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The Delay and Failure of Residential Investment Projects in Iraq: Review

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ABSTRACT

One of the challenges that arises frequently when carrying out residential investment projects is building delays. This study aims to fill this gap and add more to the body of knowledge about residential investment projects in Iraq. The research methodology was divided into two sections: one on previous studies, as mentioned in this research, and the other on techniques and tools for reducing residential project delays. The researcher concluded that there are several issues with residential projects, like inadequate project comprehension, outdated methods, untrained contractors, etc. This issue is not readily resolved and can have a detrimental effect on the project's outcome, including cost overruns, subpar work, a lack of safety, and schedule delays. In addition to other detrimental social effects, project delays may occur at some point during the construction process, and in certain cases, even when the project is completed. A construction project must be completed on schedule and within the projected budget. Approximately eighty-four pertinent articles over the past twenty-five years have been examined. This issue has a direct influence on people's lives and social welfare. Implementing residential project policies for new clients has sparked building projects and increased demand for residential buildings. However, a lot of residential projects were abandoned or never finished, which seriously concerned the government.

Keywords: Residential projects, Failure, Delay, Investment, Construction project.

1. INTRODUCTION

The delay is a common problem in global construction. An essential component of socioeconomic development is the construction of any development Due to unexpected problems encountered during the conception, designing, and construction phases, there is often an unwanted delay in project completion The primary delay factors that result in project overruns are connected to the project owner's role, contractor-related, financing-related, materials-related, and design documents, which are most responsible for time and cost overruns in construction projects **(Hammadi and Nawab, 2016)**. Delay in construction

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projects is a common phenomenon, and there are numerous studies on this issue that identify the factors causing the delay. Delay is a major concern for the parties involved in construction projects **(Al-Emad and Nagapan, 2015)**.

The majority of building projects in Iraq, according to the study, experience delays in their implementation periods, albeit the percentage varies from project to project **(Mohammed and Jasim, 2017)**. The delay issue in building projects has eight root causes, which are as follows: External considerations, supplies, equipment, labor, contract, contractor, client, and designer. When it comes to contributing to the group of other (external) factors that cause delays in building projects, the country's economic difficulties during project execution have the greatest impact. In order to minimize and regulate delays in construction projects, the researcher ultimately recommends applying contemporary project management techniques and ideas as an agile management tenet. Furthermore, **(Abdul-Adheem and Abdul-Lateef, 2020)** addressed the idea of the phases of developing a geographical database and getting it ready for investment projects in the Baghdad Governorate, designing and making a digital investment map, and learning how many investment projects have been completed in the province using geographic information systems. While looking into the potential for subcontractors to cause residential building projects to be abandoned. In order to reduce and mitigate the risk factors that were found to be associated with abandonment in residential building projects, it was recommended that owners and contractors should increase their selection of a merit subcontractor **(Ayudhyaa and Kunishima, 2017).**

This study aims to close this knowledge gap and add to the body of knowledge on unsuccessful residential investment projects in Iraq. This will list these factors, evaluate and rank them according to significance, build a model, and offer recommendations based on the results that will assist in lessening the likelihood that this threat will materialize. The inability of residential construction projects to succeed has shown to be an unsolvable issue, persistently impeding the effective execution of projects in Iraq. The probability of failure is increased in residential projects due to its complexity, intricacy, and plethora of specific execution challenges.

2. LITERATURE REVIEW OF RESIDENTIAL PROJECTS FAILURE

The issue of the failure of residential projects are a prevalent topic that have received a lot of attention worldwide, especially in Iraq. The nation's economy has suffered significant losses as a result of this problem. It was taken in Iraq and other countries as follows:

2.1 Residential Project Failure in Iraq

(Altaie and Onyelowe, 2024) summarized the verification of the failure factors facing the implementation of residential complex projects. The interview and questionnaire approach were used to obtain 51 major failure factors divided into four main components in the implementation of residential complexes: leadership, management system, external forces, and project resources. Use the Relative Importance Index (RII) to determine the factors influencing failure and obtain the twelve most important factors, which are: political interference, change in governments, available partisan politics, unclear and inappropriate strategic planning, lack of materials and equipment, weak commitment of project leaders, work stoppage due to demonstrations, lack of human capabilities, bureaucracy, corruption, culture imbalance, and the results of the importance index for the components were very high, as follows: leadership, followed by resources, and administrative systems. And external

forces, respectively. They recommended the need to address the problems of failure in implementing residential complex projects and solve the housing crisis to begin the state's economic growth phase according to new foundations and standards.

(Mahmoud and Erzaij, 2023) the study came to the conclusion that, in order to avoid project reluctance and stalling, it would be important to identify the most important issues and factors for any construction investment project. These techniques may have been disrupted and project development hampered by unforeseen events and conflicts. Construction projects require large initial investment expenditures, thus crises can have an immediate effect and cause large financial losses. One of the most notable disasters Iraq had in 2014 was the financial crisis. This led the researcher to use Pareto scientific theory to evaluate and identify the barriers using questionnaires and study, excluding non-project-lag contributing factors. It was found that there are 28 factors that cause project latency both before and during implementation. Expert viewpoints are gathered, consensus is reached through the Delphi technique, and a software system is used to develop a proactive plan to lessen and eventually eliminate these obstacles in order to acquire solutions. Numerous challenges hindered or stopped residential investment projects in Iraq; recognizing these risks is essential to regulating and managing them. 37 barriers are found in the research, which indicates the most frequent risk in investment initiatives. Consequently, the researcher uses the Delphi technique to reach a consensus on a possible solution before putting the suggested expert system to use in an attempt to identify a solution. A few speculative suggestions have been made, specifically: A license is granted to each company until the project is successful, and after five years at the latest, a law is passed requiring the investors to monitor and perform at a specific standard during the project implementation phase. Investors are also required to submit a schedule, which entails paying a late fee. Make use of a single-window platform system; the license shouldn't be granted unless the draining is in line with the city's fundamental layout. Ask the firms to give financial statement equipment to the project-related compound, deal with reliable businesses, enter into contracts with additional businesses for supply as a backup, and employ a permanent staff member in order to verify their qualifications. The project manager must be an engineer with at least 15 years of experience, an electrical engineer with at least 10 years of experience, and an engineering consulting office that specializes in supervision in order to be eligible for investment commissions. The project will subsequently be financed by certificates issued by the engineers that the Investment Authority has selected and assigned.

The study **(Waheeb, 2023)** examined the reconstruction tactics and time and cost overruns resulting from various delay causes in a few chosen projects in Iraq (using Baghdad as a case study). The aim of this research is to prevent building project delays, especially in the aftermath of natural or man-made disasters, given their unique significance for the country and the humanitarian community. This study sought to determine the causes of effective delays in Iraqi construction projects that impact time and particular quality costs, as well as the most effective ways to mitigate delays and resolve issues by establishing constraints that will allow equilibrium to be restored. For this investigation, twelve delay variables were used. While, the goal of **(AL musawi and Naimi, 2023)** was to pinpoint the key causes and variables that influence the project delivery process within the allotted time frame. It was determined that the most typical causes of delays. To avoid any problems during task completion, organizations and people should coordinate their efforts throughout the construction divisions.

The study of **(Khamees and Altaay, 2022)** highlighted the issue of residential complexes having several difficulties, particularly in developing nations like Iraq. Given that funding is thought to be necessary for projects to be completed, the financing issue may be the most challenging. Due to financial issues and security concerns, the Iraqi government has experienced a severe lack of funding on a national and international scale, resulting in unfinished projects. The researcher studied private financing methods (partnerships between the public and private sectors) in residential complex projects instead of the public financing method because of the financial crisis that Iraq experienced, which resulted in the cancellation of many residential complex projects and made it difficult to return work to them through the use of public financing methods. The appropriate method for each project was selected instead of using traditional methods through optimization models that were used by choosing the optimal financing method for the investment project using the Public Private Partnership (PPP) approach, Gravitational Search Algorithm (GSA), and Gravitational Algorithms (GA). Twelve contract types were described in this research study solely for explanation: Build, Operate, and Transfer (B.O.T.); Build, Operate, Owns, and Transfer (B.O.O.T.); Build, Operate, and Own (B.O.O.); Build, Operate, Lease, and Transfer (B.O.L.T.); Build, Transfer, and Operate (B.T.O.); Maintain, Operate, and Transfer (M.O.T.); Build, Lease, and Transfer (B.L.T.); Build, Operate, and Renew Concession (B.O.R.); Design, Build, Finance, and Operate (D.B.F.O.); Rehabilitate, Operate, and Transfer (R.O.T.); and Operation And Maintenance (O.M.).

