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Investigating critical failure drivers of construction project at planning stage in Saudi Arabia

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Abstract

Purpose – The purpose of this research is to identify the constraints and restrictions and their impact on the construction projects in Saudi Arabia from three key participants' perspectives for the planning stage.
Design/methodology/approach – Using a descriptive-analytical approach, this research described and analyzed the frequency and severity of failure factors in construction projects in the planning stage using a five-Likert scale questionnaire in Saudi Arabia construction between 2019 and 2020. A total of 100 experts from contractors, consultants and owners were included in the study.
Findings – The findings have shown that time dispute was the major factor affecting the projects to be failed. Similarly, cost overrun and total abandonment have an impact on project failures. The findings have indicated that government officials were involved in delaying the projects while contractors also failed in the project deliveries.
Research limitations/implications – Further research is needed to investigate the relationship between failure characteristics and project success measures in the same stage, in addition to, factors of failure for construction projects' life-cycle stages.
Originality/value – The findings have indicated that government officials were involved in delaying the projects while contractors also failed in the project deliveries.

Keywords Construction projects, Failure drivers, Life cycle, Clustering
Paper type Research paper

1. Introduction

The construction industry is one of the most valuable industries providing significant contributions to any countries' economy. However, the success and failure of the construction project is often a considerable challenge for various project managers due to the different dynamics, uncertainty and complexity of different projects (Nguyen *et al.*, 2004). It is widely acknowledged that a country's construction industry has a considerable beneficial influence on its national economy. According to the United Nations Economic Commission for Europe (UNECE) report, the construction sector contributed 10.4% of gross domestic product (GDP). In Saudi Arabia, the construction sector accounted for around 6% of GDP (Abdulmoneim, 2021). Therefore, to overcome the chances of failure, it is important to recognize different drivers that control the performance of the project to obtain desirable outcomes (Yu and Kwon, 2011).

The construction industry of Saudi Arabia is considered among the largest industries across the world as it has significantly contributed to the development of various mega projects. These projects are related to the development of basic infrastructure and are

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executed under predetermined national plans, which favor the delivery of several infrastructural facilities (Alsulamy, 2015). The failures in construction projects have become a recurring problem within the industry, which adversely impacts the pre-set schedules of project completion. The problems faced by the construction industry develop certain issues between the individuals that are part of a construction project (Bresnen, 2016). Notably, projects related to public utility generally face failures due to the participation of several stakeholders in a single project. These projects usually need to comply with the regulations regarding the utilization and working of such roads (Alaghbari *et al.*, 2007). They further need timely maintenance because of their dependency on the heavy machinery. A lot of planning and coordination work takes place during and after the commencement of work; however, the failures would cause significant problems to run the project smoothly (Assaf and Al-Hejji, 2006).

Several consequences are related to the failure in the construction projects that are initiated by the government in Saudi Arabia for project stakeholders (Bhattacharya *et al.*, 2015). The impact of such failures is experienced in different ramifications causing various difficulties to the user as well as the public in the form of increased costs and litigations. For various scholars, failure or success factors of the construction project are categorized as a one stage activity. However, there is only one study specifically conducted focusing on an Ethiopian construction project by Gebrehiwet and Luo (2017). The investigations were related to the factors that prevent the success of construction projects in the pre-construction phase. Findings outlined ten different causes as the most important in preventing the successful completion of the project, which include corruption, ineffective project planning and scheduling, inflation/price increases in materials, unavailability of utilities at site, improper project feasibility study, late design and design documents, unclear and inadequate details and specification of design, slow delivery of materials, and design mistakes and errors.

Other studies have investigated the defects and failures in construction projects resulting in the identifying of different factors and causes. Nevertheless, these factors were not related to a particular phase and were considered to be inclusive of all construction project phases, without even analyzing the varying effect and frequency by stages (Megha and Rajiv, 2013). Project failures have received comparatively less attention although numerous studies have mainly identified certain elements related to project success, especially from the perspective of the Saudi Arabian construction sector. This study aims to close this gap by providing a methodology for identifying and categorizing the reasons for project failures in Saudi Arabia from the viewpoints of customers, consultants and contractors.

