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THE KEY PERFORMANCE INDEX FOR THE SUCCESSFUL PROJECT PHASES IN THE CONSTRUCTION INDUSTRY

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ABSTRACT

This research aims to create a set of critical success factors among project phases based on a key performance index that may be used to evaluate the success of construction projects in the Iraqi construction industry to meet the time, cost, quality, safety and health limits.

Two approaches are used in the methodology. First, a literature review with an intensive interview with construction experiments was conducted to identify 38 success factors for high-performance initiatives and four KPI (cost, time, quality, safety and health). Then, a questionnaire was used to perform the empirical study. A survey was administered to 120 practitioners in the Iraqi construction sector. SPSS Data was analysed using version-24, which used descriptive statistics, Cronbach's Alpha, mean score, one way ANOVA, eventually, the t-test to determine the most critical success factors.

The paper offers a basic framework criterion for 30 critical successful factors depend on **key** performance index as the indicators throughout the pre-construction, construction and post construction, and an increased successful rate among project phases by achieved concentrating on these important aspects.

This research study involved only governement buildings projects completed. The researcher did not address in his study the suspended projects because projects are not completed for different reasons such as economic crises and the ISIS war. Iraqi construction professionals make up the study's not all Iraqi region but representative sample.

As a result of the sophisticated nature of building projects, researchers investigate, create, and develop building participants' performance that would help construction companies alleviate the situation and resolve the complexity connected with construction projects to deliver a successful performance.

KPI by these successes factors through the project phases guide construction organisations' strategic decision-making when developing future effective construction industry strategies; an in-depth look at the current construction market environment in Iraq, which is an accurate representation of developing nations as a whole, is provided by this study's results.

Keywords: Key Performance Index (KPI), project phases, Success factors, construction industry

1. Introduction

The construction sector is no different from most others in that it is constantly changing during project phases. As technology, finances, and development processes all face growing uncertainty, the construction's environment has grown more volatile. Many events and interactions, both planned and unforeseen, occur during a project phases (pre-construction, construction, post construction), with different actors and processes in a continually changing environment; therefore, a construction project is finished (Sanvido *et al*., 1992). Construction phases is rife with concepts like "temporary," "fragmented," and "short-term" These attributes largely affect a project manager's ability to lead a successful team. The notion of project success was designed to provide criteria and standards by which project managers may finish projects with the best possible results (time, cost ,quality, safety and health). However, building experts

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are at a loss as to how to characterise this term. As a result, many project managers still handle this issue ad hoc. They are doing their best to keep track of and distribute resources across numerous projects Freeman & Beale (1992). Project performance in developing nations was examined in a series of research projects. Construction performances in the UAE are suffer by a lack of skilled labor, poor site management, inadequate leadership, and equipment shortages and breakdowns. Faridi and El-Sayegh (2006). In most cases, the project manager's choice of contractor(s) determines whether or not the project succeeds or fails, according to Ajayi et al. (2010). The success of a contract is inextricably linked to the success of the contractor. Furthermore, he said that the construction business has struggled for decades with the assessment of performance. According to Ajayi et al. (2010), confine their examination to certain metrics like cost, scheduling or labor productivity. Customer satisfaction, time performance, cost performance, construction quality, and sustainable development are all included in the definition of construction performance. Subcontractor performance was analysed by Cheng et al. (2011) and 12 criteria were found to be linked to the subcontractor's performance such as construction methods, time management skills, and material waste are only few of the aspects that contribute to a project's success. Although many researchers have looked at this idea, no consensus has yet been reached to research on project phases. These projects demand a different set of management abilities than the typical one-off building jobs. Regardless of the fact that certain success criteria may be similar to all projects, others are likely to be particular to projects with certain features. The success criteria for a project are being continually refined at different construction phases. A thorough review of the available literature is thus required to build a framework for quantifying and evaluating the suitability of construction project phases' key performance index (KPI) and the success factors that influence those KPI.