The building is an intricate process that occurs in a nearly unmanageable setting. Even while projects can theoretically be meticulously planned out in advance, unanticipated circumstances and crises may cause these plans to be disrupted and have an impact on the project's development **(Fadhil and Burhan, 2022)**. Construction projects are susceptible to sudden shocks due to their substantial initial investment costs, which can lead to substantial financial losses. One of the most notable crises Iraq had in 2014 was the financial crisis, which had a big effect on a lot of different things, including the building sector in particular. The researchers discovered that, despite the significance of crisis management systems, there are very few local studies that examine crisis management, particularly in the fundamental stages selected for its growth, which are before, during, and after a crisis. As a result, a successful crisis management system has been created, with 20 essential success characteristics and 59 possible actions for each of the three crisis stages and suggested criteria.

According to **(Khamees and Altaay, 2022)**, the Iraqi government has experienced a significant lack of funding on a local and international level, leading to unfinished projects. Instead of public financing methods for the implementation of residential complex projects, we investigated private financing (public and private partnership) methods due to the financial crisis that Iraq experienced, which resulted in the suspension of many residential complex projects, and the challenges associated with using public financing methods. Using a questionnaire created and disseminated to experts in the field, this study confirmed the financial issues and the variables associated with their likelihood of occurring. A pilot study, questionnaire distribution, questionnaire arbitration, and statistical testing were carried out. To determine whether there are any distinctions between the public and private financing strategies, the paired samples T-test (T-test) was employed. The findings demonstrated that, in the current state of Iraq, private financing (or public-private partnerships) approaches outperform public financing techniques. The elements that assess the effectiveness of both public and private funding were gathered for this study from earlier

research as well as an open-ended questionnaire survey. Experts devised and arbitrated the questionnaire, and the study population was pertinent to the topic. Data analysis techniques including the T-test and descriptive statistics were applied. The second approach is thought to be superior since it has a higher average effectiveness than the first one. We may conclude that when it comes to building residential complex projects in Iraq, PPP methods are more effective than state financing methods.

The goal of **(Alsaadi and Ghasemlounia, 2021)** was to identify the hazards that building projects in Iraq face and the strategies for mitigating such risks. Changing the project location can often be all that is needed to distinguish one construction project from another, exposing the involved parties to distinct risks, even if the projects share comparable configurations, specifications, and purposes. These are risks that could have an adverse effect on how these initiatives are implemented, causing a delay or raising the cost of the project. Here, data is gathered via a questionnaire in order to identify potential risks that could arise during the various stages of the construction project. Several samples from the public and commercial sectors of Iraqi state entities were given this questionnaire electronically. The hazards to which these projects might be exposed were determined after they were finished. This was carried out with engineers and project managers from businesses and joint ventures operating in the public, private, and cooperative sectors. SPSS was then used to examine these risks. Most of the time, the lengthy implementation period and job interruptions result in shifting conditions, which raises a number of potentially unanticipated dangers. One of the biggest dangers facing projects, as I deduced from the study, is the owner's failure to pay the bills on time, which causes a delay in the project's timely and high-quality completion, and because the contractor will attempt to do the work quickly to cut down on wasted time, this results in higher costs, a delayed project completion date, and poor implementation quality.

To determine the severity risk for such project risks based on a relative importance index, this research will use statistical analysis with IBM SPSS v22 and Microsoft Excel to identify, assess, and analyze the factors related to risks that may affect the implementation time for residential complexes projects **(Khaleel and Flayeh, 2020)**. External factors are necessary for the execution of all construction projects with comparable features **(Al-Sayyid and Ali, 2021)**. These elements could have an impact on how the construction project is carried out. However, there are a number of issues with the feasibility study in relation to the underappreciated segment of the Iraqi construction sector as well as the issues of feasibility study abuses. misunderstanding the purpose of the feasibility studies as well as misinterpreting the steps of the study. Additional elements that have a direct and detrimental impact on the Iraqi industry include delays, expenses, and other problems that lower the standard of building projects. This article seeks to evaluate the degree of knowledge regarding feasibility studies in construction projects, ascertain the impacts of feasibility studies in the construction sector, and pinpoint the reasons behind their misuse in the sector **(Mohammed and Naji, 2019)**.

The research of **(Naji et al., 2019)** explores the challenges associated with financial investment in Iraq. Given the limited options available, one of the most important decisions facing projects and investors is how to finance and find the right sources of funding for the project. This choice will ultimately impact the project's continuity and future success. There are numerous issues plaguing the Iraqi investment process at the moment. insufficient specialist investment banks to fund business ventures. Numerous financial obstacles impede the Iraqi investment process, and an investment project would not qualify as a project in the

absence of funding. The failure to pay for the necessary quantities of machinery and equipment exposes the reputation of the private sector, both inside and outside of Iraq, to misrepresentation, misuse, and a decline in business, finance, and public trust. The accumulation of financial benefits on loans taken from the private sector and its companies from banks and public and private financial institutions due to delays in repaying these loans exposes the Iraqi government and its institutions to a breach in the international trust wall for the safety and security of the investment environment in Iraq. A number of choices and activities need to be made in order to find a solution for the earlier problems. Once they're finished, they just need to figure out a way to pay the investors their dues, which will reduce the issues that impede the investing process.

The researchers in **(Yassin and Al-Asadi, 2019)** made the assumption that whereas brown investments are worthless because of their poor returns over years of investing within the same investment environment, long-term green investment patterns are viable within the investment ecosystem. Net present value, self-financing capabilities, rate of return on investment, and payback period for invested capital were among the comparative tools and benchmarks that the researcher employed. The researcher came to a number of conclusions, one of them being that the laws that legislate and promote foreign investment are crucial to improving the competitiveness of international ventures in Iraq. The study shown that the long-term green investment pattern is economically possible within the Iraqi investment environment by applying practical investment standards. In contrast, the investment demonstrated that Brown lacks economic feasibility because of its poor returns over the years of investment. Along with covering a variety of areas for investment development, the investment pattern also achieves larger chances to attract investor to invest.

The primary objective of **(Altaie and Borhan, 2018)**, according to the researcher, is to help the project manager by using an artificial neural network model that makes recommendations based on science and reality regarding the best time to complete recurring construction projects in Iraq during the planning and scheduling stages, which can be influenced by a variety of fundamental factors. Ensuring the success of artificial neural network-based project management, a novel approach to project management, was imperative. Any effective recurrent construction project management system aims to finish the work on schedule, within budget, and with the necessary level of planning and scheduling quality. The Artificial Neural Network (ANN) model, which is based on gathering past data authorized by (65) utilizing thirteen variables, is used to forecast the dates of recurrent construction projects in Iraq. The final results demonstrated a good association between test error and the anticipated and observed variables of the validation data, as well as a strong relationship between the actual and expected durations. Where was to use search Mean Absolute Percentage Error (MAPE), percentage of Average Accuracy (AA%), Coefficient of Determination (R^2), and Coefficient of Correlation (R).

Three key factors are necessary for projects to succeed: performance, requirements, and cost-time. The goal of the project stakeholder is to meet the contract's cost-and-time constraints while still achieving the best specifications. The contractor, owner, and consultant manage the project's daily operations, and their technical and practical abilities allow them to balance the three project fundamentals—cost, time, and quality—while keeping in mind the owner's set project objectives. This is what makes the project successful. Notwithstanding the project's main phases and logical framework administration, a number of components serve as key indicators of the project's success or failure. Many conclusions were drawn from the research, the most significant of which is that Iraq cannot have an

assessment system without a comprehensive monitoring system. It was also concluded that underspending on the planning stage is the primary cause of project failure **(Erzaij and Aljanabei, 2016).** Furthermore, the goal of **(Al-Ageeli and Alzobaee, 2016)** was to identify the success criteria as well as crucial success and failure elements that significantly affect the outcome of a project. the following was the questionnaire form to complete: Thirteen crucial failure reasons were identified, with "corruption," "external circumstances," and "financial difficulties of the owner" ranking as the most significant. The research findings were crucial, because the majority of the first feasibility assessments for government projects were either false or nonexistent, which resulted in the project and contracting procedures being marked by significant corruption. The nature of the Iraqi citizen and employee, the experience of the committees supervising the projects or limiting their authority, and the project manager, who plays a critical role in the project's structural success, are all deficient and have a negative impact on the success of construction projects.

