

# The relationship between financial management strategies and firm financial performance: the moderating role of firm size

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## Abstract

**Purpose** – This study aims to explore the impact of financial management strategies on the financial performance of construction projects in Iraq, specifically investigating the moderating role of company size. The primary focus is to understand how different cost components contribute to performance and how this relationship varies between larger and smaller businesses in the construction industry.

**Design/methodology/approach** – Utilizing a sample of 296 participants from the construction business in Iraq, this research employed a survey questionnaire. The WarpPLS software facilitated data analysis, employing Partial Least Squares Structural Equation Modelling (PLS-SEM) with bootstrapping for model validation. Confirmatory factor analysis (CFA) with maximum likelihood estimation assessed the measurement model, ensuring a comprehensive understanding of the financial management strategies and performance relationship.

**Findings** – The study reveals that equipment costs show no significant relationship with performance in Iraq's construction industry. Larger construction firms exhibit a positive influence on financial performance from material costs, labour costs and permit/licencing fees compared to smaller firms. This suggests a moderation effect of size on the relationship between these cost components and financial outcomes, highlighting the nuanced impact of financial management strategies on performance.

**Research limitations/implications** – While shedding light on the size-dependent nuances in the relationship between financial strategies and performance, this study is confined to the construction industry in Iraq. The findings might not be universally applicable, and contextual variations should be considered. Additionally, the reliance on survey data introduces the potential for response bias. Future research could expand the scope to different industries and regions, incorporating diverse methodological approaches for a more comprehensive understanding of the nuances in the financial management and performance relationship.

**Practical implications** – Construction companies in Iraq can enhance project performance by strategically allocating resources and effectively managing costs, considering the nuanced impact of company size. Larger firms, in particular, should focus on optimising material costs, labour costs and permit/licensing fees to maximise financial outcomes. This study provides actionable insights for practitioners, guiding financial management decisions and offering practical recommendations for improving project performance in the Iraqi construction industry.

**Social implications** – The research contributes valuable insights to the Iraqi construction industry, an area with limited prior research on management matters. By emphasising the role of size in moderating the relationship between financial strategies and performance, the study informs industry stakeholders, policymakers and professionals about the importance of tailoring financial management approaches based on company size. This knowledge can potentially lead to improved financial outcomes, positively impacting the overall economic and social landscape in Iraq.

**Originality/value** – This research adds to the body of knowledge by examining the impact of company size on the relationship between financial management methods and performance in Iraq's construction projects. The study's originality lies in uncovering the moderating effect of size on the connection between specific cost components and financial performance. The findings provide a unique perspective on financial management strategies, offering construction companies valuable insights into optimising performance based on their size.



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This research contributes significantly to an underexplored area, filling a gap in the existing literature and providing practical implications for financial decision-making in the construction industry.

**Keywords** Construction projects, Financial management strategies, Financial performance, Firm size

**Paper type** Research paper

## 1. Introduction

Research on financial management related to construction projects in Iraq provides insight into its difficulties and opportunities, particularly how firm size affects financial performance (Mahmood and Ahmed, 2023; Shibani, 2022). Unfortunately, however, there remains a limited understanding of the interrelations among financial management techniques, organisational size and completion of projects; costs related to labour, materials, equipment permits and licencing are often ignored or given insufficient attention. Prior studies have recognised the combined impact of these characteristics on financial performance (Barauskaite and Streimikiene, 2021; Baah, 2021; Anwar and Shah, 2021). Nonetheless, no research has examined how much company size affects these relationships in the Iraqi construction sector. The literature on financial management in Iraq does not adequately address integrating it with project management, procurement and supply chain management, given the country's distinctive regulatory environment and market conditions (Salman *et al.*, 2023; Alfaiz *et al.*, 2021). To enhance financial performance as well as safeguard Iraq's construction sector, construction enterprises and authorities must address and rectify these deficiencies.

The construction industry is pivotal in propelling national growth by developing infrastructure, residential and commercial structures, as well as various facilities. It contributes significantly to the Gross Domestic Product (GDP). It is anticipated to continue its growth in the coming years (Alaloul *et al.*, 2021). However, the construction industry is particularly susceptible to be affected by the risks that may affect the progress of construction projects negatively (Fei, 2021; Afraz *et al.*, 2021). Firm size and some other external factors can affect the financial management methods of the company (Huy *et al.*, 2021). The financial management impact, as well as the moderating influence of firm size on the performance of Iraqi construction projects, shall be studied (Abed *et al.*, 2022; Sahib *et al.*, 2022). After the war in 2013, the Iraqi construction industry soared when more investments came to infrastructure, retail outlets and office buildings.

Nevertheless, the performance of the Iraqi construction industry has been influenced by political unrest, security issues and limited investment options. In this research, we seek to assess the influence with regard to financial management concerning the financial performance of Iraqi construction projects from a new perspective. In addition, the firm size will be studied as a moderating factor. Data will be collected via a range of techniques from construction companies running in Iraq, in which surveys and interviews will be the main methods used for data collection (Abbas and Burhan, 2022). The relationship between management strategies (return on investment, net profit margin and cost of capital) and their financial performance will be studied in this research. Our study is focused on Iraq. This paper examines the financial management approaches utilised within construction industry organisations and their implication based on organisational size (Asare *et al.*, 2024). These results have significant ramifications. Construction firms strive to increase productivity through strategic planning. Correspondingly, policymakers and industry stakeholders may gain a better understanding of the challenges involved with building. Our study will assist the Iraqi authorities in formulating strategies that foster the growth and sustainable development of this sector.

### 1.1 Firm size and financial management strategies

Yap *et al.* (Abbas and Burhan, 2022) state that larger construction businesses tend to implement financial management procedures for their projects. As per Zuerl (Zuerl, 2022), organisations can efficiently implement strategies such as cost-cutting and risk mitigation. All of these help construction companies handle risks efficiently (Settembre-Blundo *et al.*, 2021). In contrast, smaller organisations possess greater agility in responding to challenges and fluctuations in the market. Size is a determining factor among other parameters that impact the efficiency of financial management systems in construction projects (Tuffour *et al.*, 2022). The elements above encompass project attributes, intricacy, contractual arrangements, level of market competition and regulatory framework. Furthermore, data accessibility and compliance with high-quality reporting standards might affect an organisation's financial management (Eleimat *et al.*, 2023). These factors exert a considerable influence on the financial management systems of construction companies. Hence, they must be understood by anyone working in the field. Through action, both individuals and organisations can improve project outcomes while lowering risks (Kasperson and Kasperson, 2022). Researchers have also assessed the relationship that exists between management techniques and the accomplishment of construction projects in Iraq (Al Musawi and Naimi, 2023; Buniya, 2021). According to Musarat *et al.* (Musarat *et al.*, 2021), the costs associated with a construction project, including charges for supplies, workers' salaries and permit fees, can substantially influence its final performance. However, equipment-related costs do not necessarily affect performance Hamza, *et al.* (Hamza *et al.*, 2022). Findings indicate that construction companies should try to decrease the costs in areas like labour, supplies and permits to enhance their performance.

### 1.2 Moderating effect of firm size

As per Al-Hashimy *et al.* (Al-Hashimy *et al.*, 2022), the performance with respect to construction projects in Iraq is bound to the financial management system, which is affected by the size of firms. Another study presented that when implementing strategies (cost control and risk management), big companies hold advantages in material costs, labour expenses and permit and licence fees (Obayi and Ebrahimi, 2021). In the current study, we explore how financial management practices affect Iraqi construction projects' performance and concentrate on how company size affects their relationship. Eight hypotheses were formulated following the literature review. Furthermore, four of the hypotheses proposed that factors (material costs, labour prices, equipment expenditure, permits and licences) would impact the Iraqi construction projects' performance. The remaining four hypotheses show that firm size is moderate in determining the impact of implementing financial management strategies on project performance. These theoretical frameworks emphasise three areas (supply chain management, project management, and procurement), highlighted by financial management techniques that may affect how Iraqi construction projects are performed.

Prior studies have also demonstrated how project-specific contextual elements such as size, complexity and type can affect how well financial management systems function for construction projects (Gatti, 2023). Note that innovations that have changed financial management techniques have immensely influenced this sector (Effiom and Edet, 2022). Construction organisations can benefit from the insights this study offers by comprehending how financial management practices affect their financial performance and modifying their plans as necessary. This study also helps policymakers understand how important financial management techniques are to improving project outcomes as well as financial performance in the construction industry. In summary, the successful implementation of financial

management strategies is heavily influenced by the size of an organisation. These strategies play a role in optimising the performance of building projects. Please refer to [Table 1](#) for a comparison between framework variables and relevant research studies.