In contrast to the previous studies, the current study analyses different ramifications of failures, affecting construction projects for managing the adverse effects. The study mainly aims to identify the causes and impact of failures in the public construction projects in Saudi Arabia. The failures in construction projects have become a recurring problem within the industry, which affects project completion schedules. Surely, this uncertainty leads to not achieving the stakeholders' desired objectives. The investigation was conducted based on the expertise's practitioners and stockholders' opinions to strict the crucial related factors. Thus, the article determines of the most significant project failure causes in the first stage by extracting them from candidate types in all project stages using frequency and severity. The failures in construction projects have become a recurring problem within the industry, which affects the schedules of project completion. The results are essential in providing meaningful insights for construction practitioners and decision-makers to increase the efficiency and effectiveness of the project by prioritizing failure causes in the project's first stage. This leads to mitigating the uncertainty that may exist in the following stages, decreasing the cost of repair, increasing the quality because of elimination of corrective actions, and decreasing the need for new technology for project process changes during the execution phases. Also, this

work can be considered as a first trial to sort out the project failure causes according to the project stage for further research. This treatment of the problem would present a new research area focusing and directing the efforts in project failures research.

This article is based on four sections. The adopted measurement model is illustrated in the second section. The third section applies the solution methodology to evaluate the level of environmental performance based on the opinion and judgment of industrial experts. Section 4 gives the discussion of the results. Finally, Section 5 provides the conclusion and future work besides an acknowledgment.

1.1 Research question

The research question addressed by the study is as follows;

RQ1. What are the constraints and restrictions affecting the project planning stage in the Saudi construction industry?

2. Literature review

In the context of Saudi construction projects, a previous study has identified the perspectives of contractors, consultants and owners, based on 73 failure causes (Assaf and Al-Hejji, 2006). Notably, lack of qualified and experienced professionals was considered as a key reason for failures according to research conducted by Al-Kharashi and Skitmore (2009) in Saudi Arabia. Abdul Rahman *et al.* (2016), on the other hand, identified 58 factors that lead to the failure of mega construction projects in Makkah. These factors were classified into four main groups, client related, contractor related, consultant related and external related. Clients considered that ambiguity of goals is one of the most significant factors, while for contractors, lack of contract details, lack of transition between pre-contracts and the site team, and inefficient procurement system are the most severe factors affecting projects success. It was identified that 30 failure factors related to the infrastructure projects in Saudi Arabia where 21 factors were extracted by 67 respondents; however, ten of them were considered as the most important: poor risk management, budget overruns, poor communication management, schedule failures, poor estimation practices, cash flow difficulties, design discrepancies, lack of efficient change management, inadequate project structure and lack of teamwork (Ikediashi *et al.*, 2012). Additional analyses were applied for these factors where 24 factors were categorized into five groups, i.e. project management deficiencies, risk challenges, project team commitment, ethical issues, government interference, constraints imposed by stakeholders, financial and schedule challenges, and user requirements.

The likelihood that hazards may be faced throughout a project. The hazards associated with expanding projects are mainly unavoidable, although they are occasionally preventable. There are significant challenges that contribute to project delays in airport expansion projects as well as other building projects (Al Hudhaif, 2021). These are administrative challenges, hasty decision-making and planning, drawing preparation and approval, manpower shortage, and a lack of command and control. Failures in construction projects have become a recurring problem within the industry, which affects the intended outcomes of any project. According to Olander (2007), a construction project is a multi-stakeholder business with overlapping interests. Failures in construction projects have become a recurring problem within the industry, which affects the intended outcomes of any project. A project is said to be successful when participants or stakeholder's specific needs and interests are met. Following this, it can be assumed that the success of a construction project relies on participants' perceptions and perspectives. In this respect, the notion of success varies from person to person and is

majorly evaluated through the project's attributes, components, stages and stakeholders' point of view (Frödell *et al.*, 2008).

For Olander (2007), role of stakeholder is critical and creates a significant impact across different stages in the construction project. Wang and Gibson (2010) defined the project as a set of activities with different attributes in each stage of the project life cycle. This study has emphasized that early stages' corrective decisions decrease failures frequencies/severity and wastes. Frödell *et al.* (2008) stated that the significance of drivers contributing towards project failure varies concerning different stages of the project life cycle and should be categorized according to stakeholders' interests. Wang and Gibson (2010) emphasized that there is a positive correlation between corrective actions taken at the early stage of the project and the projects expected outcomes.