2.2 Residential Project Failure in Other Countries

In Nigeria, this study was conducted in Nigeria, to determine the reasons for building project failures and abandonment. The goal of the study was to determine potential reasons for construction project failure and abandonment and to rank the factors according to significance. In order to do this, a quantitative research strategy was applied, and Kaduna State data was gathered via questionnaires. MS Excel 2016 was utilized for the analysis of the data obtained from the returned questionnaires in order to derive the Relative Importance Index (RII) and descriptive statistics. Even though insecurity was a major concern for the sector, particularly in the research field, the study's ranking indicated that it was not regarded as a significant factor in relation to the other elements **(Adagba et al., 2023).** States and organizations, particularly those in developing nations, have also had project implementation failures; however, the reasons, ramifications, and repercussions of these failures may vary throughout states. Through a survey of the literature, this study sought to understand the reasons for project failures in developing nations, specifically focusing on Nigeria. Sources of information on project failures in Europe, Asia, and Africa included books, journals, and newspapers. It was evident that project failure is a common occurrence in developing nations, especially Nigeria. It is recommended that the Nigerian government overhaul its policy architecture to mitigate the causes of project failure. The Nigerian government needs a national policy to deal with the nation's issue of project failure **(Eja and Ramegowda, 2020).** Additionally, the study included recommendations for efficient project and contract administration of multi-story construction projects, which is critical to enhancing Nigeria's ability to complete complex, expensive, and technically demanding building projects. The data were evaluated using factor analysis, mean item score, frequency distribution and percentages, and a questionnaire. The study was limited to multi-story building projects in Lagos State, Nigeria. This study assessed the significant factors that predisposed multi-story building projects in Nigeria to failure and abandonment **(Adebisi et al., 2018)**. Also, **(Aibinu and Jagboro, 2002)** investigated the consequences of delays in the Nigerian construction industry and found that the most common reasons of delays were time and expense overruns; contractors have been identified as one of the main sources of delays.

In India, in order to improve knowledge of the variables that need to be taken into account when starting a construction project, we seek to highlight the primary contributing causes

that are causing building projects throughout the city to fail. By going over some of the key elements that contribute to construction projects failing, this analysis aims to extract the opinions of specialists in the field. building experts were given questionnaires as part of a triangulated data collection strategy to get their opinions on the 20 elements contributing to the failure of the building projects (**Ahamed and Asadi, 2017)**. Additionally, **(Prasad, 2019)** demonstrated, included comparing the delay caused by design-build (DB) projects with those in design-bid-build (DBB) projects and examining the reasons behind delays in India by project sector (transport, power, buildings, and water). Additionally, projects were grouped according to the kind of contract. The Statistical Package for Social Sciences was used to do one-way analysis of variance, Kruskal-Wallis tests, and Cronbach's alpha statistical analysis of the replies. The study's conclusions show that financial issues rank among the main reasons Indian projects are delayed. Also **(Dixit et al., 2017)**, investigated of the factors influencing construction productivity and their ranking according to the answers provided on their influence on the productivity of building projects in India. Using a relative importance index, the research study determines the top 10 traits that significantly affect construction productivity. The top three attributes are supply chain management, planning and logistics, and decision-making. The research focuses on identifying and prioritizing the reasons for delays in residential building projects within the Indian environment. In addition to discussing the ranking of the reasons, this study offers a method for carrying out the ranking of the causes of delays using two distinct techniques: the relative importance index and the important index based on the severity and frequency of the cause. The results indicate that five criteria out of the top ten were ranked similarly by both techniques. All three parties concurred that the most significant element was labor-related, and the least significant factor was external. It is believed that the paper's conclusions will assist the stakeholders in addressing important issues and continuing to work toward reducing project delays **(Desai, 2013)**.

One of the most frequent issues that has a wide range of detrimental repercussions on construction projects is delay. Only until the root cause is found can construction delays be reduced. This study set out to determine the main reasons for building delays **(Ravisankar et al., 2014)**. Time overruns or an extension of the project's completion date are examples of delays. When a construction project really proceeds more slowly than anticipated or is completed later than expected, it is said to be in a delayed state **(Sharma et al., 2019)**. Gaining knowledge of potential risk factors for construction projects is the primary goal of this review article. Thus, the risks are essential to the project's execution on schedule and within the allocated budget **(Sheen et al., 2017)**. Any of these risks, which arise throughout a project, could lead to monetary loss or possibly the project's termination. Therefore, effective risk management is crucial to preventing this. Risk management is only possible through evaluating the likelihood that dangers may materialize. This is being done to use the PI approach to identify the different risk variables that arise in building projects and to prioritize the information. A five-point rating scale questionnaire was created for that purpose. Eight significant risks were taken into account for the questionnaire survey **(Krishnan and Johny, 2016)**. This study found that improved estimation of the escalation in cost and time overrun will result from early risk identification and evaluation in the project during the construction project's bidding stage. These risk evaluations aid in incorporating the project's budget and timeline for a successful conclusion **(Renuka et al., 2014)**.

In Malaysia, a project's success depends on its ability to identify the elements that contribute to the rehabilitation of abandoned projects. A study aimed at identifying those characteristics and then assessing them to ascertain their significance is applied to this paper. The study's primary focus is residential projects, and questionnaires were distributed as part of a survey. Finally, a model with a satisfactory fit index was built utilizing the Maximum Shared Variance (MSV), Average Shared Variance (ASV), and Average Variance Extracted (AVE) using the data from it to generate the latent and measurable variables. All things considered, it can be said that the produced model satisfies a number of requirements. Additionally, it demonstrates some validity in that it measures the things that it is intended to measure **(Doraisamy et al., 2016)**. An overview of the problem of project delays was provided by (**Sunitha et al., 2015)**, which also helped to highlight the severity of the problem and may encourage other researchers to give solutions in the future. When considering the state of the construction industry, particularly in developing nations, delays in projects are unavoidable. Project delays can occur at any time during the building process, and in some cases, they even occur when the project is almost finished. A construction project must be completed on schedule and within the projected budget. Due to its failure, a lot of research has been conducted to identify and look into the origins and effects of this problem. As well as **(Sambasivan and Soon, 2007)** who also examined the consequences of construction delays and found that one of the most significant ones was cost overrun. Although there is much research on the causes and effects of construction delays, there are few that address these causes and effects and provide concrete recommendations for delay reduction for clients, consultants, and contractors. It multiplies the effect on the overall economy in Malaysia **(Durdyev and Ismail, 2016)**. Determining the important causes and impacts of variation orders in building projects is, thus, the goal of this study. The study's findings indicated that variation orders frequently arise in JKR projects in Malaysia. The main consequences of voice over the top (VO) on projects are higher project costs, longer project completion times, and logistical delays. Professionals' early involvement could help to lessen the likelihood of deviations **(Memon et al., 2014)**.

In Ghana, in order to identify the most significant (essential) aspects, this study looked into the reasons why government projects in Ghana fail, gathering input from contractors, project managers, and the general public. A total of thirty-two potential reasons why government projects in Ghana fail have been determined. In order to identify the critical elements and interrelationships among the reasons why government projects in Ghana fail, the data was subjected to statistical techniques such as the Chi-square test of significance, Kendall's coefficient of concordance, Spearman Rank Correlation Coefficients, and the Relative Importance Index. According to the group ranking study, inadequate leadership is the primary reason behind Ghanaian government project failure, as reported by contractors, PMP, and the general public **(Damoah et al., 2015)**.