## 2. Hypothesis development

This research centres on investigating the influence of financial management strategies on the performance of building projects in Iraq. Our study investigates how construction firms of different sizes impact each other in relation to building projects in Iraq. To guide this research, we have created hypotheses. Finally, we will analyse whether financial management techniques like cost-cutting can have any influence on construction project success in Iraq. In addition, we aimed to determine whether the size of construction firms possesses a significant impact on the link between financial management practices and performance. We aim to provide insights and guidance to the financial management practices employed by construction firms to boost financial performance with respect to Iraqi construction projects.

### 2.1 H1: Material costs have a positive impact on the financial performance of construction projects in Iraq

Many researches support this hypothesis. For example, Heravi and Mohammadian ([Heravi and Mohammadian, 2021](#)) in Iran, Mesároš *et al.* ([Mesároš \*et al.\*, 2021](#)) in Slovakia and Asare *et al.* ([Asare \*et al.\*, 2024](#)) in Ghana investigated construction projects in different countries. Yet, they reached the same finding — Material expenses contribute positively to the financial outcomes of construction projects. According to the literature review, we can propose that material costs positively affect the performance of construction projects in Iraq ([Buniya, 2021](#)). This hypothesis is grounded on the fact that any increase in prices of expense factors (including the material costs) in construction projects can seriously affect financial

**Table 1.** The theoretical framework variables compared to related work

| Theoretical framework variables | Previous studies   | The current study's contributions  |
|---------------------------------|--|--|
| Financial management strategies | We investigated the relationship between financial management strategies and the financial performance of construction projects in Iraq ( <a href="#">Othman <i>et al.</i>, 2020</a> ) | She emphasised the importance of company size in leveraging financial management strategies to enhance financial performance                                   |
| Financial performance           | We explored the influence of various cost components on the financial outcomes of construction projects in Iraq ( <a href="#">Zamim, 2021</a> )  | N/A  |
| Construction projects           | They investigated how financial management strategies impact financial performance with respect to construction projects in Iraq ( <a href="#">Dabirian <i>et al.</i>, 2021</a> )      | N/A  |
| Firm size                       | N/A  | We explored how company size moderates the relationship between financial management strategies and the financial performance of construction projects in Iraq |

**Notes:** N/A = No prior research was discovered that directly investigated the connection between the variables in question and financial performance within the context of Iraq's construction sector. Therefore, no prior literature exists for direct comparison with the current study's findings concerning these particular relationships

**Source:** Author's own work

performance. Therefore, it is proposed that Iraqi construction companies can achieve better performance when they raise the material costs. The results of this study demonstrate how construction companies' financial performance is impacted by their material costs, providing valuable insights for adjusting financial management practices. These findings are beneficial for both construction companies looking to optimise their operations and authorities aiming to improve the construction industry's performance in Iraq.

### *2.2 H2: Labour costs have a positive impact on the financial performance of construction projects in Iraq*

This hypothesis is also grounded in previous studies. Abdel-Hamid and Mohamed Abdelhaleem (Abdel-Hamid and Mohamed Abdelhaleem, 2022), Hamza, *et al.* (Hamza *et al.*, 2022) and Kalantzis and Niczyporuk (Kalantzis and Niczyporuk, 2022) All investigated the relationship between labour cost and financial performance and discovered that labour cost affects project expenditures, duration, productivity, and efficiency – all of which affect performance. Additionally, the situation in Iraq, to some extent, is volatile. This forces instability in the market, which results in security issues and differences in working conditions and wages among various companies. Therefore, the relationship between labour costs and financial performance in Iraq is not straightforward. On the other hand, Buniya *et al.* (Buniya, 2021), in their study, determined that labour cost was an impacting factor as far as project performance and profitability in Iraq were concerned. In light of this, it is safe to assume that labour costs will possess a positive effect on the success with regard to construction projects in Iraq if their level increases. Nevertheless, it is crucial to be cautious while accepting or rejecting the hypothesis on the basis of correlation because confounds may interfere with the results.

### *2.3 H3: Equipment costs have a positive impact on the financial performance of construction projects in Iraq*

The previous studies related to equipment costs are important for researchers who want to comprehend the impact of equipment costs on construction projects in Iraq. Hence, similarly, the hypothesis is articulated, signifying the relationship between equipment expenses and project performance (Kissi *et al.*, 2021). Some other papers also presented that managing equipment costs could achieve the project objectives. In this way, the problem is worth investigating (Kissi *et al.*, 2021). Conversely, this enables technical tools and platforms in the construction industry to result in the maximum levels of productivity and efficiency that, in turn, provide business performance (Bhattacharya *et al.*, 2021). Even if we have to bear in mind that Iraq is still experiencing instability, security crises, and capital under-investment in infrastructure, evidence indicates that the effect of equipment cost on project success in Iraq is high. On the other hand, it is demonstrated that equipment costs are at the beginning of the repayment chain of the accompanying profits in the Iraqi construction process. Apart from that, resource allocation and equipment purchase can contribute to the endeavour by increasing production capacity and profitability, which will be instrumental in dealing with labour shortages. The study suggests that equipment prices have an effect on the construction projects' performance in Iraq. Nonetheless, the endemic diversity of the factors in the construction market may mediate the clarity of the relationship between the cost of equipment and the performance of projects. There is a need for comparative cost analysis concerning equipment prices and frameworks in relation to foreign nations and the expenses linked to repairs and innovations when advanced technologies are utilised in construction works.

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#### 2.4 H4: *Permit and licencing fees have a positive effect on the financial performance of Iraqi construction projects*

This study aims to conduct a comprehensive literature search to derive this hypothesis. Short (Short, 2021) illustrated that different stakeholders' payment of permits and licences affected the overall construction cost and the financial turnout, which illustrated the importance of enforcement. The Iraqi construction sector is regulated by official bodies that set and monitor industry rules, regulations and standards. Suppose construction firms cannot effectively get approvals and permits. In that case, this will result in expensive project prices, extra fees and time delays, among other financial problems. However, it has been evidenced that waiver or removal of these charges may improve project performance. AL-Saadi *et al.* (AL-Saadi *et al.*, 2022) have shown increased construction activities and financial investments in Iraq. The case of Iraq is unique in that the political and economic realities have contributed to a set of institutional frameworks that can hardly be discovered elsewhere. This hypothesis has the potential to chart a course for future research.

#### 2.5 H5: *Firm size can help moderate the relationship between material costs and financial performance in Iraqi construction projects and material costs*

The Iraqi construction industry, as depicted in the previous work of Buniya *et al.* (Buniya *et al.*, 2021) and Zaia *et al.* (Zaia *et al.*, 2023), is influenced by the enterprise size, construction costs and the financial outcome realised. Anwar and Shah (Anwar and Shah, 2021) discovered that small firms in the construction industry may be new and have very limited resources and investment. Therefore, they might have financial performance challenges because of their high material costs relative to the established large market players, which are more able to effectively manage their material costs and thus lead to enhanced financial performance. In Iraq's construction sector, there is a significant presence of small and midsize enterprises SMEs and this shows that there are. Hence, many small companies that engage in the business. Therefore, the author should investigate the issues concerning SMEs in terms of material costs, among other aspects, in the bid to improve their financial performance in Iraq (Abbas and Burhan, 2022). Thus, emerging questions on the relationship between these variables in Iraqi construction projects remain unanswered. Hence, some work still needs to be done in this area (Sagar *et al.*, 2022). It can be concluded that firm size might reduce the degree of intervention of material costs in project operations in the Iraqi construction industry. For instance, small firms may struggle with such expenditures, yet large firms could easily overcome these challenges. When we examine the link between company size, material costs and financial performance in the construction industry, there are some other issues that we need to consider, such as supply chain management, procurement processes and technology use (Gunasekara *et al.*, 2022). The specific market conditions, the regulatory framework of the market and other factors like economic and political contexts in Iraq should also be paid attention to achieve a higher level of such performance.

