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Unveiling critical success factors for program management in the construction industry

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Abstract

In the literature on the construction industry, program management comprises related projects coordinated and managed to implement construction projects that have the same objectives, and would be feasible if handled separately, and are useful for all stakeholders in the construction sector. The emphasis of this research is on exploring and identifying the characteristics crucial to and the relative significance of Critical Success Factors (CSF) in Iraq's Regional Development Programs (RDPs) in order to manage these programs with high efficiency and accuracy, to determine whether the program's projects have been completed satisfactorily. Consequently, to conduct this study, the initial literature review pertaining to research keywords (Program management, Critical Success Factor, Success Program) to a Systematic Literature Review (SLR) approach. Subsequently, a conceptual framework encompassing all facets of program management success factors is proffered. To evaluate the actuality of RDPs in Iraqi provinces and to determine the degree to which their advantages and aims have been attained, a list of 29 CSFs has been chosen based on the experts' opinions from nine international studies selected from the SLR approach. Conclusion: The results indicated that the selected critical success factors in RDPs are categorized and organized into four categories: program planning, strategy of the organization, stakeholders, and construction program performance.

Keywords: Critical success factor, Program management, Regional development programs, Systematic review.

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1. Introduction

Program management is a strategic approach that enables organizations to manage several interconnected projects and gain substantial benefits simultaneously. It is crucial to understand the concept of program management clearly since it is frequently misconstrued or misapplied. While overseeing several projects in one location has existed for a considerable period, program management is increasingly acknowledged as a successful standard that provides uniformity to the whole process [1].

Distinguishing program management from project management is crucial as it involves a comprehensive approach to conceptualizing delivery, which can potentially result in cost and time savings. Many people confuse the two ideas. Accordingly, it has been observed that organizations commonly use the phrases "project management" and "program management" interchangeably despite the fact that these roles are separate from one another but closely related [2].

Program management can't be left to chance; thus, distinguishing its methodologies from those of project management is crucial [3]. Whereas project management is concerned with the efficient administration of operations to achieve the project's goals within the approved boundaries of cost, quality, and time, program management is concerned with the management of a collection of projects. The high level of synergy and integration in program management requires the identification of certain critical success factors CSFs that will facilitate efficient delivery [4].

The Iraqi construction sector lacks knowledge of the concept, mechanisms, and methodologies of program management despite its many programs, including Regional Development Programs RDPs and others. RDPs launched in Iraq in 2006 are one of the most important aspects of administrative decentralization by giving the provinces and provinces a percentage of financial allocations according to the criterion of relative importance of the population in each province, as administrative decentralization means the distribution of administrative functions between the central government and local governments (lower bodies) with an independent moral personality but acting under supervision and control of the central government [5].

Infrastructure projects of RDPs generally do not come from a vacuum or without a specific goal. Still, they are made in response to the demands of society in general or a segment of it in a region or province to solve a problem or achieve a public benefit; the most important stage is the proposal and then choosing projects in a way that is consistent with the goals set for them without wasteful effort, time, and money. In other words, these projects in the RDPs contribute effectively to improving the development reality of the province, and the accuracy of the selection of regional development programs and projects and their suitable formulation for the province has a prominent role in achieving development for the province and providing the best service with the least possible deficit [6].

The reasons that stand behind the adoption of this research are as follows: the provinces of Iraq suffer from severe weaknesses in infrastructure projects and disproportionately low amounts allocated to them to support and strengthen infrastructure. The lack of success in the management of RDPs is due to poor planning of material and human resources. Therefore, this study presents a comprehensive overview of the existing literature relevant to program management through the use of a Systematic Literature Review (SLR) in order to extract the critical success factors for processing program management. Furthermore, it aims to conduct a systematic review of previous studies on program management, particularly concerning successful construction program strategies. A comprehensive review of RDPs in Iraq's provinces illustrates the reality of decentralization in local governments.

2. Program Construction Industry

The sector of construction one of the most significant project-oriented sectors, the construction industry has several distinctive traits that cover a range of projects, and their execution is crucial to the growth of nations [7, 8]. The construction sector is a significant industry in various nations, particularly in developing countries like Iraq; when implementing their long-term and strategic initiatives at the national level, governments must carefully consider various factors and potential challenges [9]. The domain of construction presents a suitable context and option for exploring the topic of Program Success, given its potential to encompass diverse cases of varying magnitudes and purposes. This research sheds attention on the frequent problems of poor performance, wasteful spending, and missed deadlines that plague Iraq's building projects and programs [10].