Also, another study examined, within the Ghanaian setting, the relationship between corruption and the failure of government projects using a number of failure criteria. According to the study, government officials take on project management roles with the dual goals of generating personal financial gain and using the proceeds to further their political cause. Therefore, they collude with contractors to inflate contract sums. Furthermore, corrupt behaviors are fostered by the government project contract awarding process. Government representatives and contractors participate in a drawn-out procedure when contracts are awarded. As such, the contractors add this to the cost of the project. A lengthy process is involved in awarding contracts, and contractors and government representatives

hire unofficial intermediaries who pocket at least 10% of the contract amounts. For their own benefit, some officials also pocket the same proportion of contract amounts, whether in cash or in kind. As a result, the contractors produce fewer project deliverables in terms of both quality and quantity. It was discovered that corruption will inevitably impact the benefits that the major stakeholders are expected to receive once it enters the project's management phase. The general public is the primary stakeholders who are most impacted, despite the fact that several stakeholders are also involved **(Damoah, 2018)**. while study was to evaluate the reasons behind and consequences of delays in Ghanaian public housing projects. Based on information gathered from a single state entity, this study is restricted to the causes and consequences of project delays in Ghana. Geographical limitations prevented the researchers from sampling state institutions engaged in different housing initiatives throughout Ghana **(Amoatey, 2015)**. **(Fugar and Agyakwah-Baah, 2010)** a study of delays in building construction projects in Ghana was conducted. The inability to get credit, price fluctuations, and payment certificate honoring delays were financial group factors. Factors related to the materials group come in second, and then scheduling and regulating factors.

In Vietnam, for government projects, the delays have become very serious. But the government initiatives haven't produced Surveys using questionnaires were carried out in Vietnam to identify the reasons for the delay and identify potential solutions. Much interest. The purpose of the questionnaire surveys in Vietnam was to identify the reasons behind the delays and to come up with ways to address them. The delay factors and the solutions were ranked using the average index. From a list of 31 delay causes and 19 delay-related remedies, this study determined the top 5 delay factors and the top 8 solutions. The study's conclusions can assist practitioners and other parties involved in construction projects in developing effective plans to combat project delays (**Kim et al., 2015)**.

In Jordan, many projects incur significant delays, going over their original budgets and schedules in the process. Numerous factors were found to be responsible for building delays in residential developments. The information gathered from a survey on residential developments was used to assess the most frequent causes. The majority of respondents concurred that the main reasons for construction delays are the owner's excessive change orders and the contractor's financial troubles. The two least significant factors were severe weather and legislative and regulatory changes. The most important conclusion of this research was that ‘‘financial difficulties’’ are the first most important delay cause. ranked ‘‘poor planning and scheduling’’ of the project by the contractor as the most important delay cause. And changes in government regulations and laws **(Sweis et al., 2008)**. Determine the reasons behind cost overruns in Jordanian construction projects. Out of 49 distinct sources of cost overruns, the survey determined the top 15 most significant factors. Overall, the study found that everyone is accountable for cost overruns in Jordanian building projects **(Bekr, 2015)**.

In Algeria, the paper aimed to determine the reasons behind delays in the Algerian construction sector and evaluate their significance based on the opinions of the owner, contractor, and consultant the three primary project stakeholders. There were fifty-nine reasons why there was a delay. The findings suggest that the primary causes of delay are those related to the owners **(Rachid, 2018)**.

In Palestine, **(Mahamid, 2011)** examined the variables influencing time delays in road-building projects and suggested educational initiatives to help project parties become more capable managers. The building sector is crucial to Gaza's ability to provide the

infrastructure needed to raise living standards. Thus, it's critical that the building business develop sustainably **(Enshassi and Ayyash, 2014)**.

In Pakistan, **(Mahmood et al., 2014)** discuss the relationship between poor quality and project productivity in this paper, along with the impact of poor quality on costs and profitability. The findings indicate that, following a 60-day study and the implementation of techniques aimed at improving construction quality, the cost of poor quality decreased **(Farooqui et al., 2008)**. All parties involved in a project will always consider delays to be costly, and they frequently lead to disputes, lawsuits, complete abandonment, difficulties with viability, and a slowdown in the expansion of the construction industry. An evaluation of the time performance of the building project was carried out in order to identify the reasons for the delay **(Haseeb et al., 2011)**.

In South Africa, there is a requirement for confidence regarding project completion. However, the projection of contract completion time has always been off. This article details a study that looked into the relationship between the start and end of a contract in order to create an equation that would allow for accurate project period estimation **(Aiyetan et al., 2012).** Time and cost overruns have a detrimental effect on the construction sector, which in turn has an adverse effect on the contractual stakeholders. Any project's likelihood of success or failure is influenced by a variety of factors, and the project manager is widely seen as one of the essential players in ensuring that a project succeeds by leading the team to satisfy the customer. The study looked into how project managers may perform at their best and lower the likelihood of cost and schedule delays on building projects by better equipping themselves with critical competency abilities **(Dlamini and Cumberlege, 2021)**.

In Cambodia, thus, utilizing residential building projects as a starting point, the goal of this study is to close a significant knowledge gap by identifying the many factors for construction project delay. It is advised that frontline players in the construction industry focus their attention on the identified critical elements based on the relative magnitudes of their influence. By doing this, it will be possible to greatly decrease or manage the reasons of project delays in Cambodia's real estate and construction sector, which will ultimately result in the completion of projects on schedule **(Durdyev et al., 2017)**. Also, in Turkmenistan, Because of its connections, both direct and indirect, to other industries **(Durdyev and Ismail, 2012).** According to **(Durdyev et al., 2016)**, the construction sector in Cambodia generates almost one-fourth of all jobs and contributes over 30.1% to the country's GDP.

In the United States and Turkey, to determine the significance of the deviations from the project length stipulated in the contract, a literature review is conducted. As required by the general conditions frequently utilized in the United States and Turkey, the study's goal is to ascertain the similarities and variations in the management of delays **(Komurlu, 2016).** In Morocco, to determine the relative significance of the factors that contribute to building delays in Morocco, a questionnaire survey of consultants and contractors, both governmental and private, was undertaken. The majority of construction projects experience schedule delays, and Moroccan construction projects are no exception. This study aims to identify the key factors influencing project delays in Morocco's construction sector **(Bajjou, 2018)**. While **(Kazaz et al., 2012)** conducted a similar study in Turkey in 2012, and the findings revealed 49-time hazards in construction projects. In Turkey, **(Gunduz, 2013)** this research seeks to uncover the elements that cause delays in building projects and to assess them using the relative relevance index approach. For this objective, a thorough literature review and interviews with construction industry experts led to the

identification of 83 distinct delay factors, which were then grouped into nine broad groups and illustrated by the Ishikawa (fishbone) diagram.

In Taiwan, **(Yang and Wei, 2010)**, assessed Cost and time overruns nearly invariably accompany delays, which have become a global occurrence. Even though schedule delays appear to be a part of every project, figuring out the root causes and avoiding these issues is preferable to handling follow-up arguments with delays.

In Iran, only once the reasons for delays are found can they be reduced or prevented. Project objectives including time, money, and quality will suffer when there is a delay in our work. The purpose of the research presented in this paper was to determine how delays may affect project objectives in the construction industry. The study's findings determined the six main consequences of delay **(Abedi, 2011)**. This study's primary goal is to determine the reasons that cause delays and how they affect the completion of a specific project, the Ghadir 2206 residential construction project in Fooladshahr, Iran. An analysis of the primary causes and how they affect certain outcomes is attempted. The nine most significant causes and consequences of delays were found in **(Najafabadi and Pimplikar, 2013)**. Also, **(Pourrostam and Ismail, 2012)** seek to determine the primary reasons for and consequences of Iranian construction project delays. From a list of 28 distinct causes of delay and 6 distinct impacts of delay, this study determined the 10 most significant causes of delay. The Relative Importance Index has been used to rank the reasons for delays from the contractors' and consultants' points of view.