#### 2.6 H6: *Firm size moderates the relationship between labour costs and the financial performance in Iraqi construction projects*

It would require us to research past literature to know the correlation between the firm's size, its average labour cost, and its financial performance (Okafor *et al.*, 2021). Meanwhile, Maqsoom *et al.* (Maqsoom *et al.*, 2021) explained that large construction firms might be able to handle labour-related expenses. However, the smaller ones may struggle due to limited resources and capital. Since SMEs are a substantive part of the Iraqi utility market, the researcher is expected to investigate how labour costs differ among firms of various sizes. Thus, it can be deduced that as different countries have different market situations and laws,

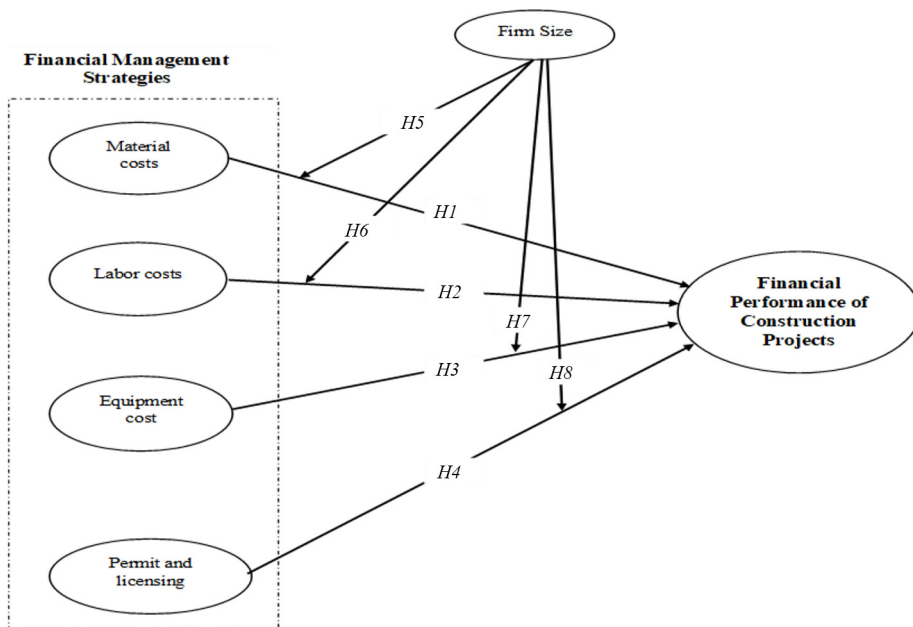
the issue must be explained based on the peculiarities of Iraq's economy (Semenova *et al.*, 2022). Besides, the story of labour costs and their impact on financial achievement will also be addressed regarding supply chain management, procurement policy, and technology application (Altekar, 2023).

### *2.7 H7: In Iraqi construction projects, firm size can help moderate the correlation between equipment costs and financial performance*

This learning process demands an in-depth study of the existing literature. Factors like medium-term developments, equipment rates, and all-finance proficiency in the construction sector have to be considered when proving this thesis. Harris (Harris, 2024) reported that construction companies gained competitive advantages by controlling equipment overheads and highlighted the significance of equipment management to compete in the market. For the start-ups in the construction field in Iraq, the financial supply and human resources are always a problem, and the equipment expenses may impact such firms' output. It has to be taken care of effectively to ensure proper equipment expenses. Thus, it helps the success of the construction projects. Nevertheless, other researchers may set up a theory where the relationship between equipment cost and financial success will not be the same across different levels of the construction company operation (Harris *et al.*, 2021). Note that investigation of firm size as the intermediate influence in Iraqi construction projects is essential. Aharoni (Aharoni, 2024) stated that equipment costs are a large part of the many challenges that small companies face, while the large ones shoulder more than that burden; such an aspect helps them improve company performance. The strategy of acquisition, integrated technology, supply chain management, local conditions, and personal requirements are the large aspects that the relationship between the firm size, equipment costs, and financial performance in construction projects executed in Iraq should be further studied from the historical perspective.

### *2.8 H8: Firm size moderates the relationship between permit and licencing fees and the financial performance in Iraqi construction projects*

Therefore, this is the hypothesis that is drawn from the literature recall. The number of construction companies can likely impose certain challenges because the amount spent on permits and licences can affect the company's performance (Stigler, 2021). Nonetheless, reports have been obtained that larger-sized construction entities will exercise pressure to determine the fees, and whether it will impact their financial welfare remains to be seen (Zhang *et al.*, 2023). Though the larger organisations can be more flexible than the smaller firms in terms of the understanding and fulfilment of the legal and authenticities of the system, for the small organisations, there are hurdles on the way, such as lacking resources and workforce, which can, in turn, affect the overall financial or material performance. This is undeniably an important point because it is wrong to say that SMEs are just a part of Iraq's construction sector and encounter special difficulties, unlike the larger entities like Kamosh *et al.* (Kamosh *et al.*, 2023), who have written in-depth about the significant role played by SMEs in the construction sector of Iraq. Among those policy issues affecting business competitiveness, land permits and licencing are crucial, including government overheads, corruption and bureaucracies (Van der Waldt and Fourie, 2022; Wibowo *et al.*, 2023). Iraqi construction projects need to allow more research on permit and licencing costs and the influence of these concerning the project size and financial performance. Note that the effectiveness of the strategies should take into consideration the market, laws, procurement procedures and technological adaptation. Here is a detailed conceptual framework on which research relies. The following Figure 1 shows the hypothesis of the study and the link between the variables.



Source: Author's own work

Figure 1. Conceptual framework

### 3. Methodology

#### 3.1 Epistemological framework

The research is built on the positivist theory, which asserts the presence of an objective reality that is tangible and can be quantified, regardless of who views it. This perspective holds significant sway in the field of science, where the main goal is to draw cause-and-effect patterns between special variables based on empirical evidence. The positivist principle contends that statistical means should be applied to test, accept or reject hypotheses, which could act as a base for generalisation (Trafimow, 2022). This method is appropriate for a systematic analysis of the connection between management intervention strategies and organisational outcomes in the construction sector in Iraq, akin to approaches in early works like those of Buniya *et al.* (Buniya *et al.*, 2021). It considers financial management an orderly and systematic approach in this dimension.

#### 3.2 Review of existing methodological approaches

The methodology is inspired by recent empirical studies using quantitative techniques like Structural Equation Modelling (SEM) to evaluate business management theories and decisional strategies in the context of complex systems (Shaikh *et al.*, 2022). The ability of SEM to simultaneously solve multiple dependent connections and its sturdiness in hypothesis testing imply the preference of SEM as the method in research concerning financial strategies within construction projects. Mohammed *et al.* (Mohammed, 2022) demonstrated how SEM was used in exploring the financial strategies in building construction.



### 3.3 Systematic literature review process

The systematic review of pertinent literature was conducted with meticulous attention to detail with the aid of defined procedures to ensure accuracy and reproducibility throughout the process. Criterion for inclusion: The search will cover peer-reviewed stock market publications from 2015 to 2023 that are narrowly focused on the relationship between financial management and the construction industry. The studies should be empirical and written in English. Criteria for exclusion: Excluded from consideration are theoretical works, publications that have not undergone peer review, and research that does not specifically address the construction sector or financial management techniques. The databases accessed for the query included Scopus, Web of Science and Google Scholar. Moreover, the search was executed using a set of keywords that included “financial management”, “construction industry”, “Iraq”, “firm performance” and “cost management”. The search produced 360 initial results. After implementing the exclusion and inclusion criteria, a total of 85 articles were considered pertinent. The articles underwent additional scrutiny to guarantee their relevance to the research topics. As a result, 68 core articles were selected for detailed analysis.

### 3.4 Integration of systematic review findings with empirical research

The systematic analysis identified significant gaps in the current research, particularly concerning how financial management affects projects of different scales in volatile countries like Iraq. The review served as a foundation for the empirical inquiry, focusing on how the company’s magnitudes influence significant financial management methods. The motivation to examine such links through SEM was immediate since research showed this as an existing gap in the field. The lack of methodological consistency makes this approach viable in these developing economies ([Irfan et al., 2021](#)).

