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Critical Success Factor Models for Project Success

Virender Kumar[1], Amrendra Pandey[2], and Rahul Singh[3]
[1]Research Scholar, Centre for Research Studies, Birla Institute of Management Technology, Plot No. 5, Knowledge Park, II, Greater Noida, Uttar Pradesh, India - 201306, E-mail: virenderkr.bimtech@gmail.com (corresponding author).
[2]Assistant Professor, Department of Economics, Kautilya School of Public Policy, GITAM University, Hyderabad, India, E-mail: amrendra@kautilya.org.in
[3]Professor and Chair of Strategy, Innovation and Entrepreneurship Area, Birla Institute of Management Technology, Plot No. 5, Knowledge Park, II, Greater Noida, Uttar Pradesh, India - 201306, E-mail: rahul.singh@bimtech.ac.in

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Abstract: Project success is dependent on multiple stakeholders' perceptions; however, current theories on project success are not translating into practice. Previous studies have duly captured or highlighted the need for the identification of critical success factors (CSFs) from multiple stakeholders' perspectives. However, most of the previous research on CSFs has been carried out in developed countries. Therefore, their applicability in developing economies needs to be explored. This study reviews the existing literature on multiple stakeholders' CSFs models for project success and investigates the existing gaps in the Indian context for project success on construction projects located in India. The findings of this paper suggest that there are few previous references in the CSFs area for project success from multiple stakeholders' perspectives in the Indian context. Very few previous studies have proposed a CSF model that is developed taking into account multiple stakeholders' perspectives, multiple project types, and multiple project procurement methods. Further, none of the models reviewed has evaluated the effects on all four performance criteria of time, cost, quality, and client satisfaction. This reveals an important existing research gap, that is, the need for the development of such a model for developing economies like India.

Keywords: critical success factors, construction projects, project success, multiple stakeholders.

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1. Introduction

The construction industry plays an important role in the economy of a country, contributing significantly to the national gross domestic product (GDP), capital formation, and employment (Cheng et al., 2021). The construction industry is referred to as the engine of a country's socio-economic growth on the account of activities related to the promotion of infrastructure investment, jobs-creations, consumption of intermediate products, and related services in other industries (Thanh Tran and Hoang, 2017). However, the construction industry is continuously facing problems with resource planning, risk management, and logistic which result in design defects, delays, cost overruns, and disputes (Akinosho et al., 2020) amidst serious performance shortfalls and technological and budgetary uncertainties with projects' becoming more and more complex and difficult (Siraj and Fayek, 2019). Project Management Institute (PMI) reported that "*for each $1 billion invested in projects that did not reach their objective, $97 million are lost*" (PMI, 2017 cited in Martens et al., 2018). Developing countries are identified with low and inadequate infrastructure, and a lack of managerial, technological, human, and capital resources (Eyiah-Botwe et al., 2019). Achieving success on the projects is especially difficult in developing countries because construction projects in developing countries are significantly different as compared to those in developed countries (Vickridge, 2002). Developing countries are increasingly seen as rising markets for huge investments in megaprojects (Amadi, 2019).

India finds its place in the lower middle-income group of developing countries. It has approximately 1.380 billion people. Approximately 21% of India's population is living in poverty. Therefore, there is an urgent need for promoting infrastructure development and improving the infrastructure projects' performance to foster economic growth and reduce poverty in the country. The Indian construction industry consistently ranks among the major contributors to India's GDP. It is the second-largest industry after agriculture in terms of capital formation and providing employment opportunities (Tripathi and Jha, 2018). India is poised to be the third-largest construction market globally by 2030. Major challenges for the Indian construction business comprise global market settings, restricted resources, limited budget, lack of qualified and experienced team members as well as intense competition

(Ingle and Mahesh, 2020). As the per project implementation status report (April 2022) on central sector infrastructure projects costing $20 million and above, out of 1559 monitored projects, 647 projects (41.50%) reported delayed, 428 projects (27.45%) reported cost overrun, and 217 projects (13.92%) reported both time and cost overrun with respect to their original project implementation schedules ((Infrastructure and Project Monitoring Division, 2022).