2.1. Index of performance

To obtain the best results in adapting to the Egan report (1998), the U.K. Key Performance Index (KPI) Working Group has established ten benchmarking parameters for the project. However, most of the index include construction costs, building hours, defects, product and service satisfaction for the customer. In the project election stage, the analysis phase, when customer and user needs are identified and delivery strategies, there are no ideas for performance index in benchmarking projects. In addition, the 'project' and the 'supplier' are not viewed. It is pivotal to define standards for benchmarking projects throughout the project election process to achieve better project performance. This view has previously been reported by Posten (1985), who found that fifty-five per cent of all deficiencies in R&D projects originate through the requirement analysis and definition, whereas forty-three per cent just after testing. It is not unexpected that building projects are subject to the same scenario.

Table I highlights many index from several construction task groups. These index aim to analyse performance across the sector and individual enterprises. Nevertheless, there is no explicit connection between the performance factors measuring from project stages and the factors determining project performance during the implementation phase in the model described. The connection between a phase is not a vital component. Furthermore, the workgroups do not indicate project stakeholders' performance and make their performance a priority to determine project success. The

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results criteria do not explicitly explain the causes and effects of stakeholders' expectations generated from their performances throughout the stages. Pillai et al. (2002) find that a performance measuring system should represent all stakeholders' demands and expectations to avoid enormously large disagreements and blame syndromes at the time of completion; the stakeholders' performance must be examined and evaluated throughout the project phases.

2.1.1Cost

The capacity to finish a project within the specified budget is a simple way to measure project success. A construction project's cost performance can be evaluated using many factors, including the company's market share and liquidity; the project's profitability; the project's cash flow; the profit rate; the overhead percentage; the project design costs; the project's material costs; the project's labor costs and the project's overtime and motivation costs (Enshassi *et al,* 2009), (Babu 2015). It is the management of unanticipated occurrences, such as disputes and conflicts, changes in client or project requirements, and other issues that influence construction project cost performance (Chan 2012).

2.1.2 Time

The length of time required to complete a task is known as the concept of "time." When the building is set to be used by the customer, this is considered. Site preparation time, the proportion of orders delivered late, and the amount of time required to complete variation orders are all ways to gauge how well a construction project is progressing on schedule. An average delay in claim acceptance and a typical delay in payment from the owner to contractor and an average delay due to closures resulted in a supplies scarcity (Enshassi et al. 2009), (Babu 2015). The capacity of the final goods to meet the requirements for which the projects were undertaken is considered a measure of construction project quality in the industry. The quality of a product is determined by its aesthetics, stability, and comfort, all of which were established at the beginning of the project.

2.1.3 Quality

Quality is now one of the three most significant performance factors for building projects known as the 'iron triangle' or the golden triangle. The evaluation of a building project's quality performance is a subjective process. All the attributes a product or service must have to meet a certain demand and its suitability for the purpose for which it is being purchased (Julien P *et al*. 2018). Even though a building project result is of a high grade, the quality of the finished product varies greatly from client to customer to the people who will utilise it (Chan 2012). Leadership and dedication to quality management from the top Incorporating the quality strategy into the company's other operations strategically plan for quality management. Quality control is based on the management of processes. the study aims to educate construction workers about the most important aspects of TQM implementation Rodrigo G & Osvaldo L,2020)

2.1.4 Safety and health

Project health and safety performance may be measured by the general circumstances surrounding a construction project's completion with no serious injuries or illnesses for those, directly and indirectly, related to the project Chan (, 2001). Even

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though some studies ranked safety lower than cost, quality, and time, its relevance cannot be underestimated. Construction projects are more likely to be completed on schedule if there are no accidents or deaths on the job site. Construction sites benefit from strong health and safety programs because they substantially decrease the potential for costly or time-consuming delays. A construction site accident or injury can lead to litigation and penalties or damages, which can cause delays in project delivery as well as additional costs in terms of compensation for injured workers or the families of deceased workers, fines for non-compliance with health and safety policies, and additional interest on the loan obtained to execute the projects due to the time extension Muhammad, Abdulateef & Ladi, (2015).