### 3.5 Empirical study design and data collection

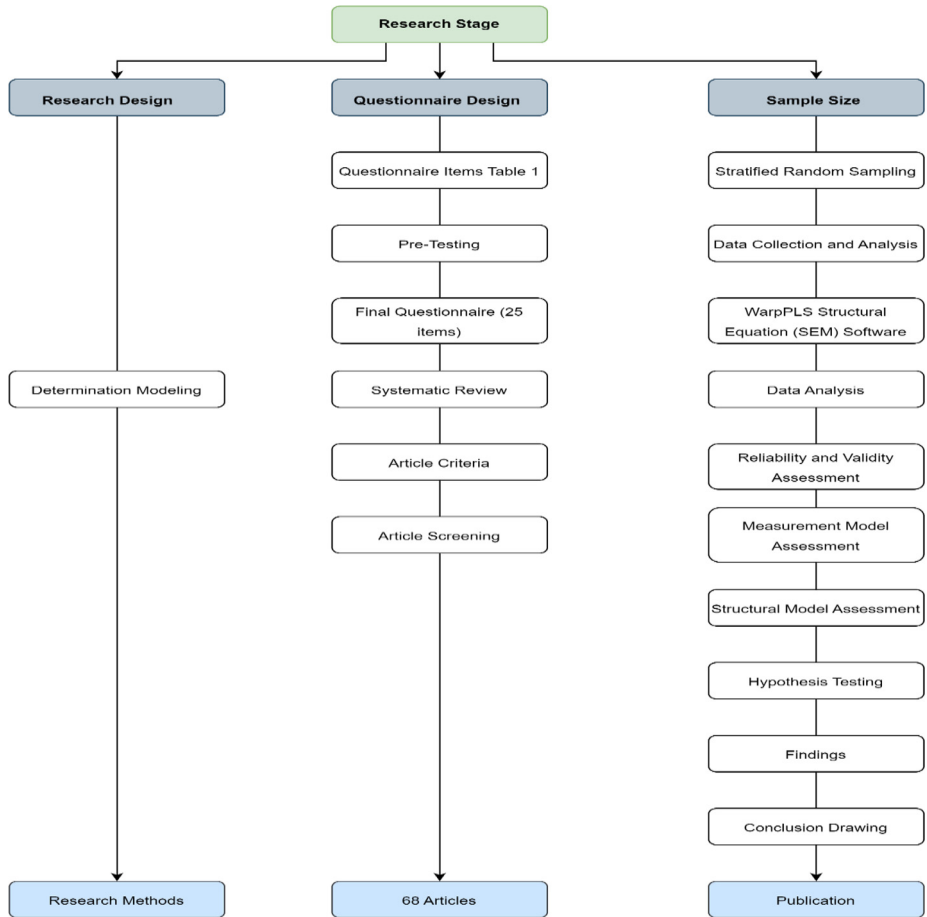
This study had an empirical dimension based on disseminating a questionnaire to the management and construction project owners in a sample of construction companies throughout Iraq. To ensure that varying firm sizes were representative, researchers followed a stratified random sample selection method. The questionnaire contained questions that put the respondents across a five-point Likert scale, which investigators created solely to single out the consequences of the various financial management strategies. The data were analysed using WarpPLS, which has already been proven in the study methodologies, and they suggested that this tool is effectively used for the study of complex SEM. Note that the standards observed in the area were also considered and established, coupled with the systematic review.

### 3.6 Research design

This study examines the connection between company size and the effectiveness of financial management approaches used in Iraqi construction projects, using a questionnaire as the data collection method. To achieve this aim, the empirical methodology is implemented, and the methodological framework is illustrated in [Figure 2](#).

### 3.7 Questionnaire design

A custom survey was developed specifically for this study to evaluate the impact of financial management practices with regard to the performance of construction projects in Iraq. The survey covered variables related to costs for materials, labour, equipment use and permits/licences. Correspondingly, respondents were instructed to rate their answers on a five-point Likert scale before we finalised and administered our questionnaire.



Source: Author's own work

**Figure 2.** The methodological framework with regard to the study

### 3.8 Population

Researchers examined Iraqi construction companies through an in-depth analysis. The researchers utilised a stratified random sampling technique to acquire a complete sample of 350 construction companies. The sample was classified into three different company sizes: small, medium, and large. The aim was to provide an authentic representation of the demographic makeup of the construction sector in Iraq. A survey of 25 items was distributed to the staff of the construction firms above. This survey covered material costs, labour costs, equipment utilisation rates and overall project costs. Note that a five-point Likert scale was utilised to evaluate respondents' responses. The SEM software WarpPLS was employed to analyse all the data collected from construction companies. Consequently, relevant papers sourced from Scopus, Web of Science and Google Scholar were compiled, and a systematic literature review was performed. Note that the conclusions were made based on the research design requirements and selected sample.

### 3.9 Sample size determination

The sample size is assessed by applying the formula proposed by Khairullah *et al.* (Mohammadi *et al.*, 2018). Three hundred fifty construction companies from different areas of Iraq were chosen via the stratified random sampling technique. Due to the different sizes of the company, they were divided into three groups: small, medium, and large. By doing this, we selected the most representative samples to properly reflect the overall picture of construction companies in Iraq.

### 3.10 Data collection and analysis technique

The questionnaire was designed to demonstrate the real ideas of the participants, who were selected from different representative construction firms in Iraq via stratified sampling. After the data were collected properly, WarpPLS, specifically developed for SEM, was chosen to analyse the valuable data, assess hypotheses and show the relationship among the abovementioned variables.

### 3.11 Systematic review process

We conducted our literature search utilising online databases, which include Web of Science, Scopus and Google Scholar, to perform this task. The subjects selected are financial management strategies, construction projects, firm size, and financial performance. We conducted extensive literature reviews by searching current research articles that would ensure a study and evaluated titles, abstracts, as well as full texts of publications according to suitability with our research question, validity, dependability and currency. Note that duplicate papers were not taken into account. In the end, we selected 68 publications that support our study with recent research findings.

### 3.12 Data analysis

To assess the associations between latent factors, WarpPLS, an SEM software program, was utilised to examine the data obtained from the survey questionnaire. To ensure accuracy, the researchers analysed and evaluated the measurement and structural models' reliability and validity. The research hypotheses were subsequently examined using the analysis findings, and conclusions were drawn. The research design is thoroughly described in this area of the study, along with specifics on the creation of the questionnaire, gathering of the data, selection of the sample size and method of analysis. The section also describes how the pertinent material was found using a systematic review approach. The data analysis results will be presented in the results section. [Table 2](#) details the sources and questionnaire items utilised.

## 4. Results

This study investigation revealed that materials and labour were the factors that contributed most significantly to the financial outcomes of construction projects in Iraq. This observation is of considerable importance to both construction industry players because they are necessary for long-term sustainability when profitability is a goal. In the challenging field of Iraq's economic base, which is severely resource-constrained and volatile by the nature of the market, costing management is the key essential success driver to project initiatives. In sharp contrast to the common investment patterns in some of the Eastern European countries as case studies, our research demonstrates that tools and equipment costs have no or very moderate effect on financial performance with respect to construction projects in Iraq. This type of strange finding can be explained by the analogy to the old traditions of the local people involved, where technologies of the previous global times are emphasised

**Table 2.** Questionnaire items and sources

| Items  | Source  |
|--|---|
| <i>Financial management strategies</i>   |   |
| How does your company manage material costs in construction projects?            | (Al-Bayati, 2019)                             |
| How does your company manage labour costs in construction projects?              | (Grossi <i>et al.</i> , 2020)                 |
| How does your company manage equipment costs in construction projects?           | (Mohammadi <i>et al.</i> , 2018)              |
| How does your company manage permit and licencing fees in construction projects? | (Andrewis <i>et al.</i> , 2018)               |
| <i>Firm size</i>   |   |
| How many employees does your company have?                                       | (Perrenoud, 2020)                             |
| What is your company's annual revenue?   | (Bashir <i>et al.</i> , 2022)                 |
| What is the total value of the assets of your company?                           | (Singla and Samanta, 2019)                    |
| What is your company's market share in the construction industry?                | (Soewarno and Tjahjadi, 2020)                 |
| <i>Financial performance of construction projects</i>                            |   |
| How does your company measure financial performance in construction projects?    | (Li, 2022)                                    |
| What is your company's average profit margin in construction projects?           | (Hardy Sundoro and Harimukti Wandebori, 2021) |
| What is your company's average return on investment in construction projects?    | (Hardy Sundoro and Harimukti Wandebori, 2021) |
| What is your company's average payback period for construction projects?         | (Bohas <i>et al.</i> , 2021)                  |
| <b>Source:</b> Author's own work   |   |

immediately and only descend into oblivion when the people evolve. This thesis, therefore, underlines the moderating effect of company size in ensuring that cost management strategies result in faithful improvement of financial performance. Big companies, as they normally possess greater capital as well as options for product resource sourcing, tend to have a better edge in lowering the cost of manufacturing. Hence, they have a stronger hold over their competitors in the market and raise their profit margins.

#### 4.1 Characteristics of respondents and construction projects

Two hundred 96 valid replies were received overall, giving the survey a response rate of 84.57%. Participants were from small, medium-sized and big businesses in proportions of 32.77%, 42.57% and 24.66%, respectively. The respondents had an average age of 37 and 8 years of experience working in the construction sector. Here, residential projects comprised the bulk of the projects (58.78%), followed by initiatives in the commercial and industrial sectors (22.30% and 18.92%, respectively).

#### 4.2 Common method bias

The method employed was Harman's single-factor test, in which the researcher could assess the accuracy of valid data gathered from the participants. As per the result, the variation of 25.48% could be accounted for in the first variance. This presents that the techniques involved in the research did not introduce any bias in the data collection and can be trusted to have valid results.