Yao (2016) investigated potential changes in the primary energy consumption based on the construction of a bottom-up technology assessment model. The process and national levels are evaluated based on five emerging technologies for the production of ethylene from natural gas. The findings have shown that state-of-the-art and emerging technologies achieve greenhouse gas (GHG) emission reductions and primary energy. The decisions are developed based on the research and development investment, emissions reduction goals and strategic planning for meeting energy. Hassani *et al.* (2017) identified the importance of technology and innovation in the petrochemical industry. The study has asserted that the innovation and technological advancement of petrochemical companies are enhanced due to oil price, geopolitics, uncertainty and volatility. Moreover, the study has identified the quantifiable and non-quantifiable impacts of innovation and technology in the petrochemical industry.

A study by Abduljawwad and Almaktoom (2021) explored the challenges that building projects experience that lead them to be delayed. The study concentrated on construction delay reasons as seen by contractors. The study revealed that project cost underestimation, obtaining a municipality permit, completion time underestimation, poor supervision, payment delays, legal issues, lack of communication between parties involved, and instruction delay from owners and consultants are the primary contributors to construction delays. This study concentrated on the elements that cause construction delays and contractors' significant difficulties. Bageis and Alsulamy (2021) observed the significance of project selection by contractors in the Saudi construction sector. The results depicted a significant relationship between the respondents' organizational size and their priority on project selection. In the project selection phase, success variables play a crucial role. Careful project selection is the first step toward the construction company's success; thus, it must be done carefully.

Moreover, Boustani (2021) investigated the impact of risk management on the development of building projects in Saudi Arabia. The current study's findings reveal that risk identification and assessment impact the project's development and success, intended budget and capacity to meet technical requirements. The study also found that responding to risks affects project success, completing the scope of work, finishing on time and reaching quality requirements.

Yun and Jung (2017) evaluated sustainability practices by introducing a phase-based benchmarking framework on industrial facility reports. The study has measured sustainability practices and project characteristics in the benchmarking framework. The results showed that the construction and startup phases are highly based on the sustainability practices. The project delivery method is used to show differences between sustainability practices and industrial facilities at the project briefing level. Thomas (2014) implemented a safety system and management in the petrochemical industry. The study has shown the effectiveness of the safety design system in evaluating safety during the briefing stage based on plant lifecycle activities. The implementation of a safety management system provides reliable perceived intrinsic safety management design approach across different sectors.

Similarly, in the case of Middle Eastern countries, 28 most important causes of construction projects failures were identified by Odeh and Battaineh (2002) from the viewpoint of contractors and consultants in Jordan. The authors have gathered these factors into ten most important causes of failures: owner interference, inadequate contractor experience, financing and payments, labor productivity, slow decision-making, improper planning, contractor management shortage in materials, unrealistic imposed contract duration and subcontractors. In another research by Sweis *et al.* (2008), financial difficulties by contractors, too many changes in orders by the owners, poor planning and scheduling of the projects and shortage of manpower were the most important causes. In the construction industry of United Arab Emirates (UAE), Faridi and El-Sayegh (2006) investigated construction project failure, where top ten causes were identified: preparation and approval of drawings, failures in owner's decision-making process, inadequate project planning, insufficient skills, and productivity through manpower, the conflict between contractors and the consultants, lack of communication and coordination between the parties involved in construction (contractor–subcontractor–consultant–owner). Likewise, Damoah and Kumi (2018) found top ten factors responsible for the failure of Ghanaian Government construction projects: political interferences, failures in payment, partisan politics, bureaucracy, corruption, poor supervision, lack of commitment by project leaders, poor planning, starting more projects than the government can fund and change in government. However, the failure factors were classified into four groups which were ordered respectively according to their importance and include leadership, management, and administrative practices, resources and external forces.

An extensive literature review showed that construction project success and failure is ambiguous; however, the construction project is measured by planned and agreed objectives. Moreover, practitioners and experts believe that planning conducted during the first stage is more beneficial in enhancing the whole performance than efforts undertaken in the later stages. Suk *et al.* (2016) investigated restrictions for low carbon technology investment and supportive policies for petrochemical companies in Korea. A total of 32 Korean companies were targeted based on their consumption of CO2 emissions. The findings showed the insignificant implementation of low carbon technology for the sampled companies. The multi-bounded discrete choice method also estimates the lack of financial support to replace technology uncertainty, lower investment priority and economic loss.