(Table I: Key Performance Index)

Authors	KPI Performance Index
Babu, N. J. (2015)	Cost, Time, Quality, Productivity, Client Satisfaction, Regular & Community Satisfaction, People, Health & Safety, Innovation & Learning, and Environmental Factors
Adnan, H. et.al 2014	Cost, Quality and quality
Chan2004	Time,cost,quality, safety, functionality and satisfaction
Ahadzie .et,al 2008	environmental-impact, customer satisfaction, quality , cost and time

2.4 Project success

The word "project success" has a wide range of meanings(Baccarini D 1993). As a result, there is no conventional definition of the word or approved technique for quantifying it. However, project success criteria must be agreed upon from the start of the project to prevent disagreements among project teams (Baccarini D 1993). That's why researchers have spent the past decade digging further into developing nations' building success criteria (Shen Q *et al* 2003). Chua D *et al*. (1999) These studies are most important because of their systematic input to the overall success model. However, a thorough grasp of what success criteria are in the construction industry is lacking. Because of this, the construction industry is undoubtedly one of the biggest and most well-established project-based industries in the business Zwikael& Globerson (2006). Although project success criteria may be universal in various industries, there is no disputing that the construction industry has its own distinct set of requirements. Success in a project might mean many things to various individuals. "success" may mean different things to different people, organisations, and industries. According to Sanvido& Pariff (1992), success is an intangible perceptual experience that changes depending on management's expectations, the individuals involved, and the stage of the project in which it occurs. It is important to remember that project owners, designers, consultants, contractors, and subcontractors all have their own goals and criteria for success. Architects, for example, tend to place more emphasis

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on the beauty of a structure than on the expense of constructing it. However, the customer may place greater importance on other aspects. It is also possible that a person's definition of success might shift from job to job. According to the kind of project, size and complexity, participants and owner's expertise, etc., definitions of project success vary widely.

2.5 Critical success factors in project phases.

Researchers have published many studies on Critical Success Factors as determined by various authors; however, there is a paucity of literature on CSFs for construction projects phases generally except limited literature work accessible largely for construction projects. This study activity has discovered CSFs connected to building projects and evaluates how they were adaptable for this investigation.

Some studies focus on the preconstruction phase. The research by Khaled Al-Reshaid et, al, (2005) demonstrates that the selection teams of key actors in project implementation benefit from an effective system for exchanging information necessary for the attainment in the preconstruction stage. These relate to the project managers' performance, the organisation that owns the development project, the team members, and the external project environment. Khaled Al-Reshaid et al, (2005) outlined several crucial success variables impacting project performance in the preconstruction phase. The following are the most important factors: cost estimation, evaluating and determining the priority to the project's requirements, top management support and financial assistance are all included in this kind of management. A study by Soloman, O. *et al. (2018)* conducted some essential success elements for the preconstruction stage for construction projects identified: comprehensive risk distribution, dedication to length and cost of the project, and technological innovation and transferring technology.

Most of the researchers concentrated on the construction phase. Successful factors during construction include the capabilities and dedication of the project manager, team motivation, commitment to the project, adequacy of plans and specifications, effective scheduling, Kog, Loh (2012), the effectiveness of site management, Scope and work definition, stakeholders communication, planning efforts, Doloi *et al*. (2012). Adequate project management techniques, environmental and construction site cleanliness, client consultation and support, political conflicts and corruption, Chan et al. (2004). Contractor’s technical capacity, control systems, effective site management Murat Gunduz & Ahmad Mohammed (2018). Competence of the project management team and the project clear and specific objectives for each project, a manager's coordination abilities, and the project's value are all factors to consider. Knowledge, skills, and abilities of the project management team members. a project manager who can effectively and quickly resolve conflicts, a customer who can quickly make decisions, the experience of project management Neringa, G.et, al. (2013).