#### 4.3 Measurement model evaluation

This study performed a confirmatory factor analysis (CFA) to examine the goodness-of-fit for the model based on maximum likelihood estimation. The maximum likelihood estimation

was based on the recommended guidelines (Grossi *et al.*, 2022). These factors indicated good empirical confirmation with factor loadings between 0.70 and 0.95 and  $p < 0.001$ . The suggested cut-off point for average variance extracted (AVE) was achieved as the values for the AVE ratio between 0.60 and 0.81 were discovered to be much higher than the threshold, as HaronShafiee *et al.* (2023) proposed. The findings indicated that our measurement model is reliable and valid, allowing us to use the data for additional analysis.

#### 4.4 Structural model evaluation

The researchers used a modelling technique called Partial Least Squares Structural Equation Modelling (PLS-SEM). They analysed the structural model using bootstrapping to investigate how different costs impact financial performance with respect to construction projects in Iraq. Thus, the study results demonstrate that material costs, labour costs, and permit and licence fees significantly influence the performance of construction projects in Iraq. However, no relationship was examined between equipment costs and financial performance, which suggests that material costs, labour costs and permit and licence fees are factors that impact the performance of construction projects in Iraq. The assessment results with regard to the model are presented in Table 3 below.

#### 4.5 Result of hypothesis testing

Factors that can negatively affect performance are the costs of material, labour, permit, and licencing, as there is no measurable impact on equipment costs. The obstacles encountered by the construction industry in Iraq, including insecurity and insufficient infrastructure, are shown in the study. We collected data from two hundred 96 construction firms in Iraq and analysed them via WarpPLS software. It examines the complex relationships between

**Table 3.** The result of the structural model evaluation

| Construct                      | Convergent validity | Weights | <i>p</i> -value | Indicator Loading 1 | Indicator Loading 2 | Indicator Loading 3 | Indicator Loading 4 |
|--------------------------------|---------------------|---------|-----------------|---------------------|---------------------|---------------------|---------------------|
| MC                             | 0.73                | 0.87    | <0.001          | 0.85                | 0.91                | 0.87                | 0.82                |
| MC 1                           |                     |         |                 | 0.80                | 0.83                | 0.81                | 0.78                |
| MC 2                           |                     |         |                 | 0.75                | 0.89                | 0.79                | 0.74                |
| MC 3                           |                     |         |                 | 0.83                | 0.84                | 0.86                | 0.81                |
| MC 4                           |                     |         |                 | 0.78                | 0.88                | 0.82                | 0.76                |
| MC 5                           |                     |         |                 | 0.84                | 0.92                | 0.84                | 0.81                |
| Labor costs (LC)               | 0.78                | 0.78    | 0.93            | <0.001              | 0.87                | 0.89                | 0.87                |
| LC 1                           |                     |         |                 | 0.85                | 0.85                | 0.88                | 0.92                |
| LC 2                           |                     |         |                 | 0.91                | 0.90                | 0.86                | 0.94                |
| LC 3                           |                     |         |                 | 0.88                | 0.86                | 0.90                | 0.94                |
| LC 4                           |                     |         |                 | 0.93                | 0.75                | 0.82                | 0.94                |
| LC 5                           |                     |         |                 | 0.88                | 0.83                | 0.81                | 0.93                |
| Permit and licensing fee (PLF) | 0.76                | 0.86    | <0.05           | 0.81                | 0.73                | 0.78                | 0.85                |
| PLF 1                          | 0.84                | 0.88    | 0.81            | 0.83                | 0.92                | 0.78                | 0.79                |
| PLF 2                          | 0.82                | 0.86    | 0.72            | 0.73                | 0.87                | 0.70                | 0.68                |

**Notes:** The AVE values surpassed the 0.50 standard, indicating that discriminant validity did well; all inside factor loadings were significant. The *p*-values of the model were below 0.001, which showed a normal relationship of the systematic variables within the model. Our study thus failed to observe multicollinearity as the VIF values were directly below the cautionary threshold of 5

**Source:** Author's own work

variables. These findings work with studies carried out by Ahmed *et al.* (Ahmed *et al.*, 2022) and Ojaomo *et al.* (Ojaomo *et al.*, 2024). In conclusion, the findings display how important implementing financial management strategies to boost the performance of Iraqi construction projects is. Moreover, it highlights how firm size moderates this relationship, offering insights for construction companies operating under the circumstances. Furthermore, these findings add to the existing body of literature on financial management within the construction industry. The results concerning hypothesis testing are presented in Table 4.

All hypotheses except for *H3* showed significance with *p* values below 0.05. *H3* exhibited a *p*-value of 0.107, surpassing the significance threshold of 0.05, indicating no statistically significant correlation that exists between equipment expenses and financial performance. Here, the practical significance of the supported hypotheses was identified as either large effect sizes. Note that firm size was a factor in moderating all four cost components. Therefore, according to the study findings, all the supported hypotheses are considered valid. It was noted that most of the hypotheses had results except for *H3*, with a value greater than 0.05. The effect sizes for these hypotheses were either medium or large, indicating their significance. Furthermore, firm size was a moderator across all four cost components. In summary, this study supports all the hypotheses determined to be significant, and Figure 3 illustrates the model measurement used in this study.

The study elucidates the correlations among financial management, expenditures, and the performance of building projects in Iraq. The survey's response rate of 84.57% from small, medium, and large firms is commendable. Deep *et al.* (Deep *et al.*, 2022) and Weldegebreal (Weldegebreal, 2021) have found that material, labour and permission and licence costs presented a substantial impact with regard to the performance of building projects. The study revealed a lack of a link between the expenses associated with equipment and the achievement of financial success. This inconclusive finding aligns with previous research and emphasises the impact of several cost factors on project results. The data's reliability and validity were ensured by Harman's single factor test, CFA and PLS-SEM with bootstrapping. The study indicates that financial management approaches influence Iraqi building project performance. The size of a firm has a crucial role in influencing all cost components, indicating that larger businesses can enhance their performance by implementing financial management techniques. These findings add to the current knowledge in construction management, particularly in Iraq, where there has been limited prior research. We discovered substantial correlations for all hypotheses, with the exception of *H3*, which pertained to the costs associated with equipment. The absence of a significant association raises the possibility that equipment costs have no direct impact on the profitability of construction projects. The supported hypotheses exhibit significant impact sizes, underscoring the practical importance of labour, materials, permission, and licencing costs in deciding a project's success. Moreover, the research findings indicate that strong financial management standards are crucial for the construction industry in Iraq, especially considering the current state of insecurity and deficient infrastructure. The organisation's size affects the relationship between expenses, project performance, and financial management. This research enhances the comprehension of financial management practices within the construction industry in Iraq, benefiting academicians as well as professionals in the field.

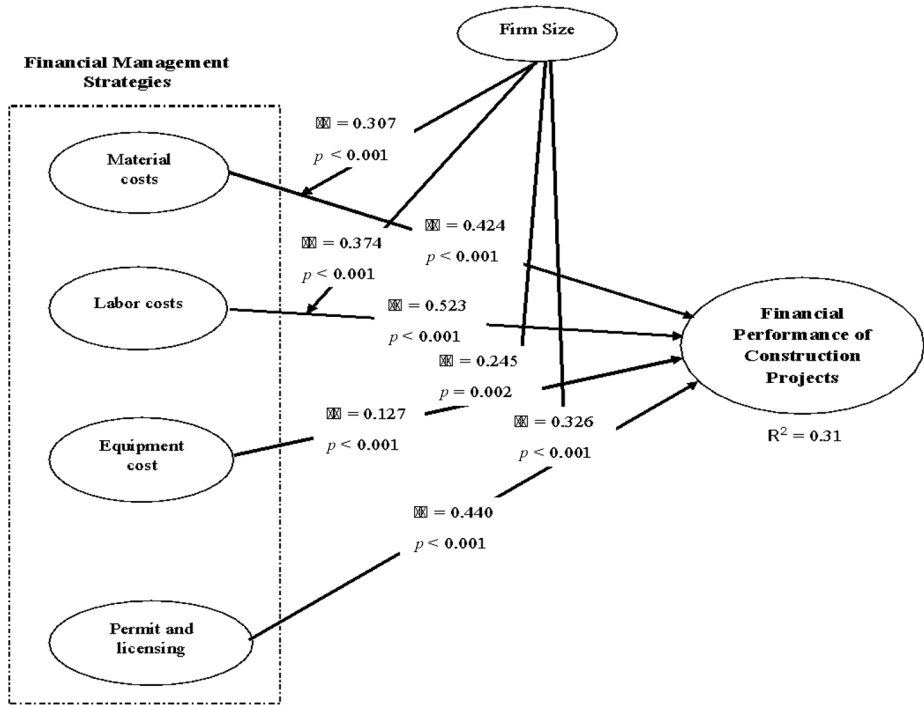
## 5. Discussion

This research on labour and cost in the construction industry is consistent with observations of El-Sayegh *et al.* (2021) in the United Arab Emirates (UAE) and Musarat *et al.* (2021) in Malaysia, which highlighted the importance of related costs in analysing the economic feasibility of construction areas. The point is that labour cost management significantly raises