3. Materials and methods

3.1 Research design

A quantitative research design has been used to analyze the causes and impact of failures in public construction projects. The study is based on a survey-based approach to recruiting participants, while numerical data were collected for synthesizing the severity of failures. A purposive sampling technique has been used to include participants from the construction companies for analyzing the causes and their severity on failures of construction projects. A total of 75 construction consultants, subcontractors, contractors and government workers were enrolled, based on a purposive sampling technique.

3.2 Data collection procedure

A primary data collection procedure was used to collect data from selected participants. The primary data were collected through a questionnaire provided to the contractors, subcontractors, consultants and government staff through random selection. The recruited individuals need to be engaged with the construction industry in Saudi Arabia.

3.3 Instruments

A self-structured questionnaire was constructed to collect primary data from selected participants. The questionnaire includes questions regarding the causes and severity of project failures that directly impact the success and execution of construction projects (Appendix). The responses were rated on a five-point Likert scale. The questionnaire captured information on the professional background and experience of the respondents with the use of a Likert-type scale for the questions with responses ranging from 1 (strongly unimportant) to 5 (strongly important). A test questionnaire was sent to the selected construction professional for completing and providing feedback to make sure of the validity of the survey. Afterward, the survey was delivered to the construction industry experts working in Saudi Arabia. Targeted respondents were chosen from four key groups: project owners, designers, construction contractors and government agency employees.

3.4 Data analysis

Statistical Package for Social Sciences (SPSS) was used to analyze the primary data. The responses were coded and afterward incorporated into the SPSS datasheet to execute the analysis process. Descriptive statistics were used to provide demographics and frequencies of causes within construction companies. Pearson correlation analysis was also used to examine the association between causes and their severity on the construction projects. The results were provided graphically based on a comprehensive illustration of the data.

4. Results

4.1 Descriptive statistics

Frequencies and probabilities had been calculated for Dim break up with the aid of using Fr. For 0, the maximum regularly found class of Dim become Leadership and Administration ($n = 9$, 32%). For 1, the maximum regularly found class of Dim become Leadership and Administration ($n = 41$, 26%). For 2, the maximum regularly found class of Dim become Procurement ($n = 16$, 30%). For 3, the maximum regularly found classes of Dim had been Financial and Control, with a found frequency of 2 each (29%). Frequencies and probabilities are supplied in Table 1.

Frequencies and percentages were calculated for FC split by Fr. For 0, the most frequently observed category of FC was Engage stakeholders-I ($n = 4$, 14%). For 1, the most frequently observed category of FC was Poor/absence of Feasibility studies-I ($n = 7$, 4%). For 2, the most frequently observed category of FC was Procurement and delivery strategy-I ($n = 9$, 17%). For 3, the most frequently observed category of FC was Lack of detailed project plans-I ($n = 2$, 29%). Frequencies and percentages are presented in Table S1 (Supplementary).

Frequency and percentages were calculated for Dim's FC splits. In the resource-based dimension, the most frequently observed FC category was inadequate resource allocation I ($n = 5$, 28%). On the financial side, FC's most frequently observed category was "inaccurate cost estimates" ($n = 9$, 29%). On the control side, the most commonly observed categories of FC were effective control of project progress-I and lack of detailed project planning I, each with an observation frequency of 7 (39%). For the control dimension, the most frequently observed categories of FC were Ineffective control of project progress-I and Lack of detailed project plans-I, each with an observed frequency of 7 (39%). For technical dimension, the most frequently observed categories of FC were Inadequate drawings-I and Using up-to-date technology-I, each with an observed frequency of 6 (32%). For a time, the most frequently observed category of FC was Unrealistic contract duration (Time frame)-I ($n = 8$, 73%). For Leadership and Administration dimensions, the most frequently observed categories of FC were Inadequate Documentation-I, Comprehensive project review, Feedback-I and Engage stakeholders-I, each with an observed frequency of 8 (13%). For undertaking attributes, the