A construction project is deemed a success when it is finished on schedule, within cost, and according to the specifications (Tabish and Jha, 2011). Other metrics of success include functionality, contractor's competitiveness, absence of lawsuits and legal cases, occupiers' "fitness for purpose" (Duy Nguyen et al., 2004), and stakeholders' satisfaction. The vast research in the context of construction projects has highlighted the significance of recognizing critical success factors (CSFs) for assessing project success. Research into infrastructure project success is more prevalent than ever, indicating that the importance of improving project delivery is recognized; however, it is yet to be solved, which is evidenced by the repeated failings of projects of all shapes and sizes (Hopmere et al., 2020; McDermot et al., 2020).

Many researchers have identified that most of the previous studies on project success factors have been carried out in developed countries. Therefore, their applicability in developing economies needs to be explored (McDermot et al., 2020; Tripathi and Jha, 2018; Wang et al., 2020). He et al. (2019) performed a mixed bibliographic and bibliometric analysis for identifying the gaps in project success research and reviewed 164 papers related to project success in construction engineering and management (CEM) for the period from 2007 to 2017. They identified that the lack of existing research has an adverse impact on current construction practices in developing countries. They included limited previous references for improving the likelihood of construction project success in developing countries as a prominent research gap and stressed finding out the differences in CSFs and criteria in developed and developing countries. Authors have identified and documented a comprehensive list of CSFs for project success (Kumar et al., 2021).

With the overall aim of developing a CSF model for project success from multiple stakeholders' perspectives in the context of developing countries, the authors reviewed the literature to find the answers to the following research questions:

RQ1. Do previous references exist for a multiple stakeholders' CSF model for construction projects in the context of developing economies like India?

RQ2. What are the existing gaps in the Indian scenario?

The first research question was answered through the descriptive analysis of selected publications and the second question was answered through an extensive analysis and assessment of each study related to CSFs for project success/project performance of construction projects located in India found during the review process.

This study discusses the research gaps identified during the review of the literature performed towards the development of a CSF model for project success on construction projects located in India. This study included projects executed in both the public and private sectors. The structure of this paper is as follows. Section 2 presents a review of the key terms. Section 3 presents the methods. Section 4 presents the results. Section 5 presents the discussion. Limitations and scope for future research are presented in Section 6.

2. Background

2.1. Multiple Stakeholders

PMI defines a stakeholder as "*an individual, group, or organization that may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project.*" (PMI, 2017). The construction industry is a multiteam continuum with a wide array of consultants, designers, contractors, domain experts, engineers, and tradesmen providing their inputs to complete projects within the given budget, on time, and as per schedule thereby playing indispensable roles to solve unstructured and technical problems unique to projects (Ali et al., 2020). The involvement of multiple project management teams on a construction project can often create an aggressive environment and complicate the situation. Therefore, their management is critical to the project's success (Irfan et al., 2019).

Success is dependent upon multiple stakeholders' perceptions (Davis, 2014). Different researchers have duly captured or highlighted the need for the identification of CSFs from multiple stakeholders' perspectives (Davis, 2018; Gruden and Stare, 2018; Hasan and Jha, 2019; Ingle and Mahesh, 2020; Martens et al., 2018; Tripathi and Jha, 2018). Literature on CSFs has identified and documented varied lists of stakeholders as having an interest in project success taking a view on how to judge project success (criteria) and which factors (CSFs) will contribute to project success. Frequently mentioned key stakeholders identified in previous studies include, among others, project managers, project teams, clients, contractors, consultants, and users.