The post-construction stage involves drawings from suppliers and consultants that have been authorised by the architect and warranty and maintenance information. Quality of rework complete activities, reserve funds for repairs, final stabilisation and established operation facilities Carbonara, N(2015). vendor invoices after gathering all papers and dealing with issues. A complete description of all vendor data, including contact information for key people, for addressing the customer for any problems

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caused, if necessary Ahmed, T.(2017). A certificate of completion based on all the documentation and drawings provided. An appropriate facilities manager. Ensure that the facility manager has the necessary papers and information before delivering them to him or her Dina, S.at, el(2018).

3. Methodology

3.1 Questionnaire survey

Using a questionnaire survey to gather information about respondents' personal and professional backgrounds, as well as the importance of success factors for project phases (pre-construction-construction-post-construction). The question was addressed by Iraqi building industry specialists. In the first section of the questionnaire, six questions were asked about the respondents and the firm they work for in order to give the assessment more credibility (Kassem et al., 2019). Of particular importance is that, in order to ensure the validity of the data collected, a specific question was asked concerning participants' prior experience working in Iraq's construction industry. According to Table 1, the questionnaire included 38questions based on the criteria that had been found in the literature and four KPI (cost, time, quality and safety & health). A Likert scale of 1-5 was employed (1= extremely irrelevant, 2= irrelevant, 3= neutral, 4= relevant, and 5= extremely relevant); the results were then tallied up. All alternatives are assumed to be "indifferent" since this knowledge has already been provided in the literature, hence this option is the neutral one. The "Nothing to say" option was also provided, although it was not included in the response statistics. Even a little positive or negative deviance from this answer was considered a contribution to the current body of knowledge. A questionnaire period from15April to 15 July 2019 , 120 specialists agreed to participate in the study after three months of investigation. Only 92 of the total replies were deemed ineligible, resulting in a return rate of 76%. Using "Creative Research Systems survey software" the sample size was computed with a 95% Confidence Level and a 10% Confidence Interval. Pilot study with 30 participants (architects, designers, consultants, quantity surveyors, project managers and contractors located in Iraq) was carried out to check that the questionnaire was clear and that the success factors were examined and key performance index was relevant to Iraq construction.

http://www.surveysystem.com/sscalc.htm#one

A five-point Likert scale with a criticality cut-off value of 3.00 Fellows & Liu, 2008. Variability and projects performance of the construction industry may be affected by successful variables with overall mean scores of 3.00 and higher, according to Adafin *et al*. (2016), using this method, the researchers identified the most important 38successful factors variables and the main key performance index, which were then used to develop a revised questionnaire given to the study participants. Initially, researchers may be inclined to begin with the creation of a questionnaire to acquire data as soon as possible, efficiently, and affordably acquiring massive quantities of information from enormous sample volumes; however, other steps must be addressed first, such as sampling, secondary data collection, observation, and interviews. It would be necessary to collect information from the target population to conduct a research analysis. The construction industry professionals who will be the subject of this study are the intended audience. The researcher visited the different construction

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firms after receiving the agreement from the organisation of companies and held interviews with the organisation management in the work office. Intensive interviews were held with the experienced personnel in the construction sector to gather information for success factors in the project phases in the key performance index(cost, time, quality, safety and health). The survey finding of this study combined with previous studies outcomes to identify critical success factors of a construction project stages. The research participants were asked to rate their respondents on a Likert-type scale from 1 to 5, used to evaluate the project's success elements and their perceived effect (preconstruction, construction, post-construction).