**Table 4.** Hypothesis testing result

| Hypothesis | Relationships  | p-value | T-ratios | Path coefficient( $\beta$ ) | Effect size | Notes           | Decision      |
|------------|--|---------|----------|-----------------------------|-------------|-----------------|---------------|
| H1         | Material costs → Financial performance                                     | < 0.001 | 4.543    | 0.424                       | Large       | Significant     | Supported     |
| H2         | Labour costs → Financial performance                                       | < 0.001 | 5.598    | 0.523                       | Large       | Significant     | Supported     |
| H3         | Equipment costs → Financial performance                                    | 0.107   | 1.617    | 0.127                       | Small       | Not significant | Not supported |
| H4         | Permit and licencing fees → Financial performance                          | < 0.001 | 4.710    | 0.440                       | Large       | Significant     | Supported     |
| H5         | Material costs → Financial performance (moderated by firm size)            | < 0.001 | 3.427    | 0.307                       | Medium      | Significant     | Supported     |
| H6         | Labour costs → Financial performance (moderated by firm size)              | < 0.001 | 4.174    | 0.374                       | Large       | Significant     | Supported     |
| H7         | Equipment costs → Financial performance (moderated by firm size)           | 0.002   | 2.735    | 0.245                       | Medium      | Significant     | Supported     |
| H8         | Permit and licencing fees → Financial performance (moderated by firm size) | < 0.001 | 3.640    | 0.326                       | Medium      | Significant     | Supported     |

**Source:** Author's own work



Source: Author's own work

Figure 3. The model measurement

the concern for the MMC method for managing labour in the sector. In Malaysia, it is globally acceptable that labour is a fundamental component for improving profits. Our data, however, reveal a deviation from the findings of Xu *et al.* (2021), whose study examining China's construction sector indicated that better control of equipment costs successfully improves profitability. Such deviations might result from the stages of economic development and the dynamics of post-conflict recovery in Iraq, which are not the same as those in other localities. Note that such factors could easily move the focus of equipment buying and spending on other existing problems in a construction contract, such as labour or materials. This further indicates that financial management solutions should consider different regions and be context-driven to suit the situations in different areas.

While analysing the outcome of the listed benchmarks, this review works with the results of Thompson and Adasi Manu (2021) from the USA. Their study shows that these huge organisations had many benefits as a result of their size, including improved efficiency and saving on costs, leading to better performance. Similarly, a study by Lennox and Wu (2022) in China asserted that smaller entities were the most resilient in adjusting their costs. It should be because they had minor issues of management bureaucracy to deal with and were even more flexible in their operations. Such bipolar perspectives clearly illustrate that the business size factor matters a lot and differs completely under the local business climate, regulations, and sector dynamics. The objective of this research was to study the links between governance frameworks for risk and financial performance in Iraq's construction



industry. Data indicates that the higher the costs of labour, materials, permits, and licences, the more complicated the operations of construction in Iraq. It was observed that the major factor in the increase or decrease of the figures accounted for the equipment used for the study, which was price. The survey collected 296, and the data set was analysed using WarpPLS software, a potent tool to support the process of data analysis under SEM. Moreover, the research also reveals that the size of the company, through the means of management practices, is the third critical factor in the context of establishing the connection between these practices and the financial results of construction in Iraq.

This implies that large companies have a position of privilege when they start implementing money management techniques that could lead to enhanced performance. Along with the mentioned benefits on construction projects, which struggled in Iraq partially because of international sanctions and civil unrest in recent years, we also identified challenges for the country's industry. The finding points out that efficient cost control and appropriate resource apportioning may enhance the performance of construction undertakings. To achieve this, we engaged a two-step approach via CFA and PLS-SEM (with bootstrapping to review the measurement and structural models). Finally, Harman's single-factor test was tackled to account for any method bias. Note that the document not only adds to the fund of knowledge of management in the construction sector. However, it is noteworthy for Iraq since little research on construction management has been done in the country. Secondly, this article explores some of the aspects that affect the accomplishment of construction projects in Iraq and explains the place of having precise financial management strategies in achieving financial performance. Nevertheless, we have not proved a possible correlation between equipment costs and financial performance, which must be defined in further explorations.

### *5.1 Contributions to theory*

This study adds to the existing knowledge base by examining how financial management approaches and financial performance are related in construction projects, specifically considering the influence of company size. The outcomes of this study provide insights into how company size can enhance performance through the effective implementation of financial management techniques. Additionally, this analysis contributes to the literature on management within Iraq's construction sector, which has received exploration thus far. These findings lay a foundation for research in this field. It is essential to help enhance understanding of financial management techniques within Iraq's construction sector. This study stands out due to its analysis of factors impacting financial management systems implementation for various scale Iraqi construction projects, making this work of particular value to professionals working within research and industry environments.

### *5.2 Practical contributions*

This investigation has gained widespread attention for its implications for Iraq's construction sector. The research concludes that effective financial management strategies, such as cost control and resource allocation, are required for effective construction industry performance in the country. Furthermore, company sizes matter when utilising financial management strategies to achieve financial success. As a result, construction companies can utilise these results to comprehend financial management strategies' effect on performance and shape their strategies accordingly. Financial management strategies, when implemented effectively, possess the potential to greatly enhance the operational efficiency of construction firms, leading to remarkable triumphs within the sector. By consequently implementing these implications, Iraqi construction firms can enhance their operational efficiency and attain a competitive advantage.

### 5.3 Limitations

It is of the utmost importance to recognise our research limitations. First, it could be challenging to identify a cause-and-effect relationship between financial management methods and financial performance when employing a sectoral strategy. Second, conclusions could be drawn from self-reported data. Furthermore, our study only focused on four cost components, overlooking financial management techniques that could impact financial performance concerning construction projects in Iraq. Therefore, future studies should adopt research designs to establish causality and gather data from diverse sources to minimise potential bias. Additionally, it would be beneficial for research to broaden the scope of financial management strategies by incorporating variables that may impact the financial performance of Iraq's construction industry.

### 5.4 Suggestions for future studies

In the years to come, future investigations can improve upon the limitations of this study by taking a long-term approach to collecting information from sources and verifying the accuracy and precision of the findings. It would also be worth exploring financial management strategies that could affect the efficiency of construction projects in Iraq. Moreover, it is crucial to investigate how contextual variables such as economic uncertainties could impact the correlation between financial management strategies and economic performance within Iraq's construction sector. By incorporating these insights, future research can potentially enrich and expand upon the discoveries of this study.

## 6. Conclusion

This study successfully examined the intricate correlation between financial management practices and the financial outcomes of building projects in Iraq. An analysis of a survey questionnaire, which received 296 responses using advanced statistical techniques using the WarpPLS program, revealed that materials, labour, permissions and licences impact the Iraqi projects' performance. Remarkably, the costs associated with equipment did not seem to impact the outcomes. The study also determined that the relationship between management approaches and financial outcomes is influenced by the firm's size, indicating that larger firms derive greater advantages from financial management strategies. The findings emphasise the importance of effectively managing costs and allocating resources to enhance project performance in Iraq's construction industry. Understanding financial management systems, particularly in the Iraqi construction industry, has enhanced theoretical knowledge. Moreover, the influence of company size on performance has been considered. The study acknowledges that its limitations include using a segmental approach and reliance on self-reported data. However, it proposes additional research to investigate causality, expand money management tactics, and consider situational factors to achieve a more comprehensive understanding. This study provides industry professionals and students with distinctive perspectives on Iraq's dynamic construction industry, establishing a foundation for further research.

## References

- Abbas, N.N. and Burhan, A.M. (2022), "Investigating the causes of poor cost control in Iraqi construction projects", *Engineering, Technology and Applied Science Research*, Vol. 12 No. 1, pp. 8075-8079.