In Indonesia, **(Maulana et al., 2024)** the goal of analysis delay in housing development is to construct infrastructure and facilities within the allotted time frame, but during the implementation phase, this is not possible. Consequently, the author carries out research using the qualitative Faul (Tree Analysis) FTA method, which has two (two) basic notation types: events and logic gates. Based on the findings of the investigation carried out for this assignment, the subsequent deductions can be made: The primary reasons why development projects employing the Fault Tree Analysis (FTA) method are delayed. **(Saputro and Wiguna, 2020)**, for both the owner and the contractor, meeting deadlines for project completion is crucial. Over 53% of home projects have been delayed by the real estate holding company XYZ Group. After identifying 48 causative elements through study, it begins by examining aspects that contribute to project delays.

In Egypt, **(Marzouk and El-Rasas, 2014)** throughout the course of a project, these issues commonly arise, giving rise to disagreements and legal action. Consequently, it is crucial to research and evaluate the reasons behind building delays. The list of reasons for building delays that this study gathered from the literature is presented. After that, a survey questionnaire was created. The highest values of the Frequency Index, Severity Index, and Importance Index are used to establish the top 10 reasons for construction project delays in Egypt. Later, in 2008, we conducted more research in Egypt, and the main causes for delay were found to be as follows: contractor finance during construction and owner payment delays **(Abd El-Razek et al., 2008)**.

In Singapore, the Singaporean government opted to shorten the waiting period for prospective public housing owners in response to the growing demand for such homes, which necessitates the timely completion of these projects. Therefore, the purpose of this study is to compare the variables influencing the schedule performance of public housing projects and other building projects in Singapore, as well as to identify the essential aspects affecting the schedule performance of public housing projects in Singapore **(Hwang et al., 2013)**. In Denmark, the primary finding of this study demonstrated that there are notable

differences in the effects of the project budget, schedule, and quality level. Consequently, the project manager cannot resolve such pressing problems by concentrating solely on schedule or budgetary complications, nor can the project manager presume that time, money, and quality are all equally impacted **(Larsen et al., 2015)**. In Kuwait, a study was conducted regarding residential projects in the private sector. The analysis found that the main causes of cost were material-related concerns, contractor-related issues, and finance limits. **(Koushki,2005)**.

In the UK, the intricate and strategic nature of the building sector frequently makes it regarded as a hazardous venture. There are a lot of project stakeholders involved, as well as internal and external elements, which increases risk significantly. Regretfully, in comparison to other industries, the construction sector has a bad reputation in risk assessments **(Laryea and Hughes, 2008)**. These internal hazards include unknowns related to labor, equipment, materials, subcontractors, resources, and site circumstances. As a result, numerous researchers have discovered several risk variables, which are then categorized into various categories based on the type of risk **(Dey, 2002; Ghosh and Jintanapakanont, 2004; Wiguna and Scott, 2005; Wang et al., 2010; Razakhani, 2012).**

In Tanzania, according to **(Kikwasi, 2012)**, the study finds that there are still a lot of reasons why construction projects in Tanzania experience delays and disruptions, which greatly jeopardizes the projects' performance. Therefore, it is advised that the parties involved in the project procurement process prioritize having an acceptable construction budget, providing information on time, finishing the design, and having project management expertise.

2.3 Failure Factors Affecting Residential Projects in Iraq and Other Countries

A group of failure factors for projects in Iraq and other countries has been collected from previous studies and has been arranged as shown in **Table 1** below. This is useful to avoid and reduce time failures when implementing projects.

Table 1. Delay and failure factors affecting residential investment projects.

Researcher	Country	Critical delay and failure factors
(Al-Ageeli and Alzobaee, 2016)	**Iraq**	1: Financial difficulties of the contractor. 2: Poor design capacity and frequent design changes. 3: Financial difficulties of the owner (delays in progress payments by the owner). 4: Incompetence of the project team. underestimation of time and cost. 5: Financial and administrative corruption. 6: Shortage of manpower (skilled, semi-skilled, and unskilled labor). 7: Insufficient data collection and surveying before design. 8: Inadequate experience of the consultant. 9: Delay in approving major changes in the scope of work by the consultant.
(Erzaij and Aljanabei, 2016)	**Iraq**	1: Lack of integration of project requirements. 2: The opinion of project users is not considered. 3: Insufficient resources. 4: Unrealistic estimations.

		5: Inefficient administrative support. 6: Changing requirements. 7: Poor planning. 8: The real need is not well estimated.
(Al-Moumani, 2000)	**Jordan**	1. Poor design. 2: Changes in orders or designs. 3: Weather. 4: Unforeseen site conditions. 5: Late deliveries.
(Koushki et al., 2005)	**Kuwait**	1: Changing orders. 2: Owners' financial constraints. 3: Owners' lack of experience in the construction business.
(Faridi and El-Sayegh , 2006)	**United Arab Emirates (UAE)**	1: Slow preparation and approval of drawings. 2: Inadequate early planning of the project. 3: Slowness of the owner's decision-making. 4: Shortage of manpower. 5: Poor site management and supervision 6: Low productivity of manpower.
(AlGheth and Sayut, 2019)	**United Arab Emirates (UAE)**	1: Contractor's financing difficulties. 2: Inadequate location management and management by the contractor. 3. Inadequate control of project progress. 4: Changes in the client's requirements. 5: Poor planning. 6: Payment problems between the contractor and subcontractor or supplier. 7: Contractor overload and financial difficulties. 8: Slow decision-making. 9: Poor subcontractor performance. 10: Problems with project cash flow. 11: Postponement of raw materials to be delivered by the client. 12: The contractor is not completely informed of the contract requirements. 13: Poor supervision Postponement in endorsement of the contractor's proposal. 14: Inadequate communication with project teams. 15: Market inflation. 16: Postponement of the project by the customer.
(Altaie and Onyelowe, 2024)	**Iraq**	1: Political interference. 2: Change in governments. 3: Partisan politics are available. 4: Unclear strategic planning. 5: Inadequate Planning. 6: Lack of materials and equipment. 7: low commitment by project leaders. 8: Suspend the work due to the demonstrations. 9: Lack of human capacity. 10: Bureaucracy. 11: Corruption. 12: Misalignment in Culture.
(Waheeb, 2023)	**Iraq**	1: Owner failure. 2: Newly added holidays.

		3: Redesigning and changing orders. 4: Changing site location. 5: Contractor failure. 6: Security status. 7: Consultant Failure. 8: Preparing projects delays. 9: Laboratory tests delay. 10: Low prices. 11: External factors. 12: Weather factors.
(Adagba et al., 2023)	**Kaduna**	1: Corruption. 2: Change in government administration. 3: Politics. 4: Government policies. 5: Inadequate involvement of construction professionals. 6: Client's interference. 7: Lack of professional ethics. 8: Insecurity. 9: Ineffective Communication. 10: Legal claims.
(Adebisi et al., 2018)	**Nigeria**	1: Inadequate funding by the client; improper planning at the pre-construction phase. 2: Structural failure in multi-story building during construction. 3: Bankruptcy or business failure of the contractor. 4: Improper scheduling of the building project activities and failure to engage qualified professionals with technical expertise and experience. 5: Inadequate feasibility studies or non-adoption.
(Damoah et al., 2015)	**Ghana**	1: Monitoring. 2: Corruption. 3: Political interference. 4: Change in government. 5: Bureaucracy. 6: Lack of continuity. 7: Fluctuation of prices. 8: Planning. 9: Delays in payment. 10: Release of funds.
(Eja and Ramegowda, 2020)	**Nigeria**	1: Poor financial capacity. 2: Inaccurate costing and corruption. 3: Incompetence and lack of knowledge. 4: Poor planning and estimation. 5: Poor communication. 6: Poor contracting and contractor practices. 7: Frequent design scope changes and errors. 8: Socio-cultural and political interference. 9: poor leadership and corruption.
(Kim et al., 2015)	**Vietnam**	1: Information delays and lack of information exchange between the parties. 2: Incompetent owner. 3: Incompetent supervision consultant. 4: Incompetent contractor.