3.1.1 Reliability and validity

Reliability and validity a questioner survey achieved by Cronbach s alpha was used to determine the internal consistency of these items. By calculating Cronbach's alpha coefficient, researchers can determine how well the items that make up the scale "hang together" and, therefore, how well the items measure the same construct. This is an important recommendation for researchers because it allows them to assess how well the items make up the same scale structure (Hair *et al*, 2009). The Cronbach's alpha scale runs from 0 to 1, and the standard for consistency across researchers is an overall value of 0.7, which indicates a level of consistency considered acceptable. When the value is 0.8, according to Nunnally and Bernstein, the internal consistency is considered to be satisfactory**.** A questionnaire was released to 120participants in this study. Only 92 respondents had been received. The sample size is a subset of the target population that includes some units from the target population that have been chosen Moser, C. & Kalton, G. (1981). There are several different approaches This study is mostly based on a literature study of measures created to evaluate the performance of the project. The three-stage conceptual model is provided, namely the preconstruction phase of the project, the construction phase and the post-construction phase.The performance and success variables related to each step of the connection between the stakeholders (customer, consultant, contractor, supplier, and end-user will be assessed. From the survey, 38 success factors in each step of the project, 13 factors related to preconstruction, 13 factors underlying in construction, and 12factors responded in post-construction. The long-term purpose of the research is to produce performance success factors shown in Table IV.

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Table II: success factor in project phases

N	Pre-construction	construction	Post-construction
1	Availability of the required technology and expertise	Government's administrative influence	communication and coordinate
2	The provision all key actors in project implementation	Site management by the contractor	availability of utilities at site
3	A detailed and accurate specification of individual action steps	Construction Method Adopted on the Project	approving and receiving of complete project work
4	bidding and tendering method	Client's commitment and Coordination	Subcontractor problem
5	Competence and experience of stakeholder	Ability to solve unanticipated problems	Preparing the detailed statement of all details with contacts.
6	Effective Procurement Method	Adequate time to project (Realistic Programmed)	quality of rework activities
7	Provision of Adequate Finance	Client's Project Financing	removal of Temporary Measures
8	Realistic Schedule and Cost Estimate	Economic environment	Final Stabilization and Established operation facilities
9	evaluating priority to the requirements of project	Precise Project Budget Estimate	client Inspections
10	Employment of Competent and Skillful	Experience of Contractor	Ongoing maintenance
11	Political, economy environmental	Implementation of Innovative Techniques by Contractor.	Skill of team maintenance
12	Risk management	Initial identification of all the risks	Organization awareness
13	Employment of Competent and Skillful	Collaborative Supervision	

3.2. Data collection

This research was performed based on the opinions from92 respondents including 15 architects, 10 contractors, 15 designers, 20 quantity surveyors, 25project managers, and 7 consultants. The first stage of the questionnaire involved general information about the participants, type of company, position, number of projects, and work experience. I.B.M. Spss V.24 (Statistical Package for the Social Sciences) was used

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to analyse the data by descriptive statistics, Cronbach's alpha, mean score, and one sample T-test.

3.3. Data analysis

3.3.1. Reliability test for data collection

To test the reliability of the data set used in this research, the internal tenacity of these items was evaluated using Cronbach's Alpha. This is an important adapter for researchers to assess how items that form the scale achieve whether they measure the same structure by using Cronbach's alpha coefficient. Nunnally and Bernstein (2007) suggested 0.8 indicates sampling adequacy. The Cronbach's Alpha for overall factors is 0.87; in other words, there is a high level of in the Reliability dependability of the data acquired, and that the data is correct and useful for the objectives of this study.

Reliability test of data collection

Cronbach's Alpha	cases	N of Items
0 .87	92	38

3.3.2. KPI index in the construction phase.

The KPI index were evaluated in Spss using descriptive statistics to rank from the most influential index to the lowest as shown in table 2.2. The ranking index was divided into 5 part degrees to the five-point of Likert designated from (1 = very low influential) to (5 = very high influential).

(Table III: KPI index in the construction phase)

KPI	N	Mean	Std. Deviation	Rank
time	92	4.04	1.12819	1
cost	92	4.03	1.17928	2
quilaty	92	3.81	1.27468	3
safty	92	3.75	1.30542	4

The finding Shown in table V rank time is the highest indicator cost the second than quality and safety. Previous studies have proofed the importance of time, cost and, quality as the most important KPI measurement Alumbugu, et.al.(2015). Babu, 2015 find the importance of safety in construction buildings.