Construction programs are typically structured as a collection of multiple projects or subprograms and are characterized by their high level of complexity, large scale, lengthy implementation period, and elevated costs [11, 12]. Due to their larger scale, cost, and duration, construction programs require meticulous planning during their initial stages to ensure their success [13]. Thus, in order to mitigate the adverse effects on expenses, timelines, and modifications, it is imperative to minimize uncertainties by establishing unambiguous objectives, strategies, and parameters for the building project in its initial phases [14].

However, there is a lack of data about the program's CSFs and the advantages of large-scale initiatives. From the scientific perspective of project management, there is an essential difference between programs and projects. A program's description and location within the organization's structure make it necessary to think about the relationship between the project, program, and portfolio levels. Table 1 illustrates the disparity among these tiers with regard to their achievement [15].

Table 1.
Comparing the success rates of projects, programs, and portfolios.

	Project	Program	Portfolio
Success	Customer satisfaction levels, project timelines, budget adherence, and product quality measure success.	The program's ability to meet the goals and objectives for which it was developed serves as a barometer of its success.	The overall performance of a portfolio's components is used to measure success.

In addition, it is worth noting that the majority of literature pertaining to critical success factors (CSFs) for construction programs is tailored to specific contexts, thereby restricting the generalizability of the findings to the countries in which the research was carried out. This necessitates further study of the program in other countries to account for factors including the magnitude of building projects, procurement procedures, the maturity of the relevant institutions, and cultural norms and values. As far as current academic literature is concerned, there appears to be a dearth of research on the aforementioned topics within the context of Iraq. Therefore, the primary purpose of this paper is to describe the CSF features of the program as a conceptual model and then to conduct empirical research and investigate the CSF of each aspect in the aforementioned context (the construction program) in order to identify the critical success factors associated with the program in the Iraqi construction industry [16].

This study focuses on the Regional Development Programs (RDPs) implemented in Iraq, which are categorized as a program management methodology. These programs encompass a series of interconnected projects that are executed by the Iraqi governorates with the aim of enhancing the developmental status of the respective regions. Moreover, the allocation of funds to the provinces based on the population criterion is a pivotal aspect of administrative decentralization. This approach entails the delegation of administrative responsibilities from the central government to the local authorities while maintaining the central government's oversight and control.

3. Systematic Literature Review Technique

Systematic Literature Review (SLR) methodology was employed to furnish a comprehensive analysis of critical success factors (CSFs) in program management. Systematic literature reviews are meant to provide "explicit, severe, repeatable, and auditable methodology" for "evaluating and understanding all available research relevant to a specific research question, subject area, or phenomena of interest," as follows [17]:

1) The significance of a systematic review lies in its ability to amalgamate discrete pieces of information from individual studies, thereby providing a comprehensive overview of the topic under investigation. This is particularly important as individual studies may only represent a single facet of a larger picture. A complete comprehension of the study issue is made possible by the systematic synthesis of outcomes.
2) In order to do a thorough literature study, researchers are able to synthesize extant evidence pertaining to a particular phenomenon, discern areas of insufficiency in current research, and establish a foundational framework for situating or bolstering novel concepts and hypotheses.
3) The present paper utilizes a systematic review to establish a theoretical framework for comprehending the critical success factors (CSFs) of program management literature. Subsequent research inquiries were developed to explore this issue:

a) Are there CSFs for program management?
b) If so, what kind of connection do they have, and how deep is it?

The review process involved a systematic sequence of actions, which encompassed identifying pertinent literature and the evaluation of its applicability, systematically extracting data from chosen articles, and synthesizing the gathered information to produce a comprehensive overview. The subsequent subsections of this paper expound on the individual steps that constitute the protocol.

3.1. Eligibility Criteria

Seven inclusion criteria served as the foundation for choosing and assessing papers for prospective inclusion. Research has to fulfill specific requirements in order to be included in the systematic review:

1) Be accessible through the chosen resources (libraries, online journals, etc.).
2) Utilize the English language.
3) Note the Publication Date Range (2000 - 2022).
4) Be equipped with enough information for the analysis.
5) Be unique (have no duplication).
6) Articles and conferences published.
7) Present some results on CSFs for program management.