		5: Difficulties in financing the project by the owner.
(Wasim and Khalidi, 2018)	**Pakistan**	1: Incompetent Contractor. 2: Delay in the procurement of long-lead items. 3: Delay in Payments to contractors. 4: Inaccurate Cost Estimates. 5: Inaccurate Project Schedule and Incompetent Project Team. 6: Lack of Project Planning. 7: Incompetent Project Manager. 8: Delay in providing site access to contractors. 9: Lack of cash flows. 10: Delay in the design phase.
(Ahamed and Asadi, 2017)	**India**	1: Knowledge and Technical Issues. 2: Management. 3: Financial and Economic Issues. 4: Social and Legal Aspects. 5: Natural Phenomenon.
(Hammadi and Nawab, 2016)	**Saudi Arabi**	1: Project-related. 2: Owner-related. 3: Contractor-elated (technical, reputation, management ability, organizational culture). 4: Consultant-related. 5: Client-related. 6: Financing-related. 7: Design related. 8: Plant/equipment related. 9: Materials. 10: Workforce (Manpower) Related. 11: External factors related.
(Al-Emad and Nagapan, 2015)	**Saudi Arabi**	1: Changes in design documents. 2. Low productivity level of labor. 3: Shortage of manpower. 4: Difficulties in financing a project by the contractor. 5: Poor contract management. 6: Unqualified workforce.

3. CONCLUSIONS

The past project failures are still evident in contemporary residential project. As a result, techniques and tools must be used whenever it can take the place of human engagement in project administration. should collaborate with regulatory organizations to enable appropriate project management and implementation. It is necessary to establish regulations to stay clear of the legal claims issue. Thus, preventing these projects from failing indefinitely and overcoming the obstacles will be beneficial for numerous housing, infrastructure, and economic sectors. It is imperative to effectively manage risks among stakeholders by utilizing programmers with a high potential for knowledge transfer, changing relevant legislation, and implementing efficient due processes that will improve transparency in the selection of contractors. Implications for efficient project management of residential investment projects are presented by this study. The researcher concluded that the project's failure was caused by weak infrastructure, weak community empowerment, exceeding project costs, loss of revenue from people, and loss of state

revenues. To solve the issue of project failure in the nation, the government needs a good methodology and, if required, a legislative strategy. Project failure has severe negative effects on both the national economy and individual citizens, which must be mitigated.

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Credit Authorship Contribution Statement

Aya A. Hasan: conceptualized, investigated, software, and edited methodology. Abbas M. Burhan: reviewing and validation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

Abd El-Razek, M.E., Bassioni, H.A. and Mobarak, A.M., 2008. Causes of delay in building construction projects in Egypt. *Journal of Construction Engineering and Management,* 134(11), pp. 831-841.

Abdul-Adheem, W.K. and Abdul-Lateef, M.G., 2020. Designing investment map and building geographical database for investment projects in Baghdad governorate. *Al-Adab Journal*, 134, pp. 311-328. https://doi.org/10.31973/aj.v0i134.1066

Abedi, M., 2011. Effects of construction delays on construction project objectives. *The First Iranian Students Scientific Conference in Malaysia,* pp. 1–8.

Adagba, T., Shamsudeen, H., and Ati, J.O., 2023. An analysis of factors causing failures and abandonment of construction projects in Kaduna state, Nigeria. *Global Journal of Business, Economics and Management*, 13(3), pp. 215–230. https://doi.org/10.18844/gjbem.v13i3.8853

Adebisi, E.O., Ojo, S.O., and Alao, O.O., 2018. Assessment of factors influencing the failure and abandonment of multi-story building projects in Nigeria. *International Journal of Building Pathology and Adaptation*, 36(2), pp. 210-231. https://doi.org/10.1108/IJBPA-10-2017-0048

Ahamed, Sk.A., Asadi, S.S., 2017. Factors affecting the failure analysis of construction projects. *International Journal of Civil Engineering and Technology (IJCIET)*, 8(1), pp.390–396.

Aibinu, A.A. and Jagboro, G.O., 2002. The effects of construction delay on project delivery in Nigerian construction industry. *International National Journals of Project Management*, 20 (8), pp. 593-599. https://doi.org/10.1016/S0263-7863(02)00028-5

Aiyetan, A.O., Smallwood, J. and Shakantu, W., 2012. A linear regression modelling of the relationship between initial estimated and final achieved construction time in South Africa. *Acta Structilia*, 19(1), pp. 39– 56. https://doi.org/10.38140/as.v19i1.121

AL musawi, L. and Naimi, S.,2023. The management of construction projects in Iraq and the most important reasons for the delay. *Journal about Logistics International Scientific*, 10 (1), p.p. 61-70. https://doi.org/10.22306/al.v10i1.351

Al-Ageeli, H.K. and Alzobaee, A.S.J.A., 2016. Critical success factors in construction projects (Governmental projects as a case study). *Journal of Engineering*, 22(3), pp. 129-147. https://doi.org/10.31026/j.eng.2016.03.09

Al-Emad, N. and Nagapan, S., 2015. Identification of delay factors from Mecca's construction expert's perspective. *International Journal of Sustainable Construction Engineering & Technology*, 6 (2), pp.16-25.

AlGheth , A. and Sayuti, M. I., 2019. contributing factors to schedule delays in construction projects in the United Arab Emirates. *International Journal of Engineering and Advanced Technology (IJEAT). 8(6S3),* pp. 422-433. https://doi.org/10.35940/ijeat.F1076.0986S319

Al-Hammadi, S. and Nawab, M.S., 2016. Study of delay factors in construction projects. *International Advanced Research Journal of Science Engineering and Technology*, 3 (4), pp. 87-93.

Al-Moumani A., 2000. Construction delays: a quantitative analysis. *International Journal of Project Management*,18(4), pp. 51–59. https://doi.org/10.1016/S0263-7863(98)00060-X

Alsaadi, A.A., and Ghasemlounia, R., 2021. Reasons for delaying the constriction projects in Iraq. *International Journal of Engineering and Management Research*, 11(1), pp. 129–133. https://doi.org/10.31033/ijemr.11.1.18

Al-Sayyid, W.M., and Ali, S.H., 2021. Integrated project management strategies-residential investment case study. *International Conference on Advance of Sustainable Engineering and its Application (ICASEA),* pp. 200–205.

Altaie, M.R. and Borhan, A.M., 2018. Using neural network model to estimate the optimum time for repetitive construction projects in Iraq. *Association of Arab Universities Journal of Engineering Sciences*, 25 (5), pp. 100-114.

Altaie, M.R., and Onyelowe, K., 2024. Identifying failure factors in the implementation of residential complex projects in Iraq. *Journal of Engineering*, 30(2), pp. 1-15. https://doi.org/10.31026/j.eng.2024.02.01

Amoatey, C.T., Yaa A.A., Ebenezer, A. and Samuel, F., 2015. Analysing delay causes and effects in ghanaian state housing construction projects. *International Journal of Managing Projects in Business*, 8 (1), pp. 198–214. https://doi.org/10.1108/IJMPB-04-2014-0035

Bajjou, M.S. and Chafi, A. ,2018. Empirical study of schedule delay in Moroccan construction projects. *International Journal of Construction Management, pp. 1-18*. https://doi.org/10.1080/15623599.2018.1484859

Bekr, G.A., 2015. Identifying factors leading to cost overrun in construction projects in Jordan. *Journal of Construction Engineering, Technology and Management*. 5 (3), pp. 25–33.

Damoah, I.S., Akwei, C. and Mouzughi, Y., 2015. Causes of government project failure in developing countries – focus on Ghana: The value of pluralism in advancing management research, education, and practice. *BAM2015 Conference Proceedings. 29th Annual BAM Conference, University of Portsmouth, Portsmouth, United Kingdom*.

Damoah, I.S., Akwei, C.A., Amoako, I.O. and Botchie, D., 2018. Corruption as a source of government project failure in developing countries: evidence from Ghana. *Project Management Journal*, 49(3), pp. 17–33. https://doi.org/10.1177/8756972818770587

Desai, M. and Bhatt, R., 2013. Critical causes of delay in residential construction projects: Case study of Central Gujarat Region of India. *International Journal of Engineering Trends and Technology (IJETT),* 4 (4), pp. 762–768.

Dey, P. K., 2002. Project Risk Management: A combined analytical hierarchy process and decision tree approach. *Cost Engineering*, 44(3), pp. 13-26.

Dixit, S., Pandey, A.K., Mandal, S.N. and Bansal, S., 2017. A Study of enabling factors affecting construction productivity: Indian scenario. *International Journal of Civil Engineering & Technology*, 8(6), pp. 741–758.