Table 1.
Frequency table for nominal variables

Dim/Fr	0	1	2	3
Resource	2 (7%)	15 (9%)	1 (2%)	0 (0%)
Financial	2 (7%)	20 (13%)	7 (13%)	2 (29%)
Control	0 (0%)	14 (9%)	2 (4%)	2 (29%)
Technical	3 (11%)	10 (6%)	6 (11%)	0 (0%)
Time	2 (7%)	7 (4%)	1 (2%)	1 (14%)
Leadership and Administration	9 (32%)	41 (26%)	11 (20%)	0 (0%)
Project attributes	7 (25%)	27 (17%)	6 (11%)	1 (14%)
Other	1 (4%)	8 (5%)	1 (2%)	0 (0%)
Procurement	0 (0%)	4 (3%)	16 (30%)	1 (14%)
Quality and Training	1 (4%)	8 (5%)	2 (4%)	0 (0%)
Health, safety and sustainability	1 (4%)	5 (3%)	1 (2%)	0 (0%)

maximum regularly discovered class of FC changed into Poor/absence of Feasibility studies-I ($n = 10$, 24%). For others, the maximum regularly discovered class of FC changed into Poor threat management-I ($n = 5$, 50%). For Procurement, the maximum regularly discovered class of FC changed into Inadequate contractor choice criteria-I ($n = 11$, 52%). For Quality and Training, the maximum regularly discovered classes of FC had been Lack of Training-I and Quality warranty systems-I, with a discovered frequency of 4 each (36%). For Health, safety and sustainability, the maximum regularly discovered class of FC changed into Environmental sustainability-I ($n = 5$, 71%). Frequencies and percentages are presented in Table S1 (Supplementary file).

4.2 Kendall correlation analysis

A Kendall correlation analysis was conducted between Fr and Sv. Cohen's standard was used to evaluate the strength of the relationship, where coefficients between 0.10 and 0.29 represent a small effect size, coefficients between 0.30 and 0.49 represent a moderate effect size, and coefficients above 0.50 indicate a large effect size. A Kendall correlation requires that the relationship between each pair of variables does not change direction. This assumption was violated if the points on the scatterplot between any pair of variables appeared to shift from a positive to negative or negative to positive relationship. Figure 1 presents the scatterplot of the correlation. The correlations were examined based on an alpha value of 0.05.

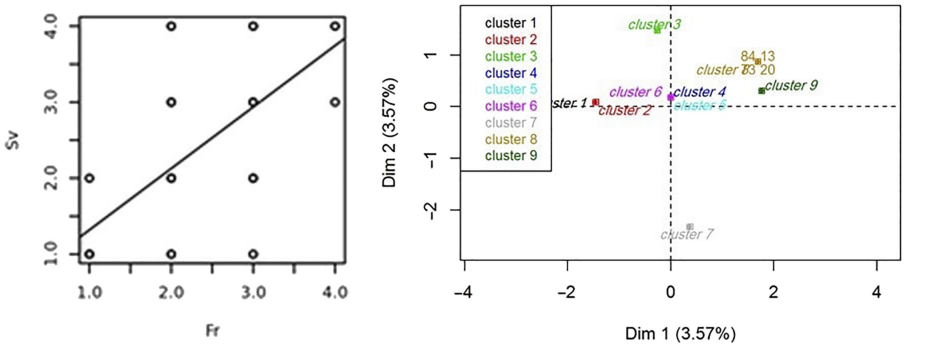

Figure 1.
(a) The scatterplot of Fr and Sv correlation and (b) ascending hierarchical classification of the individuals. The classification made on individuals reveals 9 clusters

A significant positive correlation was observed between Fr and Sv (rk = 0.58, $p < 0.001$). The correlation coefficient between Fr and Sv was 0.58, indicating a large effect size. This correlation indicates that as Fr increases, Sv tends to increase. Table 2 presents the results of the correlation. Figure 1b shows the ascending hierarchical classification of the individuals. The classification made on individuals reveals 9 clusters.

5. Discussion

The contractor, consultant, client and other external factors play a significant role in the failure of construction projects. The lack of equipment and unavailability of resources affect the efficiency of the processes. The present study revealed that contractors, consultants and government officials play an active part in failing the projects. One of the previous studies states that approximately, 70% of the projects have been failed in Saudi Arabia in the last 10 years (Samarghandi *et al.*, 2016). The poor planning on the part of the contractors and lack of technical knowledge and skills affect the construction projects. The Saudi government has not provided sufficient support for the development and growth of construction projects (Albogamy *et al.*, 2014). The qualified engineers that specialize in construction projects were limited in Saudi Arabia. The poor performance of the contractor, failures in getting approval from the authorities, and wrong decision-making causes failures in the project. For instance, the failures in road construction project mean that the citizens suffer from traffic-related issues.