3.2. Information Sources

The databases "Elsevier Science Direct," "Wiley Online Library," and "Emerald" were searched to find relevant research. The study drew from three of the field's most prestigious academic publications on project management:

1) "The Project Management Journal" is sometimes known as (PMJ), published by Wiley in partnership with (PMI).
2) The Inter. Journal of Project Management, sometimes known as IJPM, is co-published by "Elsevier" and the International Project Management Association (IPMA).

3) The Inter. Journal of Managing Projects in Business (IJMPB): "published by Emerald."

3.3. Search Terms

The selected databases were first searched using the phrase "Program management" in the search bars of specific online Project Management publications. "Future studies" was also used to allow for other phrases. The phrases "multi-project" and "megaproject" were included due to their popularity within the program and the restricted number of outcomes. Due to their strong syntactic compatibility with the CSFs for program management, the phrases "success factor" and "critical success" were also examined as potential search terms. A comprehensive search was conducted on the titles, abstracts, and keywords of the papers that were retrieved. A data extraction sheet was created from all of the search results.

3.4. Study Selection

Each article's inclusion or deletion from this evaluation was decided using four criteria. Figure 1 explains these steps.

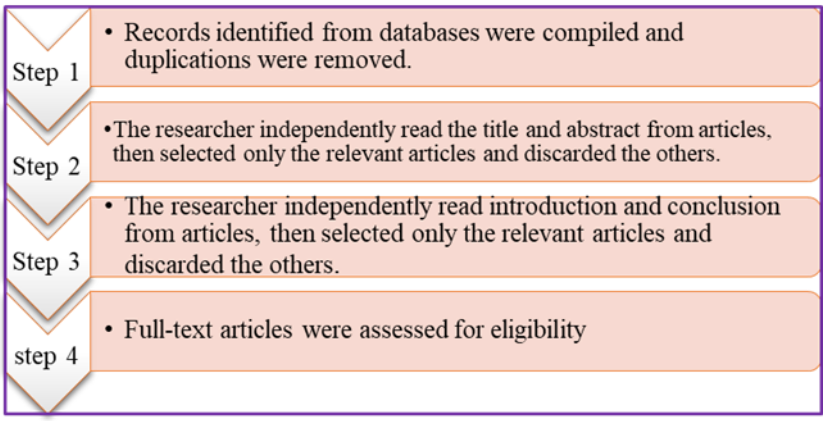

Figure 1.
Study Selection Procedures.

3.5. Data Collection Process

In order to collect information for this review, a data extraction sheet was created, and the researcher was tasked with reading the selected articles in their entirety and collecting information that was both related to the subject at hand and would support the hypotheses being investigated.

4. Results and Discussion

The findings from the systematic review are provided in this section. Figure 2 of the flow diagram below displays the results on each dimension.