Dlamini, M. and Cumberlege, R., 2021. the impact of cost overruns and delays in the construction business. *The ASOCSA 14th Built Environment Conference, IOP Conference Series: Earth and Environmental Science,* (pp. 1-10).

Doraisamy, S.V., Akasah, Z.A. and Khamis, A., 2016. A Model on the significant factors contributing towards the restoration of abandoned residential projects in Malaysia using AMOS-SEM. *Australian Journal of Basic and Applied Sciences*, 10(11), pp. 87–94.

Durdyev, S. and Ismail, S., 2016. On-site construction productivity in Malaysian infrastructure projects. *Structural Survey*, 34(4/5), pp. 446–462. https://doi.org/10.1108/SS-12-2015-0058

Durdyev, S., and Ismail, S., 2012. Role of the construction sector in the economic development of Turkmenistan. *EEST Part A: Energy, Science and Research*, 29(2), pp. 883–890.

Durdyev, S., Maksat, O. and Syuhaida, I., 2017. Causes of delay in residential construction projects in Cambodia. *Cogent Engineering*, 4, pp. 1–12. https://doi.org/10.1080/23311916.2017.1291117

Durdyev, S., Omarov, M., and Ismail, S., 2016. SWOT Analysis of the Cambodian construction industry within the ASEAN economic community. *Proceedings of the 28th International Business Information Management Association Conference, Seville,* pp. 2335- 2341.

Eja, K.M. and Ramegowda, M., 2020. Government project failure in developing countries: A review with particular reference to Nigeria. *Global Journal of Social Sciences*, 19, pp. 35–47. https://doi.org/10.4314/gjss.v19i1.4

Enshassi, A. and Ayyash, A., 2014. Factors affecting cost contingency in the construction industry – Contractors' perspective. *International Journal of Construction Management*, 14(3), pp. 215–239. https://doi.org/10.1080/15623599.2014.922729

Erzaij, K.R., and Aljanabei, D.M., 2016. Performance evaluation of the investment projects during the implementation phase (Najaf province as a case study). *Journal of Engineering*, 22(8), pp. 54-74. https://doi.org/10.31026/j.eng.2016.08.04

Fadhil, G.A., and Burhan, A.M., 2022. Developing crisis management system for construction projects in Iraq. *Journal of Engineering*, 28(1), pp. 33-51. https://doi.org/10.31026/j.eng.2022.01.03

Faridi, A.S and El-Sayegh, S.M, 2006. Significant factors causing delay in the UAE construction industry. *Construction Management and Economics*, 24(11), pp. 1167–1176. https://doi.org/10.1080/01446190600827033

Farooqui, R., Farrukh, A. and Rafeequi, A., 2008. Safety performance in construction industry of Pakistan. *Proceedings of the 1st International Conference on Construction in the Developing Countries (ICCIDC-I), Karachi, Pakistan*.

Fugar, F.D.K. and Agyakwah-Baah, A.B., 2010. Delays in building construction projects in Ghana. *Australasian Journal of Construction Economics and Building*, 10(1-2), pp. 103-116. https://doi.org/10.5130/AJCEB.v10i1-2.1592

Ghosh, S. and Jintanapakanont, J., 2004. Identifying and assessing the critical risk factors in an underground rail project in Thailand: a factor analysis approach. *Elsevier International Journal of Project Management*, 22(8), pp. 633-643. https://doi.org/10.1016/j.ijproman.2004.05.004

Gunduz, M., Nielsen, Y. and Ozdemir, M., 2013. Quantification of delay factors using the relative importance index method for construction projects in Turkey. *Journal of Management in Engineering (ASCE)*, 29 (2), pp. 133 – 139. https://doi.org/10.1061/(ASCE)ME.1943-5479.000012

Haseeb, M., Xinhai-Lu, Bibi, A., Maloof-ud Dyian, and Rabbani, W., 2011. Problems of projects and effects of delays in the construction industry of Pakistan, *Australian Journal of Business and Management Research*, 1(5), pp. 41–50.

Hwang, B.G., Zhao, X. and Ng, S. Y., 2013. Identifying the critical factors affecting schedule performance of public housing projects. *Habitat International*, pp. 214–221. https://doi.org/10.1016/j.habitatint.2012.06.008

Kazaz, A., Ulubeyli, S., Tuncbilekli, N.A., 2012. Causes of delays in construction projects in Turkey. *Journal of Civil Engineering and Management*, 18(3), pp. 426-435.

Khaleel, T.A. and Flayeh, M.A., 2020. Evaluation of risk factors affecting the implementation time for residential complex projects in Iraq. *3rd International Conference on Engineering Sciences IOP Conf. Series: Materials Science and Engineering 671 (2020) 012002,* pp. 1-14.

Khamees, A.S. and Altaay, M.R., 2022. Optimizing methods of funding residential complexes projects. *International Journal of Intelligent Systems and Applications in Engineering*, 10(3), pp. 57-63

Khamees, A.S. and Altaay, M.R., 2022. Evaluating the efficiency of finance methods in residential complex projects in Iraq. *Engineering, Technology & Applied Science Research*, 12(1), pp. 8080-8084. https://doi.org/10.48084/etasr.4663

Kikwasi, G.J., 2012. Causes and effects of delays and disruptions in construction projects in Tanzania, *Australasian Journal of Construction Economics and Building Conference Series*, 1(2), pp. 52-59. https://doi.org/10.5130/ajceb-cs.v1i2.3166

Kim, S.Y., Nguyen, V.T. and Luu, V.T., 2015. Delay factors affecting the completion of the government construction projects in Vietnam. *The 6th International Conference on Construction Engineering and Project Management (ICCEPM 2015) at Paradise Hotel, Busan, South Korea.*

Komurlu, R. and Arditi, D., 2016. Delay management in building construction: a comparative study. *Proceedings of International Structural Engineering and Construction*, 3(1), pp. 431-436.

Koushki, P.A., Al-Rashid, K. and Kartam, N.,2005. Delays and cost increases in construction of private residential projects in Kuwait. *Construction Management and Economics*, 23(3), pp. 285–294. https://doi.org/10.1080/0144619042000326710

Krishnan, G.R. and Johny, M.A., 2016. Assessment of risk factors in construction project using PI method. *International Research Journal of Engineering and Technology (IRJET)*. 3(9), pp. 767 -770.

Larsen, J.K., Shen, G.Q., Lindhard S.M. and Brunoe T.D., 2015. Factors affecting schedule delay, cost overrun, and quality level in public construction projects. *Journal of Management in Engineering*, 32(1), pp. 1-29. https://doi.org/10.1061/(ASCE)ME.1943-5479.0000129

Laryea, S. and Hughes, W., 2008. How contractors price risk in bids: theory and practice. *Construction Management and Economics*, 26(9), pp. 911–924. https://doi.org/10.1080/01446190802317718

Mahamid, I., 2011. Risk matrix for factors affecting time delay in road construction projects: owners' perspective. *Engineering, Construction and Architectural Management*, 18(6), pp. 609-617. https://doi.org/10.1108/09699981111180917

Mahmood, S., Ahmed, S.M., Panthi, K. and Kureshi, N.I., 2014. Determining the cost of poor quality and its impact over productivity and profitability. *Built Environment Project and Asset Management*, 4 (3), pp. 296- 311.

Mahmoud, T.N. and Erzaij, K.R., 2023. Develop proactive system for risk management (DPSRM) for lagging investment project in Iraq. *Journal of Engineering*, 29 (7), pp.137-152. https://doi.org/10.31026/j.eng.2023.07.09

Marzouk, M.M. and El-Rasas, T.I., 2014. Analyzing Delay Causes in Egyptian Construction Projects. *Journal of Advanced Research*, 5(1), pp. 49–55. https://doi.org/10.1016/j.jare.2012.11.005

Maulana, V., Apriliani, D., Susila, D., Ardiansyah, R., 2024. Analysis of delays in housing construction Pt. Tata building facilities using the faul tree analysis method. *Proceedings of the International Conference on Consumer Technology and Engineering Innovation (ICONTENTION 2023), Advances in Engineering Research 233, pp. 98-102*. https://doi.org/10.2991/978-94-6463-406-8_18

Memon, A.H., Rahman , I.A., and Abul Hasan, M.F., 2014. Significant causes and effects of variation orders in construction projects. *Research Journal of Applied Sciences*, *Engineering and Technology*, 7(21), pp. 4494-4502. jttps://doi.org/10.19026/rjaset.7.826

Mohammed, S.R., and Jasim, A.J., 2017. Study and analysis of the delay problems in Iraqi construction projects. *International Journal of Science and Research (IJSR)*, 6(5), pp. 2331-2336.