- Abdel-Hamid, M. and Mohamed Abdelhaleem, H. (2022), "Impact of poor labor productivity on construction project cost", *International Journal of Construction Management*, Vol. 22 No. 12, pp. 2356-2363.
- Abed, I.A., Hussin, N., Haddad, H., Al-Ramahi, N.M. and Ali, M.A. (2022), "The moderating impact of the audit committee on creative accounting determination and financial reporting quality in Iraqi commercial banks", *Risks*, Vol. 10 No. 4, p. 77.
- Afraz, M.F., Bhatti, S.H., Ferraris, A. and Couturier, J. (2021), "The impact of supply chain innovation on competitive advantage in the construction industry: Evidence from a moderated multi-mediation model", *Technological Forecasting and Social Change*, Vol. 162, p. 120370.
- Aharoni, Y. (2024), "The role of small firms in an interdependent world", *Standing on the Shoulders of International Business Giants*, World Scientific, pp. 237-261.
- Ahmed, I., Mustafa, G., Subhani, M.U., Hussain, G., Ismail, A.G. and Anwar, H. (2022), "A detailed investigation of lanthanum substituted bismuth ferrite for enhanced structural, optical, dielectric, magnetic and ferroelectric properties", *Results in Physics*, Vol. 38, p. 105584.
- Al Musawi, L. and Naimi, S. (2023), "The management of construction projects in Iraq and the most important reasons for the delay", *Acta Logistica*, Vol. 10 No. 1, pp. 61-70.
- Alaloul, W.S., Musarat, M.A., Rabbani, M.B.A., Iqbal, Q., Maqsoom, A. and Farooq, W. (2021), "Construction sector contribution to economic stability: malaysian GDP distribution", *Sustainability*, Vol. 13 No. 9, p. 5012.
- Al-Bayati, A.J. (2019), "Satisfying the need for diversity training for Hispanic construction workers and their supervisors at US construction workplaces: a case study", *Journal of Construction Engineering and Management*, Vol. 145 No. 6, p. 5019007.
- Alfaiz, S.K., Abd Karim, S.B. and Alashwal, A.M. (2021), "Critical success factors of green building retrofitting ventures in Iraq", *International Journal of Sustainable Construction Engineering and Technology*, Vol. 12 No. 1, pp. 12-17.
- Al-Hashimy, H.N.H., Said, I. and Ismail, R. (2022), "Evaluating the impact of computerized accounting information system on the economic performance of construction companies in Iraq", *Informatica*, Vol. 46 No. 7.
- Al-Saadi, T., Cherepovitsyn, A. and Semenova, T. (2022), "Iraq oil industry infrastructure development in the conditions of the global economy turbulence", *Energies*, Vol. 15 No. 17, p. 6239.
- Altekar, R.V. (2023), *Supply Chain Management: Concepts and Cases*, PHI Learning Pvt.
- Androwis, N., Sweis, R.J., Tarhini, A., Moarefi, A. and Hosseini Amiri, M. (2018), "Total quality management practices and organizational performance in the construction chemicals companies in Jordan", *Benchmarking: An International Journal*, Vol. 25 No. 8, pp. 3180-3205.
- Anwar, M. and Shah, S.Z. (2021), "Entrepreneurial orientation and generic competitive strategies for emerging SMEs: financial and nonfinancial performance perspective", *Journal of Public Affairs*, Vol. 21 No. 1, p. e2125.
- Asare, E., Owusu-Manu, D.-G., Ayarkwa, J. and Edwards, D.J. (2024), "Conceptual review study of working capital management practices in the construction industry: trends and research prospects in Ghana", *Journal of Engineering, Design and Technology*, Vol. 22 No. 4, pp. 1082-1098.
- Baah, C., et al (2021), "Examining the correlations between stakeholder pressures, green production practices, firm reputation, environmental and financial performance: evidence from manufacturing SMEs", *Sustainable Production and Consumption*, Vol. 27, pp. 100-114.
- Barauskaite, G. and Streimikiene, D. (2021), "Corporate social responsibility and financial performance of companies: the puzzle of concepts, definitions and assessment methods", *Corporate Social Responsibility and Environmental Management*, Vol. 28 No. 1, pp. 278-287.
- Bashir, H., Ojiako, U., Haridy, S., Shamsuzzaman, M. and Musa, R. (2022), "Implementation of environmentally sustainable practices and their association with ISO 14001 certification in the

- 
- construction industry of the United Arab Emirates”, *Sustainability: Science, Practice and Policy*, Vol. 18 No. 1, pp. 55-69.
- Bhattacharya, S., Momaya, K.S. and Iyer, K. (2021), “Bridging the gaps for business growth among Indian construction companies”, *Built Environment Project and Asset Management*, Vol. 11 No. 2, pp. 231-250.
- Bohas, A., Morley, M.J. and Kinra, A. (2021), “Perlmutter revisited: revealing the anomic mindset”, *Journal of International Business Studies*, Vol. 52 No. 9, pp. 1695-1723.
- Buniya, M.K., Othman, I., Durdyev, S., Sunindijo, R.Y., Ismail, S. and Kineber, A.F. (2021), “Safety program elements in the construction industry: the case of Iraq”, *International Journal of Environmental Research and Public Health*, Vol. 18 No. 2, p. 411.
- Buniya, M.K., *et al.* (2021), “Critical success factors of safety program implementation in construction projects in Iraq”, *International Journal of Environmental Research and Public Health*, Vol. 18 No. 16, p. 8469.
- Dabirian, S., Ahmadi, M. and Abbaspour, S. (2021), “Analyzing the impact of financial policies on construction projects performance using system dynamics”, *Engineering, Construction and Architectural Management*, Vol. 30 No. 3.
- Deep, S., Banerjee, S., Dixit, S. and Vatin, N.I. (2022), “Critical factors influencing the performance of highway projects: an empirical evaluation”, *Buildings*, Vol. 12 No. 6, p. 849.
- Effiom, L. and Edet, S.E. (2022), “Financial innovation and the performance of small and medium scale enterprises in Nigeria”, *Journal of Small Business and Entrepreneurship*, Vol. 34 No. 2, pp. 141-174.
- Eleimat, D., Ebbini, M., Aryan, L. and Al-Hawary, S. (2023), “The effect of big data on financial reporting quality”, *International Journal of Data and Network Science*, Vol. 7 No. 4, pp. 1775-1780.
- Fei, W., *et al.* (2021), “The critical role of the construction industry in achieving the sustainable development goals (SDGs): delivering projects for the common good”, *Sustainability*, Vol. 13 No. 16, p. 9112.
- Gatti, S. (2023), *Project Finance in Theory and Practice: designing, Structuring, and Financing Private and Public Projects*, Elsevier.
- Grossi, G., Kallio, K.-M., Sargiacomo, M. and Skoog, M. (2020), “Accounting, performance management systems and accountability changes in knowledge-intensive public organizations: a literature review and research agenda”, *Accounting, Auditing and Accountability Journal*, Vol. 33 No. 1, pp. 256-280.
- Grossi, L.M., Green, D., Cabeldue, M. and Pivovarova, E. (2022), “Assessing feigning with the feigning evaluation INtegrating sources (FEINS) in a forensic psychiatric sample”, *Psychological Services*, Vol. 19 No. 2, p. 213.
- Gunasekara, H.G., Sridarran, P. and Rajaratnam, D. (2022), “Effective use of blockchain technology for facilities management procurement process”, *Journal of Facilities Management*, Vol. 20 No. 3, pp. 452-468.
- Hamza, M., Shahid, S., Bin Hainin, M.R. and Nashwan, M.S. (2022), “Construction labour productivity: review of factors identified”, *International Journal of Construction Management*, Vol. 22 No. 3, pp. 413-425.
- Hardy Sundoro, H.S. and Harimukti Wandebori, H.W. (2021), “Exploring the misalignment between business and information technology on the implementation of balanced scorecard: Case study of state-owned telecommunication companies in Indonesia”, *Jurnal Sistem Informasi*, Vol. 17 No. 2, pp. 18-32.
- Harris, F., McCaffer, R., Baldwin, A. and Edum-Fotwe, F. (2021), *Modern Construction Management*, John Wiley and Sons.
- Harris, T. (2024), “Managers’ perception of product market competition and earnings management: a textual analysis of firms’ 10-K reports”, *Journal of Accounting Literature*.