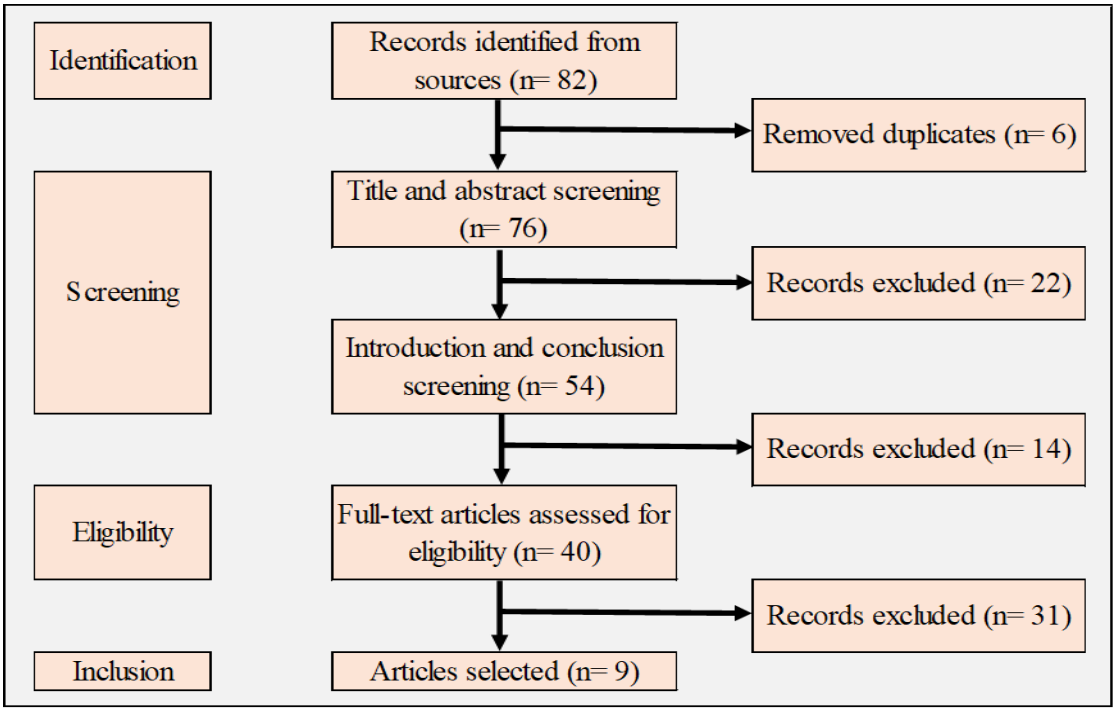

Figure 2.
Flowchart for a Systematic Review.

There were initially (82) records found in the sources that were searched, shown in Figure 3 below (Science Direct (35) + Wiley (15) + Research Gate (12) + ASCE Library (7) + Growing Science (8) + Project Management Institute PMI (5)), as shown in Figure 3.

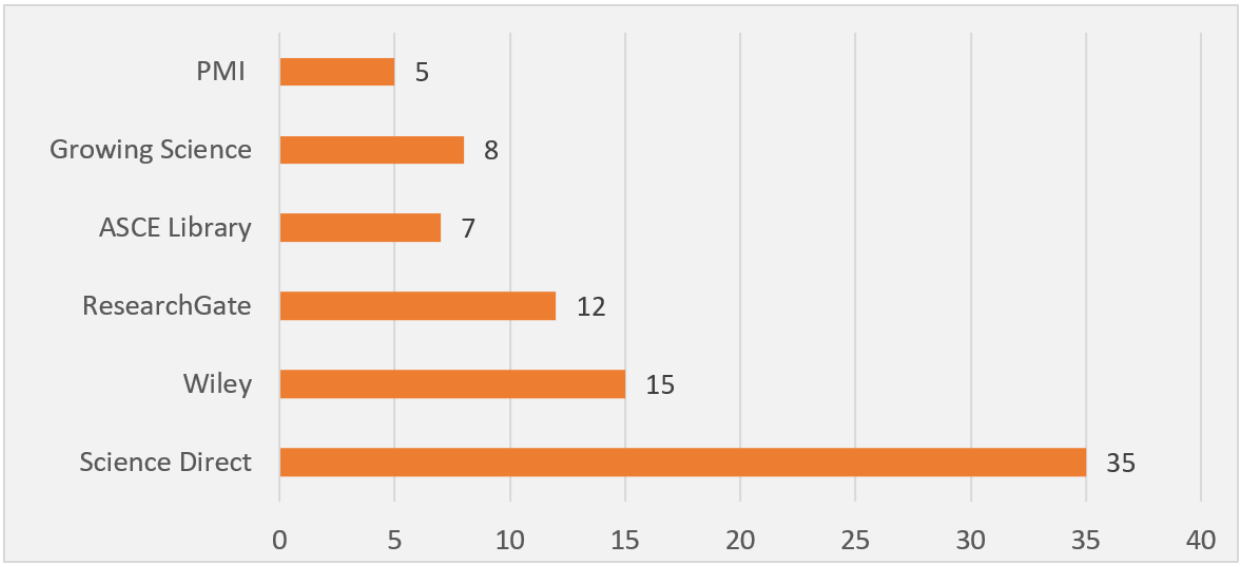

Figure 3.
Databases for Sources Searched.