Cost overruns are still key militating variables impacting the adoption of in light of the high demand for residential structures in emerging nations. Cost overruns have been so significant in certain cases that the management of human resources has been called into doubt. A project's success hinges on its ability to meet the needs of an estimated one billion people living in substandard housing in developing nations.

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Due to the high demand for residential structures in emerging nations, time overruns are a key militating issue in their implementation. There have been substantial doubts made regarding human resource management procedures in certain cases when the time over-run has been so severe. Because of the projected one billion people who lack proper living quarters in developing nations, on-time performance is critical to project success.

It is difficult for property developers to be certain that every part of a new home would withstand the same design installation, occupancy circumstances throughout time. Therefore, property developers have a responsibility to ensure that the right resources are allocated to allow the knowledge of effective quality management that fits the specific demands of prospective customers.

A construction site's rate of illness, injury, and accident is a good indicator of the project's safety performance. The amount of property damage sustained during a construction project is an additional sign of the project's safety. The absence of safety equipment, faulty equipment, and noncompliance with construction companies' health and safety policies are all blamed for these health and safety failures.

3.3.3. Evaluating level of a current construction phases in the Iraq construction industry.

To evaluate the construction phases, compare means a tool used to find the link in the life cycle of a construction project. Table IV show the result of comparing the mean to all tree project phase.

(Table IV: ANOVA table comparing mean in the current construction phases)

Construction phase	F	Sig	Mean
Pre-construction*total mean	1.268	.372	3.51
Construction*total mean	3.011	.038	3.57
Post-construction*total mean	0.847	.682	3.15

In a table IV, the result indicated that the construction phases is high ranking mean score is 3.57 the second phase is preconstruction mean score of 3.51 and post-construction score 3.15, mean score for all construction phases is 3,41. From the ANOVA test, the analysis of variance is a statistical procedure. Individually chosen sample units were compared to one another in terms of three different building stages using an ANOVA. With the help of the analysis of variance, it is possible to separate the observed variability into pieces that may be allocated to specific causes of variability. The results of multi-component dispersion analysis may be used to identify two distinct scenarios. If there is no mutual interaction between factors, this indicates that they do not impact each other; if there is mutual interaction between factors, the factors are affected by each other. Find the construction phase Sig 0,038 <0.,05, which mean its highly significant effect on success delivery time. During implementation, construction activities often suffer from changes in design; the risk associated with cost, time, quality and safety is critical. To measure the successful construction life

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cycle in the Iraq construction industry, KPI is the measure of best critical success. to achieve that T-test is used to compare each mean score and the overall construction process with KPI (time, cost, quality and safety). Table V shows the result.

(Table V: T-test to compare construction phases with KPI)

Construction life cycle	mean	sig	
Pre-construction phase	**3.51**	0.00	KPI= 4.04(time)
Construction phase	**3.57**	0.00	
Post-construction	**3.15**	0.00	
Construction life cycle	mean	sig	
Pre-construction phase	**3.51**	0.00	KPI= 4.03(cost)
Construction phase	**3.57**	0.00	
Post-construction	**3.15**	0.00	
Construction life cycle	mean	sig	
Pre-construction phase	**3.51**	0.004	KPI=3.81(quality)
Construction phase	**3.57**	0.00	
Post-construction	**3.15**	0.00	
Construction life cycle	mean	sig	
Pre-construction phase	**3.51**	0.019	KPI=3.75(safety)
Construction phase	**3.57**	0.004	
Post-construction	**3.15**	0.00	

Data from table V showed a significant difference (sig > 0.05) for all construction phases mean scores compared with KPI mean score. Construction practice in the construction industry explains the failure of the current construction process in the Iraq construction project. The range means of KPI between (3.75to 4.04) while the mean score of the construction process (3.51,3.57,3,15). Requirement of successful construction industry not meeting KPI for successful performance, the participants reflect no indicators on the execution of the stakeholders concerned in the project and prioritise their performance to set project success. Research carried out by Kaplan & Norton (2005) shows that customers are not pleased with the final product's pricing, quality, timing, functionality, and delivery performance standards. In this respect, the consultants will not develop the skills and expertise or make efforts to create and manage processes unless the customer satisfies his necessary terms of employment. Consumers and suppliers may not continue to provide customers or any firm with decent products and resources that do not allow them to earn an acceptable return on their time and capital investments. As a result, end-users are not satisfied if their service quality and functionality requirements do not satisfy the end product. The key

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objective of ensuring their continuing involvement and cooperation on a building project is to evaluate and monitor effective stakeholder performance.