- 
- Heravi, G. and Mohammadian, M. (2021), "Investigating cost overruns and delay in urban construction projects in Iran", *International Journal of Construction Management*, Vol. 21 No. 9, pp. 958-968.
- Huy, D.T.N., Nhan, V.K., Bich, N.T.N., Hong, N.T.P., Chung, N.T. and Huy, P.Q. (2021), "Impacts of internal and external macroeconomic factors on firm stock price in an expansion econometric model—a case in Vietnam real estate industry", *Data Science for Financial Econometrics*, pp. 189-205.
- Irfan, M., Zhao, Z.-Y., Rehman, A., Ozturk, I. and Li, H. (2021), "Consumers' intention-based influence factors of renewable energy adoption in Pakistan: a structural equation modeling approach", *Environmental Science and Pollution Research*, Vol. 28 No. 1, pp. 432-445.
- Kalantzis, F. and Niczyporuk, H. (2022), "Labour productivity improvements from energy efficiency investments: the experience of European firms", *Energy*, Vol. 252, p. 123878.
- Kamosh, Y.M.F., Wu, L. and Tan, K.H. (2023), "The contribution of the internet of things to enhance the brands of small and Medium-Sized enterprises in Iraq", *Advances in Information Communication Technology and Computing: Proceedings of AICTC 2022*, Springer, pp. 193-202.
- Kasperson, R.E. and Kasperson, J. (2022), *The Social Contours of Risk*, Earthscan.
- Kissi, E., Agyekum, K., Musah, L., Owusu-Manu, D.-G. and Debrah, C. (2021), "Linking supply chain disruptions with organisational performance of construction firms: the moderating role of innovation", *Journal of Financial Management of Property and Construction*, Vol. 26 No. 1, pp. 158-180.
- Li, X., *et al* (2022), "Predicting monthly runoff of the upper yangtze river based on multiple machine learning models", *Sustainability*, Vol. 14 No. 18, p. 11149.
- Mahmood, N.S. and Ahmed, E.M. (2023), "Mediating effect of risk management practices in Iraqi private banks financial performance", *Journal of Financial Services Marketing*, Vol. 28 No. 2, pp. 358-377.
- Maqsoom, A., Choudhry, R.M., Umer, M. and Mehmood, T. (2021), "Influencing factors indicating time delay in construction projects: Impact of firm size and experience", *International Journal of Construction Management*, Vol. 21 No. 12, pp. 1251-1262.
- Mesároš, P., Behúnová, A., Mandičák, T., Behún, M. and Krajníková, K. (2021), "Impact of enterprise information systems on selected key performance indicators in construction project management: an empirical study", *Wireless Networks*, Vol. 27 No. 3, pp. 1641-1648.
- Mohammadi, A., Tavakolan, M. and Khosravi, Y. (2018), "Factors influencing safety performance on construction projects: a review", *Safety Science*, Vol. 109, pp. 382-397.
- Mohammed, M., *et al* (2022), "The mediating role of policy-related factors in the relationship between practice of waste generation and sustainable construction waste minimisation: PLS-SEM", *Sustainability*, Vol. 14 No. 2, p. 656.
- Musarat, M.A., Alaloul, W.S. and Liew, M. (2021), "Impact of inflation rate on construction projects budget: a review", *Ain Shams Engineering Journal*, Vol. 12 No. 1, pp. 407-414.
- Obayi, R. and Ebrahimi, S.N. (2021), "A neo-institutional view of the transaction cost drivers of construction supply chain risk management", *Supply Chain Management: An International Journal*, Vol. 26 No. 5, pp. 592-609.
- Ojaomo, K.E., Samion, S. and Yusop, M.Z.M. (2024), "Nano Bio-Lubricant as a sustainable trend in tribology towards environmental stability", *Opportunities and Challenges*.
- Okafor, A., Adeleye, B.N. and Adusei, M. (2021), "Corporate social responsibility and financial performance: evidence from US tech firms", *Journal of Cleaner Production*, Vol. 292, p. 126078.
- Othman, I., Kamil, M., Sunindijo, R.Y., Alnsour, M. and Kineber, A.F. (2020), "Critical success factors influencing construction safety program implementation in developing countries", in *Journal of Physics: Conference Series*, Vol. 1529 No. 4, p. 42079.

- 
- Perrenoud, A.J. (2020), "Delphi approach to identifying best practices for succession planning within construction firms", *International Journal of Construction Education and Research*, Vol. 16 No. 3, pp. 197-210.
- Sagar, S.K., Arif, M., Oladinrin, O.T. and Rana, M.Q. (2022), "Challenges negating virtual construction project team performance in the Middle east", *Built Environment Project and Asset Management*, Vol. 12 No. 4, pp. 613-629.
- Sahib, A.A., Mohammed, A., Shaker, R.M., Ali, M.H., Ahmed, M.D. and Shannan, M.A.A. (2022), "The relationship among team skills and competencies, construction risk management and supply chain performance with moderating effect of government laws acts, and policies: a study from Iraq construction contractors", *International Journal of Construction Supply Chain Management*, Vol. 12 No. 1, pp. 127-146.
- Salman, F., Hashemi, S.A. and Foroghi, D. (2023), "Feasibility of establishing operational budgeting in Iraqi public universities", *Risks*, Vol. 11 No. 2, p. 44.
- Semenova, T., Al-Dirawi, A. and Al-Saadi, T. (2022), "Environmental challenges for fragile economies: adaptation opportunities on the examples of the arctic and Iraq", *Agronomy*, Vol. 12 No. 9, p. 2021.
- Settembre-Blundo, D., González-Sánchez, R., Medina-Salgado, S. and García-Muiña, F.E. (2021), "Flexibility and resilience in corporate decision making: a new sustainability-based risk management system in uncertain times", *Global Journal of Flexible Systems Management*, Vol. 22 No. S2, pp. 107-132.
- Shaikh, A.A., Lakshmi, K.S., Tongkachok, K., Alanya-Beltran, J., Ramirez-Asis, E. and Perez-Falcon, J. (2022), "Empirical analysis in analysing the major factors of machine learning in enhancing the e-business through structural equation modelling (SEM) approach", *International Journal of System Assurance Engineering and Management*, Vol. 13 No. S1, pp. 681-689.
- Shibani, A., *et al* (2022), "Financial risk management in the construction projects", *Journal of King Saud University-Engineering Sciences*.
- Short, J.L. (2021), "The politics of regulatory enforcement and compliance: theorizing and operationalizing political influences", *Regulation and Governance*, Vol. 15 No. 3, pp. 653-685.
- Singla, H.K. and Samanta, P.K. (2019), "Determinants of dividend payout of construction companies: a panel data analysis", *Journal of Financial Management of Property and Construction*, Vol. 24 No. 1, pp. 19-38.
- Soewarno, N. and Tjahjadi, B. (2020), "Measures that matter: an empirical investigation of intellectual capital and financial performance of banking firms in Indonesia", *Journal of Intellectual Capital*, Vol. 21 No. 6, pp. 1085-1106.
- Stigler, G.J. (2021), "The theory of economic regulation", *The Political Economy: Readings in the Politics and Economics of American Public Policy*, Routledge, pp. 67-81.
- Trafimow, D. (2022), "Generalizing across auxiliary, statistical, and inferential assumptions", *Journal for the Theory of Social Behaviour*, Vol. 52 No. 1, pp. 37-48.
- Tuffour, J.K., Amoako, A.A. and Amartey, E.O. (2022), "Assessing the effect of financial literacy among managers on the performance of small-scale enterprises", *Global Business Review*, Vol. 23 No. 5, pp. 1200-1217.
- Van der Waldt, G. and Fourie, D. (2022), "Ease of doing business in local government: push and pull factors for business investment in selected South African municipalities", *World*, Vol. 3 No. 3, pp. 470-486.
- Weldegebreal, E. (2021), "Cost and time performance analysis on construction projects in Addis Ababa: a comparative study on selected local and foreign real estate developers", St. Mary's University.
- Wibowo, L.R., Hayati, N., Bisjoe, A.R., Kurniasari, D.R., Wahyudiyati, K.T. and Race, D. (2023), "Untangling the regulatory environment: why do wood processing businesses in Indonesia fail to be competitive in the global market?", *Small-Scale Forestry*, Vol. 22 No. 1, pp. 121-149.

- Zaia, Y.Y., Adam, S.M. and Abdulrahman, F.H. (2023), "Investigating BIM level in Iraqi construction industry", *Ain Shams Engineering Journal*, Vol. 14 No. 3, p. 101881.
- Zamim, S.K. (2021), "Identification of crucial performance measurement factors affecting construction projects in Iraq during the implementation phase", *Cogent Engineering*, Vol. 8 No. 1, p. 1882098.
- Zhang, Q., Oo, B.L. and Lim, B.T.-H. (2023), "Key practices and impact factors of corporate social responsibility implementation: evidence from construction firms", *Engineering, Construction and Architectural Management*, Vol. 30 No. 5, pp. 2124-2154.
- Zuerl, K. (2022), *Effective Cost Cutting in Asia*, Springer.

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