After weeding out (6) entries with identical information, we were left with a total of (76) to use for our first cut. Twenty-two records out of a total of 76 articles chosen for the title and abstract screen were disqualified because they did not fulfill the predetermined criteria. A second selection reviewed (54) papers, focusing on introductions and summaries, and rejected (14) as unnecessary for this evaluation. In the end, nine studies were chosen after their entire texts were evaluated for eligibility, and thirty-one more were disqualified because they did not align with the CSFs of program management. In Table 2 can be seen the studies that met the eligibility criteria. Although the purpose of eligibility criteria is to reduce selection bias and, therefore, boost the credibility of the literature review, it is vital to remember that a review that is too strict in its inclusion criteria runs the risk of missing valuable data.

Table 2.
Similar Selected Studies.

Study	Year	Title	Journal	Country
1	2019	Critical Success Criteria for Programs in China: Construction Companies' Perspectives [18]	Journal of Management in Engineering	China
2	2018	Development of a Program Definition Rating Index PDRI for the Performance Prediction of Construction Programs [19]	Sustainability	Korea
3	2014	Identifying program critical success factors CSF in the construction industry [15]	Management Science Letters	Iran
4	2010	A critical analysis: Major challenges to the successful implementation & practice of program management in the construction environment. [20]	International Journal of Project Management	UK
5	2012	Measuring Program Success [21]	Project Management Journal	China
6	2009	The critical success factors for effective program management: a pragmatic approach [22]	The Built & Human Environment Review	UK
7	2011	The development of constructs of program context PC and program success PS: A qualitative study [23]	International Journal of Project Management	Sweden & others
8	2009	Boosting program manager effectiveness—nine factors for success [24]	Conference Paper	PMI
9	2012	The steps to program success [25]	Conference Paper	PMI

From the final collection of records, the database chose to pull two papers from ScienceDirect, three articles from Wiley Online Library, one item from Growing Science, one article from ASCE, and two articles from the PMI website search, as seen in Figure 4. In conclusion, seven of the pieces were published in scholarly publications, and two were presented as conference proceedings.

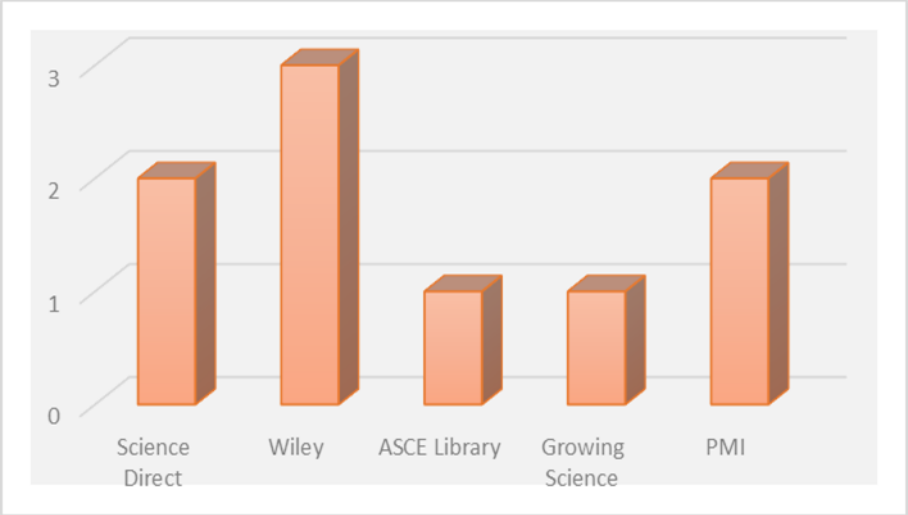

Figure 4.
Databases of Studies Selected.

These factors have been defined at the program level per se and include general factors such as program management, program key stakeholders, program benefits, requirements, and needs, etc. The researcher identified the most important critical factors that affect the success of program management after extracting the relevant studies. CSFs were 206 factors for studies selected accordingly.

This study sought to address the question, "Does the leading research in Project Management literature make explicit reference to critical success factors for program management?" The limited number of studies dealing with construction program management and related CSFs may indicate a need for further investigation into this area. All of the research that made it into the systematic review offered a list of important success criteria (206) that may be used at any stage of a construction program's life cycle to increase the likelihood of the program's goals and objectives being realized. Four of the studies focused exclusively on categorizing the critical success factors for specific categories (organizational strategy, construction program performance, stakeholder satisfaction, program benefits execution, etc.) in order to aid in the control and monitoring of those factors.