Furthermore, the building sector can restructure communities and their settings. The sector is no longer detached from society's challenges and needs. The building business has the power to have a deeper influence on its final products, as do many other businesses.

3.3.4. KPI benchmarking to the measurement of critical success factors in the project phases.

Many building projects don't meet expectations in terms of time, cost, quality, and safety. Numerous projects were completed with poor performance due to numerous evidentiary reasons such as the security of the customer, impediments by the client and the non-availability of materials and tribal conflicts, revisions to the design and drawing, extra tasks, and delays in approval drawings. Project management, coordination between participants, monitoring, feedback, and leadership abilities are all markers of poor performance in Iraq. In Iraq, political, economic, and cultural factors all play a role in project failures. So that to determine the critical success factors in the Iraq construction industry, KPI is the best benchmark to measure success practice. The T-test is a tool to compare each mean score overall success factor with KPI mean score for (time, cost, quality and safety). to compare the population mean to a postulated value of(time=4,04,cost=4,03,quality=3,81,safety=3,75) by analysing the findings of the mean score for each factor. The following are the theories for assessing each factor:

H0: The suggested factor is insignificant if the mean rating is equal(=) mean score (time, cost, quality, safety and health) sig < 0,05.

According to H1: A factor is considered important when its mean rating is not equal (≠) mean score (time, cost, quality, safety and health).sig > 0,05 table VIII shows the result.

(Table VI: KPI to the measurement of critical success)

Critical success factors	mean	Time=4.04 sig	Cost=4.03 sig	Quality=3.81 sig	Safety=3.75 sig
Employment competent and skillful	3.91	.264	.300	.180	.344
Tender method	3.87	.162	.188	.968	.113
A detailed and precise specification of all particular action procedure	3.82	0.105	.122	.902	.338
Government's organization influence in funding	4.05	.908	.845	.624	.264
Contractor related financial	3.97	.621	.679	.090	.103
The construction team skill on the project	3.86	.236	.262	.834	.290

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Project team commitment and Information Coordination	4.01	.804	.871	.749	.299
Ability to solve changes that occur during project implementation	3.90	0.237	.272	.428	.084
Experience of Contractor	3.84	.113	.131	.904	.164
Availability of the required techniques by a contractor.	3.76	.059	.069	.357	.972
Ability the project team to the identification of all the risks in construction activities	3.81	.110	.128	.065	.464
Collaborative team project	3.80	0.051	.061	.962	.383
Workmanship skills	3.79	.100	.115	.832	.606
Precise Project Budget Estimate	3.83	.118	.137	.737	.678
Employment of Competent and Skillful	4.03	.951	.983	.455	.283

Table VI show the critical success factors that meet(time, cost, quality and safety&health) the required success of the industrial practice. Employment competent and skilful, government's organisation influence in funding, procurement method, tendering method, a detailed and precise specification of all particular action procedure, contractor related financial, the construction team skill on the project, project team commitment and information, coordination ability to solve changes that occur during project implementation, the experience of the contractor, ability to the identification of all the risks in construction activities, collaborative team project, workmanship skills and precise project budget estimate. Measurable verification that a planned performance has achieved the desired objectives is what we mean by a performance indicator. The word "measure" refers to indications that can be examined with some degree of precision and without ambiguity. Performance indicators are typically used when an exact measurement is unlikely. Chan& Chan (2004) find the financial related the client, competence and experience of project management, the technical capability of project manager, technical and professional capability of the contractor, the efficiency of communication on the project, experience of the contractor, supervision on the project and commitment of project manager to project are critical success factors to the performance of projects. (Bassam. *et al* 2018) the skill of the design team, the contractor's experience, the construction staff skills on the project, the availability of funding, the mechanism of payments, the experience of the contractor, delay in obtaining funds sufficient time for design. Pello (2017) predicts that success and performance influences success factors. underlined the necessity of stakeholders for the achievement of the construction project to uncover the 'true' success determinants for building projects. Chan& Chan (2004) confirms that a project