Several issues occurring in the construction business are complex and difficult, and they generally include a considerable deal of subjectivity and uncertainty (Sheng and Gu, 2018). Several researches have been conducted, with a significant focus on evaluating the impact of uncertainty on one component of the project, such as time, cost and safety. Similarly, the outcomes of this study have validated the assertion by demonstrating that competitive price and updated goods are essential criteria that may contribute to the success of project selection if regarded right. The contractors cannot manage purchase orders, material indent and vendor evaluation operations. The contractors fail to fulfill their responsibilities, which results in enhancing the cost of construction projects. It is the responsibility of the contractor to check the quality of the material that has been provided by the vendor. The authorities should take the input of all the stakeholders in the development of the construction plan. These failures in construction projects are developing a negative image of Saudi Arabia across the world. Therefore, it is high time that the local authorities take appropriate steps for addressing this issue (Al-Emad *et al.*, 2017). Frequent changes in construction project design, payment failures and contractor's strict requirements are having a negative impact on the overall construction sector in Saudi Arabia.

The design errors, financial issues and not obtaining construction permits from the authorities caused unnecessary disruptions and failures in the projects (Al-Emad *et al.*, 2017). The cost overrun and incompetency on part of the project manager results in the low-quality final product. The strict taxation policy applied by the Saudi government increased the prices of goods. It has resulted in putting the financial burden on the contractors and clients (Suk *et al.*, 2016). The inefficient inventory control, material handling, procurement, scheduling, material estimation and transportation processes have a negative impact on the construction project.

Combination	rk	Lower	Upper	p
Fr-Sv	0.58	0.49	0.66	<0.001

Note(s): The confidence intervals were computed using $\alpha = 0.05$; $n = 248$

Table 2. Kendall correlation results between Fr and Sv

The contractors cannot manage purchase orders, material indent, and vendor evaluation operations. The contractors fail to fulfill their responsibilities which results in enhancing the cost of construction projects. It is the responsibility of the contractor to check the quality of the material that has been provided by the vendor. The Saudi authorities should examine all the factors that are failing construction projects. Hence, the Saudi government should formulate a plan for the development of the construction industry in Saudi Arabia. The contractors should understand their responsibilities and show full commitment to completing the projects on time. The failure in construction projects means that the additional resources of the state are being utilized. It hurts the economy and financial system of the country.

The contractors and clients should collaborate on a regular basis. It will help the contractor in understanding the requirements of the client. The focus of the contractor should be to vial the services of skilled labor in the construction project. After examining all the project requirements, the team which would be a part of the project should be selected after examining all the requirements of the project. Qualified engineers should be included in the project. The availability of the resources and financial budget should be examined. The progress of the project should be assessed after every stage. It will help the authorities in identifying the weaknesses present in the process. The resource management plan should be developed by the project manager so that the productivity of the employees can be enhanced. The factors that are causing disruptions in the projects need to be identified. The workload should be equally distributed among the laborers.

Construction projects begin in a dynamic and active atmosphere, which may result in a condition of uncertainty due to extra interconnected aspects. Taylan *et al.* (2014) evaluated building projects and the risks involved in uncertain scenarios. Similarly, the study's findings revealed that the site of a building or construction project should be carefully chosen since it might substantially influence the stakeholders' performance. Specific decisions linked to project selection are crucial for building project contractors. In circumstances where initiatives are initiated by mechanisms other than trending, these decisions may include negative and positive aspects. These judgments may be challenging because project selection relates to many distinct elements that may affect the results. Pekuri *et al.* (2015) assessed project selection by considering business management better to understand the influence of business models in project selection. The findings revealed that a business model never guides project selection, but rather short-term concerns dominate the decision-making process. Profitability and the need for labor are examples of such causes. As a result, independent of expertise, the estimation mostly defines the firms' projects chosen.

