it reflects uncertainty that must be quantified and managed.

Construction-specific risks include cost overruns, schedule delays, design discrepancies, and contractual disputes. These must be addressed through a structured risk management framework, which involves (Flanagan & Norman, 1993; Wang et al., 2020):

1. Risk Identification – Detecting potential hazards early in the bidding process.
2. Risk Analysis and Evaluation – Assessing impact, probability, and cost consequences.
3. Risk Response Planning – Formulating mitigation, avoidance, or transfer strategies.

**Risk Analysis in Bid Preparation**

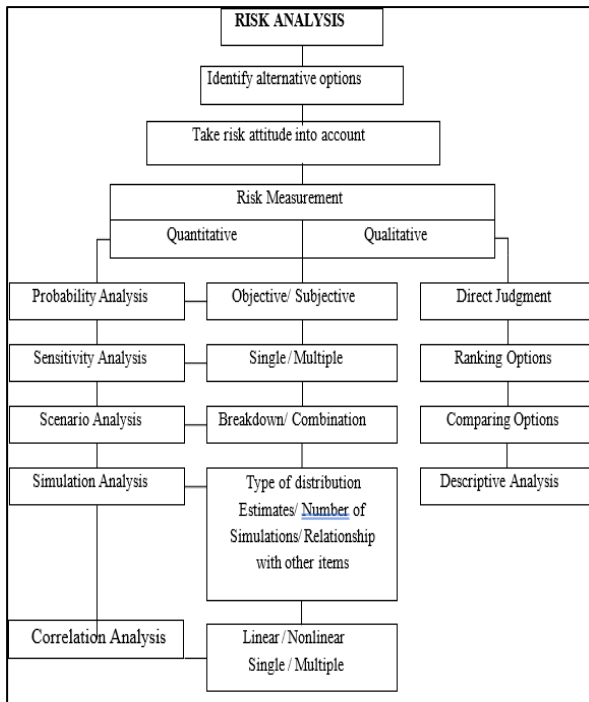
Risk analysis enables contractors to incorporate uncertainty into cost estimates, using sensitivity analysis or Monte Carlo simulations to quantify pricing volatility (Mak & Wong, 1997; Zhou et al., 2022). Modern practices recommend integrating risk registers into tender documentation to ensure transparent and informed pricing.

**Risk analysis**

The purpose of risk analysis of estimates is to allow for the inherent uncertainty of the costs of individual activities or elements within a project when accessing the anticipated final cost of a particular scheme (Mak & Wong, 1997). Figure-1 shows risk analysis flowchart.

**Figure 01**

*Risk Analysis*



**Methods**

This research employed a thematic and critical literature review methodology to investigate bidding strategies and the associated risks encountered by contractors within the Sri Lankan construction industry. Thematic analysis was chosen due to its ability to categorize and interpret large volumes of qualitative data across multiple domains, including strategy formulation, theoretical model applicability, and risk management integration.

A systematic search of peer-reviewed journals, dissertations, and industry reports published between 1990

and 2024 was conducted using academic databases such as Scopus, Google Scholar, ScienceDirect, and the University of Moratuwa repository. Selection criteria included relevance to contractor bidding behaviour, risk analysis in construction procurement, and Sri Lankan industry contexts. Special attention was given to recent studies (2020–2024) to ensure contemporary relevance.

The data extraction process involved coding findings under five principal themes:

1. Factors influencing bid strategy formulation
2. Classification of bidding models
3. Practical industry strategies
4. Risk integration in bidding
5. Implications of the Winner's Curse

Each theme was critically reviewed to assess the strengths, limitations, and applicability of models and practices in real-world Sri Lankan construction projects. The review emphasized both theoretical insights and empirical evidence to generate a comprehensive understanding of bidding risks and mitigation practices.

## **Results and Discussion**

The review highlights that bid decisions are influenced by multiple factors, notably the type of client, type of construction work, and project size (Drew et al., 2001). Developing a bidding strategy requires firms to carefully balance pricing objectives with market competitiveness (Skitmore & Akintoye, 1990). Over time, various theoretical models — such as probability, regression, econometric, mathematical, judgmental, and AI-based models — have been developed to guide bid decision-making (Smith as cited in Zoysa, 1997). However, practical application remains limited due to complexities and unrealistic assumptions.

The industry practices show that bidding strategies are highly diversified, ranging from bid unbalancing techniques (front-end loading, back-end loading, and individual rate loading) to pricing strategies like equally distributed mark-ups, planned mark-ups, high-low criteria, and standard fee adherence. Moreover, intuitive approaches, like gut feeling-based decision-making (intuitive manipulation) and discounting after submission, highlight the less structured but commonly used methods in practice.

Further, contractors employ strategic actions like diversifying bidding across markets, targeting repetitive projects, and emphasizing labour resource management to remain competitive. These strategies show that real-world bidding is a mix of structured models and intuitive, experience-driven decisions.

The discussion on the Winner's Curse reveals a critical risk in bidding: overestimating project value and facing financial loss (Wilson, 1969). This underscores the importance of risk management practices, which involve risk identification, analysis, and response (Flanagan & Norman, 1993; Wang et al., 2004). Despite the awareness of risk management, its integration into bid pricing strategies is still inconsistent across firms.

Overall, the findings suggest that while theoretical bidding models provide frameworks, contractors prefer practical, adaptable strategies that consider market dynamics, client behavior, resource capabilities, and inherent project risks.

## **Conclusion**

This study critically examined contractor bidding strategies and their associated risks within the Sri Lankan construction sector. The findings underscore that while contractors employ a variety of practical bidding techniques, ranging from structured mark-ups to intuitive manipulation, many of these strategies are adopted in the absence of formal risk assessment methodologies.

The literature review highlights the persistent divide between theoretical bidding models and real-world applications, largely due to the models' complexity and misalignment with industry conditions. As a result, contractors often default to experience-based decision-making, which, while adaptive, increases exposure to strategic bidding risks such as the Winner's Curse.

A key conclusion is that effective bidding requires a balanced approach, merging quantitative models with qualitative judgment, and embedding risk analysis as a core part of the bidding process. Contractors who adopt this hybrid strategy are more likely to deliver sustainable project performance, particularly in Sri Lanka's evolving and competitive construction landscape. Future research should focus on developing simplified, context-specific bidding tools that combine decision support with embedded risk analytics. Further empirical studies could also examine how firm size, ownership structure, and procurement type affect risk tolerance and strategic behaviour in contractor bidding.

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