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is only effective in as much as it meets the demands of its target user previous studies have specified different CSFs and a lack of assent among researchers on the standard for agreement project success and the effective, successful factors.

3.2.*5. Constructing stakeholder conceptual*

The critical success factors for determining a property developer's performance were graded according to priority to have a grasp of their perspectives (cost, time, quality, safety and health). The Table VII reflects the performance indicators for stakeholders based on the three stages of the project phases, preconstruction, construction and post-construction. The key factor in the study's success criteria included both participants of the projects and the entire project phases. As a result, the project context was considered while determining the success criterion. However, the constructing stakeholder conceptual methods utilised to monitor stakeholder performance in each project phase have still to be improvement.

(Table VII: critical success factors based on the KPI among project phases)

Preconstruction	Construction	Post-construction
Availability of the required technology and expertise	Contractor related financial	Preparing the detailed statement
Procurement mothed	The construction team skill on the project	Quality of rework complete activities
Tender mothed	Site management	Removal temporary measures
A detailed and precise specification of all particular	Ability to solve changes	Final stabilization
influence in funding	Experience of Contractor	Inspections
Ability the project team to the identification of all the risks	Availability of the required techniques	availability of utilities at site
Precise Project Budget Estimate	Safety system	Established operation facilities
Employment of Competent and Skillful	Workmanship skills	Ongoing maintenance
Political, economy environmental	Quality system	Skill of team maintenance
Risk management	The efficiency of supplier and inventory system	Organization awareness

It was argued that repetition should lead to effectiveness in both the particular project and the entire construction process while defining the 38 probable success criteria employed in this research. This resulted in a clearer understanding of the project's

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overall success criterion. The relevance of each of the success criteria was assigned a numerical value in order to better comprehend the developers' viewpoints. They should aid PMs in focusing their efforts to satisfy these success criteria. . The factor scales used in this research discovered four distinct clusters, including cost,time, quality, money, and safety and health, among others. The four groups' theoretical positions on success criteria are generally endorsed in the mainstream literature. In particular, the study's scaling lends credence to the work provides a substantial addition to understanding the overall success model in developing nations' project management practice.

4. Conclusion

From a developing country's viewpoint, this research sought to identify the essential success factors that impact construction performance implementation and suggest critical success factors through project phases base on KPI. The following are some of the article's strengths and weaknesses.

A comprehensive review of this research highlighted ,first, subjected 38 success factors. Through a study of construction projects in Iraq. Secondly, investigate the failure of the construction projects by comparing the project phases on the Iraqi construction sector using the ANOVA statistical test. Compare these parameters with the KPI (time, cost, quality and safety) established using t-tests. As a result, 30 CSFs for each phase base on four KPIs (time, cost, quality, and health and safety) were independently defined as relevant in Iraq's construction sector. These elements may guide strategic decision-making at the organisational level to improve building practices.

As a result, further comparative studies of successful factors implementation in other nations are envisaged in the future, allowing for a wider worldwide application of the study.

Future studies should use a case study to test the market reaction to research and further enhance critical success performance for construction industry, as indicated in this article.

The research limitations was restricted to experts in Iraq's construction business, and its sample size involve specific areas of Iraq with security and economic independence was based on how many people responded to a questionnaire issued to the construction industry. A study that meets all of these criteria can still be considered academically significant because it contains information that can be used as a starting point for new research on the topic of construction industry improvement. After all, leaders of organisations can use the identified critical success factors to promote actions that prioritise these factors and assist in implementing new strategies for this improvement.

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