Mohammed, S.R., Naji, H.I. and Ali, R.H., 2019, May. Impact of the feasibility study on the construction projects. In *IOP Conference Series: Materials Science and Engineering* (Vol. 518, No. 2, p. 022074). IOP Publishing.

Na Ayudhyaa, B.I. and Kunishima, M., 2017. Risks of abandonment in residential projects caused by subcontractors. *Procedia Computer Science*, 121, pp. 232–237. https://doi.org/10.1016/j.procs.2017.11.032

Najafabadi, E.A. and Pimplikar, P.S.S., 2013. The significant Causes and effects of delays in Ghadir 2206 residential project. *Journal of Mechanical and Civil Engineering*, 7(4), pp. 75–81.

Naji, H.I., Mahmood, M.S., and Mohammad, H.E., 2019, May. The Impact of financial problems related to investment projects in Iraq. *2nd International Conference on Sustainable Engineering Techniques (ICSET 2019) In IOP Conference Series: Materials Science and Engineering. IOP Publishing, 518(2),* pp. 1-7.

Pourrostam, T. and Ismail, A., 2012. Causes and effects of delay in Iranian construction projects. *International Journal of Engineering and Technology*, 4 (5), pp. 598-601. https://doi.org/10.7763/IJET.2012.V4.441

Prasad, K.V., Vasugi, V., Venkatesan, R. and Nikhil Bhat, 2019. Analysis of causes of delay in Indian construction projects and mitigation measures. *Journal of Financial Management of Property and Construction*. https://doi.org/10.1108/JFMPC-04-2018-0020

Rachid,Z., Toufik, B. and Mohammed, B., 2018. Causes of schedule delays in construction projects in Algeria. *International Journal of Construction Management*, pp. 1-11. https://doi.org/10.1080/15623599.2018.1435234

Ravisankar, K.L., Anandakumar, S.M.E., Krishnamoorthy, V.M. and Phil, M., 2014. Study on the quantification of delay factors in construction industry. *International Journal of Emerging Technology and Advanced Engineering*, 4(1), pp. 105–113.

Renuka, S.M., Umarani, C. and Kamal, S., 2014. A review on critical risk factors in the life cycle of construction projects. *Journal for Civil Engineering Research*, 4(2A), pp. 31-36.

Rezakhani, P., 2012. Classifying key risk factors in construction projects. *Bulftinul institutului politrhnic din IASI Construction and Architectural*, LVIII(LXII), Fasc. 2, pp. 1-13.

Sambasivan, M. and Soon, Y.W., 2007. Causes and effects of delays in Malaysian construction industry. *International Journal of Project Management*, 25 (5), pp. 517-526. https://doi.org/10.1016/j.ijproman.2006.11.007

Saputro, P.B. and Wiguna, I.P.A., 2020. Analysis of the factors affecting delay in housing projects in XYZ group. *The 6 th international Seminar on Science and Technology (ISST) 2020, IPTEK Journal of Proceeding Series No. (6), Institute Teknologi Nopember, Surabaya, Indonesia,* pp. 348 – 353. https://doi.org/10.12962/j23546026.y2020i6.11121

Sharma, M., Trivedi, A S. and Sharma, A., 2019. Analysis of delays in building construction projects. *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, 7 (XII), pp. 621-629.

Sheen, S., Priyan, R. and Sugumar, S., 2017. A review on risk management in residential projects. *International Journal of Engineering Research & Technology (IJERT),* 6 (11), pp. 295-298. https://doi.org/10.17577/IJERTV6IS110150

Sunitha, V.D., Akasah, Z.A. and Yunus, R., 2015. An overview on the issue of delay in the construction industry. *Proceedings of the International Civil and Infrastructure Engineering Conference 2014 (InCIEC 2014),* pp. 313-319. *https*://doi.org/10.1007/978-981-287-290-6_27

Sweis, G., Sweis, R., Abu Hammad, A. and Shboul, A., 2008. Delays in construction projects: the case of Jordan. *International Journal of Project Management*, 26(6), pp.665–674. https://doi.org/10.1016/j.ijproman.2007.09.009

Waheeb, R., 2023. Identification of delay causes in construction projects and emergency, reconstruction- Iraq as a case study. PhD thesis, Department of Civil Engineering, Norwegian University of Science and Technology Faculty of Engineering, Norwegian. https://doi.org/10.2139/ssrn.4449802

Wang, Q.S., Dulaimi, M.F. and Aguria, M.Y., 2004. Risk management framework for construction projects in developing countries. *Construction Management and Economics*, 22 (3), pp. 237-252. https://doi.org/10.1080/0144619032000124689

Wasim, S.S. and Khalidi, M.A., 2018. Causes of construction project failures in Pakistan. *Civil and Environmental Research*, 10(7), pp .38–41.

Wiguna, I.P.A. and Scott, S., 2005.Nature of the critical risk factors affecting project performance in Indonesian Building Contracts. *21st Annual ARCOM Conference, SOAS, University of London, Association of Researchers in Construction Management, 1,* pp. 225-235.

Yang, J.B. and Wei, P.R., 2010. Causes of delay in the planning and design phases for construction projects. *Journal of Architectural Engineering*, 16(2), pp. 80-83. https://doi.org/10.1061/(ASCE)1076-0431(2010)16:2(80)

Yassin, A.T., and Al-Asadi, A., 2019. Pattern of investment projects in the investment environment. *Iraq Journal of Market Research and Consumer Protection*, 11(1), pp. 160-169.

التأخير والفشل للمشاريع الاستثمارية السكنية في العراق

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الخلاصة

إن أحد التحديات التي تنشأ بشكل متكرر عند تنفيذ مشاريع الاستثمار السكنية هو تأخير البناء. حيث تهدف هذه الدراسة إلى سد هذه الفجوة وإضافة المزيد إلى مجموعة المعرفة حول مشاريع الاستثمار السكنية في العراق. تم تقسيم منهجية البحث إلى قسمين: أحدهما حول الدراسات السابقة، كما ورد في هذا البحث، والآخر حول التقنيات والأدوات اللازمة للحد من تأخير المشاريع السكنية. وتبين للباحث إلى وجود العديد من القضايا المتعلقة بالمشاريع السكنية، مثل الفهم غير الكافي للمشروع، والأساليب القديمة، والمقاولين غير المدربين، وما إلى ذلك. لا يتم حل هذه المشكلة بسهولة ويمكن أن يكون لها تأثير ضار على نتيجة المشروع، بما في ذلك تجاوز التكاليف، والعمل دون المستوى، والافتقار إلى السلامة، وتأخير الجدول الزمني. بالإضافة إلى التأثيرات الاجتماعية الضارة الأخرى، قد يحدث تأخير في المشروع في مرحلة ما أثناء عملية البناء، وفي حالات معينة، حتى بعد اكتمال المشروع. من الضروري إكمال مشروع البناء في الموعد المحدد وفي حدود الميزانية المتوقعة. تم مراجعة ما يقارب أربعة وثمانين بحث ذات صلة على مدى السنوات الخمس والعشرين الماضية. إن هذه القضية لها تأثير مباشر على حياة الناس ورفاهيتهم الاجتماعية. إن تنفيذ سياسات المشاريع السكنية للعملاء الجدد أدى إلى تحفيز أنشطة مشاريع البناء وزيادة الطلب على المباني السكنية. ولكن العديد من المشاريع السكنية تم التخلي عنها أو لم يتم الانتهاء منها على الإطلاق، الأمر الذي أثار قلق الحكومة بشكل خطير.

الكلمات المفتاحية: المشاريع السكنية، الفشل، التأخير، الاستثمار، المشاريع الانشائية.