The findings of this study are expected to assist both practitioners and academics. In practice, the findings can aid in the selection of project teams and their leaders for infrastructure projects in Saudi Arabia, identify potential points of failure so that appropriate standard remedial measures can be taken ahead of time, and forecast expected performance level requirements even before projects begin. The research has the potential to be used to design or redesign the contents and curriculum of educational programs for project managers and stakeholder management in construction and has provided some insights and thoughts about existing theories about construction project management, particularly about project success and failure. However, this study has certain limitations. This study's conclusions were mostly based on the results of a large questionnaire survey. Because the poll was done with experts working in Saudi Arabian construction businesses for a limited time, the results may not be representative of the whole Saudi Arabian construction sector.

6. Conclusions

The study aimed to identify the impact of failures in public construction projects in Saudi Arabia. Based on the study findings, it can be stated that contractors, consultants and

government officials play an active part in failing the projects. The study concluded that the majority of the projects failed at an average period of less than 10% (53.3%), while 33.3% of projects failed at 10–30%. In recent times, there have been failures in the completion of construction projects in Saudi Arabia. These failures had a negative impact on the growth and development of the construction company, resulting in huge losses. It was concluded that overtime, disputes, overcasts and complete abandonment were the main causes of failure. Governments, contractors and consultants are encouraged to adopt effective success factors to address identified issues and overcome the negative impacts on the growth of the construction industry. Better decisions allow managers to establish processes for specific project types and business models, reducing wasted resources and the amount of variability. Well-managed and developed procedures are critical productivity drivers that will increase a company's competitiveness and financial performance. This study reveals some limitations that future research should address in order to address a particular problem. Due to COVID-19, we were unable to take multiple approaches, such as visiting project sites or interviewing teamwork. However, future studies should focus on exploring the perceptions and opinions of the stakeholders. Future studies need to compare the findings of this research in Saudi Arabia with those of other nations in the area, therefore bolstering the validity of the findings, and more research studies should be conducted to investigate the correlation between the planning stage and outcomes of the operation stage to discover ultimate construction success that achieves users' satisfaction.

7. Implications

This article focuses on research directions in the field of construction management to investigate the attributes, failure drivers, stockholders' interests, correction actions for each project life-cycle stage. This enables researchers to understand the uncertainty and clarify ambiguity in project failure and success to increase sustainability. The Saudi authorities should examine all the factors that lead towards either the failure or failure of construction projects. Hence, the Saudi government should formulate a plan for the development of the construction industry in Saudi Arabia. The contractors should understand their responsibilities and show full commitment to completing the projects on time. The failure in construction projects means that the additional resources of the state are being utilized. It hurts the economy and financial system of the country. The contractors and clients should collaborate on regular basis. It will help the contractor in understanding the requirements of the client. The focus of the contractor should be to vail the services of skilled labor in the construction project. The team which would be a part of the project should be selected after examining all the requirements of the project. Qualified engineers should be included in the project. The availability of the resources and financial budget should be examined. The progress of the project should be assessed after every stage. It will help the authorities in identifying the weaknesses present in the process. The resource management plan should be developed by the project manager so that the productivity of the employees can be enhanced. The factors that are causing disruptions in the projects need to be identified. The workload should be equally distributed among the laborers.