Although there is currently little practical research available, it is obvious that the discovery of CSFs is valued by the program management discipline and that there is growing interest among academics in this field. The benefit of identifying these CSFs throughout the program is predicated on the idea that, while it's impossible to know what the future holds, organizations can take steps to improve their ability to deal with strategic surprises and adapt to change by assessing the current state of their CSFs in the context of their program environments and deciding on the most effective next steps for maximizing their impact.

A preliminary theoretical construct for evaluating the performance of construction programs was established by the researcher based on the field of study and the literature review. There were 29 success criteria in the preliminary approach, as shown in Table 3, which were arranged along four dimensions:

1. Program Planning: - in order to be evaluated via multiple success criteria, including financial allocation, budget estimate, business case, determining program priorities, plan and roadmap, and efficient management of program time and cost [26].
2. The strategy of the organization: - in order to be evaluated via multiple success criteria, including reducing the wasting time, aligning the program with the organization, final benefits, promotion of the role of leadership, and development of new technologies/materials [27].
3. Stakeholders: - This will be evaluated via multiple success criteria, including communication, stakeholders' attitude, control of disputes and conflicts, satisfaction, willingness of stakeholders, expectations, training initiatives, and interests toward the program [28].
4. Construction program performance: - in order to be evaluated via multiple success criteria, including quality projects, on-time completion of projects, on or under-budget delivery of projects, safe projects, project conformity with environmental requirements, and efficient and increased use of available resources [29].

Table 3.
Critical Success Factor Selected

No.	Category Factor	Critical Success Factor
1	Program Planning	Allocation of Program Funds Appropriately
2		Program Budget Estimate
3		High-Level Program Business Case
4		Establishing program priorities
5		Program Plan and Roadmap
6		Management of program time effectively
7		Management of the program cost-effectively
8		Powerful and Coordinated Program management office
9	The strategy of the organization	Aligning Program Objectives with Organizational Objectives
10		providing a comprehensive description of the typical PMO's role within an organization
11		Innovation in technologies/materials
12		related projects
13		Final program benefits
14		Provide leadership across all levels.
15		Match Requirements to Resources
16	Stakeholders	Effective communication
17		Understanding the stakeholders' attitude
18		Understanding specifically what data is required by the top management
19		Control disputes and conflicts
20		Satisfaction with equipment and material suppliers
21		Public satisfaction
22		Stakeholders are willing to be involved
23	Construction program performance	Quality projects
24		Procurement and Supply Chain Management
25		Right risk management
26		Safe projects
27		The best technique to assess project benefits
28		Environmental Assessment
29		Utilization of existing resources that is efficient and optimal

5. Conclusion

Program management in the construction sector involves systematically coordinating and regulating a group of interconnected construction projects to accomplish strategic and organizational objectives effectively. Program management is essential for supervising several construction projects simultaneously, optimizing the allocation of resources, and ensuring that programs are performed efficiently to achieve success.

In order to assess the actuality of Regional Development Programs (RDPs) in Iraqi governorates and learn how much their advantages and goals have been realized, the Systematic Literature Review (SLR) methodology was employed to furnish a comprehensive analysis of critical success factors (CSFs) for program management in the construction sector.

The systematic literature review plays a vital role in establishing familiarity with similar studies, identifying gaps, and enhancing credibility. It serves as a solid basis for a well-founded thesis or research.

Two hundred six critical success factors were determined, though studies were selected from the SLR and categorized into several categories. According to the findings of the research, a program's success cannot be assumed simply because all of its constituent projects have been completed successfully in terms of product and project quality, timeliness, cost-effectiveness, and customer satisfaction. This is because there are other aspects and dimensions that might affect the results of a program. Additionally, program management in Iraq is still developing its understanding of the crucial success components. Because of this, it is possible to infer that the information on building program management is incomplete and not yet reliable, strongly suggesting a direction for further study.

Finally, there are 29 success criteria in the preliminary framework, which are arranged along four dimensions (Program Planning, the strategy of the organization, stakeholders, and construction program performance).

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