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Further reading

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Supplementary material

FC/Fr	0	1	2	3
Shortage of manpower-I	0 (0%)	4 (3%)	0 (0%)	0 (0%)
Project team formation-I	0 (0%)	4 (3%)	0 (0%)	0 (0%)
Difficulties in financing the projects-I	0 (0%)	5 (3%)	0 (0%)	1 (14%)
Ineffective control of project progress-I	0 (0%)	6 (4%)	1 (2%)	0 (0%)
Inadequate drawings-I	0 (0%)	5 (3%)	1 (2%)	0 (0%)
Unrealistic contract duration (Time frame)-I	0 (0%)	6 (4%)	1 (2%)	1 (14%)
Inadequate documentation-I	1 (4%)	5 (3%)	2 (4%)	0 (0%)
Inaccurate cost estimation-I	1 (4%)	6 (4%)	2 (4%)	0 (0%)
Poor definition of project scope-I	2 (7%)	6 (4%)	1 (2%)	0 (0%)
Poor risk management-I	0 (0%)	4 (3%)	2 (4%)	0 (0%)
Lack of detailed project plans-I	0 (0%)	4 (3%)	1 (2%)	2 (29%)
Poor/absence of feasibility studies-I	0 (0%)	7 (4%)	2 (4%)	1 (14%)
Procurement and delivery strategy-I	0 (0%)	1 (1%)	9 (17%)	0 (0%)
Lack of training-I	0 (0%)	4 (3%)	0 (0%)	0 (0%)
Application of health and safety system-I	0 (0%)	2 (1%)	0 (0%)	0 (0%)
Comprehensive project review and feedback-I	1 (4%)	6 (4%)	1 (2%)	0 (0%)
Insufficient resources allocation-I	1 (4%)	3 (2%)	1 (2%)	0 (0%)
Using up-to-date technology-I	2 (7%)	2 (1%)	2 (4%)	0 (0%)
Project organization structure-I	0 (0%)	4 (3%)	2 (4%)	0 (0%)
Inadequate contractor selection criteria-I	0 (0%)	3 (2%)	7 (13%)	1 (14%)
Engage stakeholders-l	0 (0%)	1 (1%)	2 (4%)	0 (0%)
Integration of the project purpose with national plans-I	2 (7%)	5 (3%)	2 (4%)	0 (0%)
Economic conditions (economic growth, economic policies)-I	0 (0%)	5 (3%)	2 (4%)	0 (0%)
Project cash flows-I	0 (0%)	3 (2%)	2 (4%)	1 (14%)
Integration of design and implementation-I	1 (4%)	2 (1%)	0 (0%)	0 (0%)
Quality assurance systems-I	0 (0%)	2 (1%)	2 (4%)	0 (0%)
Frequent change orders-I	0 (0%)	2 (1%)	0 (0%)	0 (0%)
Flexibility in future expansion-I	1 (4%)	4 (3%)	0 (0%)	0 (0%)
Environmental sustainability-I	1 (4%)	3 (2%)	1 (2%)	0 (0%)
Shortage of required materials-I	0 (0%)	2 (1%)	0 (0%)	0 (0%)
Shortage of required equipment-I	0 (0%)	1 (1%)	0 (0%)	0 (0%)
Ineffective leadership-I	0 (0%)	4 (3%)	0 (0%)	0 (0%)
Ineffective quality control by contractor-I	0 (0%)	2 (1%)	0 (0%)	0 (0%)
Change in project leadership-I	1 (4%)	5 (3%)	1 (2%)	0 (0%)
Compatibility on vision-I	2 (7%)	4 (3%)	0 (0%)	0 (0%)
Engage stakeholders-I	4 (14%)	2 (1%)	2 (4%)	0 (0%)
Organizing materials and maintaining the site-I	1 (4%)	2 (1%)	0 (0%)	0 (0%)
Time to correct defects-I	2 (7%)	1 (1%)	0 (0%)	0 (0%)
Maintenance costs-I	0 (0%)	1 (1%)	0 (0%)	0 (0%)
Lack of top management support and communications-I	0 (0%)	6 (4%)	1 (2%)	0 (0%)
Compatibility on vision-l	0 (0%)	1 (1%)	0 (0%)	0 (0%)
Improper construction methods-I	0 (0%)	1 (1%)	1 (2%)	0 (0%)
The adequacy of details, specifications and standards-I	1 (4%)	1 (1%)	2 (4%)	0 (0%)
Disputes between project participants-I	2 (7%)	1 (1%)	0 (0%)	0 (0%)
Efficiency of the team-I (skills, qualification, experience)	0 (0%)	2 (1%)	0 (0%)	0 (0%)
Delay of progress payments by the client-I	1 (4%)	0 (0%)	1 (2%)	0 (0%)
Quality training-I	0 (0%)	1 (1%)	0 (0%)	0 (0%)
Lack of site meetings-I	1 (4%)	2 (1%)	0 (0%)	0 (0%)
Energy and water consumption-I	0 (0%)	1 (1%)	0 (0%)	0 (0%)
Waste of resources and building materials-I	0 (0%)	1 (1%)	0 (0%)	0 (0%)
Sequencing of work according to schedule-I	0 (0%)	2 (1%)	0 (0%)	0 (0%)
Lack of monitoring/supervision-I	0 (0%)	1 (1%)	0 (0%)	0 (0%)
The adequacy of details, specifications and standards	0 (0%)	1 (1%)	0 (0%)	0 (0%)

Table S1.
Frequency table for nominal variables