2.2. Evolution of CSFs Definitions

Daniel first discussed the concept of "success factors" in the 1960s (Leidecker and Bruno, 1984). Rockart, based on Daniel's concept has introduced the CSFs approach and defined CSFs as "*those few key areas of activity in which favorable results are absolutely necessary for a particular manager to reach his or her goals*" (Rockart, 1982). A seminal study on CSFs is Pinto and Slevin's (1987) work who are recognized as "*authors of the most widely used success factor list*" (Davis, 2014).

Several definitions of CSFs are found in the literature. Pinto and Slevin (1987) defined CSFs as "*those factors which, if addressed, will significantly improve project implementation chances.*" (Pinto and Slevin, 1987). Maghsoodi and Khalilzadeh, (2017) defined CSFs as "*the project management system inputs which directly increase the likelihood of attaining the project success.*". Hofer and Schendel defined CSFs as "*those variables which management can influence through its decisions that can affect significantly the overall competitive positions of the various firms in an industry*" (Hofer and Schendel, 1978 cited in Leidecker and Bruno, 1984). Leidecker and Bruno (1984) contended Hofer and Schendel's (1978) definition and defined CSFs as "*those characteristics, conditions, or variables that when properly sustained, maintained, or managed can have a significant impact on the success of a firm competing in a particular industry.*". However, Amberg et al. (2005) opined that Rockart's (1982)

approach is particularly relevant within project management.

2.3. CSF Research in Project Management

Because of the importance of construction, several works have recognized the factors that support completing construction projects successfully, especially the factors which have a greater effect on project success than others (Altarawneh and Samadi, 2019). In the project management approach, CSFs and project success research are frequently considered among the key ways of enhancing project delivery effectiveness (Chan et al., 2004).

Extensive research has been carried out on CSFs for project success in the last few decades. The research identifies and ranks these factors on various metrics of project success, - predominately that of time, cost, quality, and client satisfaction. Over the period, various authors have defined CSFs for different project types, project sizes, procurement methods, countries, stakeholders, and different success categories (project success, product success, and project management success). Moradi et al. (2020) performed a literature review aimed at understanding the longitudinal developments in the project success research field. They identified 338 success factors and documented 132 success factors after synthesizing and excluding similarities. Kumar et al. (2021) documented a comprehensive list of CSFs identified in previous studies.

"*No project can be studied comprehensively without considering its context*" (Hanisch and Wald, 2012). Many previous studies have highlighted the geography-specific nature of CSFs and the need for the identification of CSFs catering to the local construction industry (Altarawneh and Samadi, 2019; Ingle and Mahesh, 2020; Martens et al. 2018; Rezvani and Khosravi, 2018).

2.4. Project Success

Maghsoodi and Khalilzadeh (2017) viewed project success as a management's foundation controlling the ongoing projects and planning for future projects. Langston et al. (2018) opined that the essence of project success is that the right projects are done right. However, various authors believe that a common consensus has not been established on the measures of project success in the construction industry (Akbari et al., 2020; Luo et al., 2020), and prior research has disagreed on the definition of project success as well as the best way to achieve it (Townsend and Gershon, 2020). Project success is still considered one of the most controversial concepts in project management on the account of its ambiguous and multi-dimensional nature and, thus, a common understanding of project success is yet to be established (He et al., 2019).

Luo et al. (2020) viewed project success as the ultimate goal pursued by stakeholders in project management. Sebestyen (2017) opined that project success is perceived differently by different stakeholders. Similarly, Olugboyega et al. (2020) observed that success is a multidimensional variable, means different things to different stakeholders, and that "*the stakeholder determinates of project success are based on focused interests that may be mutually exclusive and/or divorced from the success of the construction project itself.*".

A construction project is considered successful when it is completed on time, without cost overruns, and within the specified quality parameters (Sinesilassie et al., 2019). These three measurements have become known as the iron triangle and sometimes are credited to Barnes (Townsend and Gershon, 2020). Albert et al. (2017) opined that ever-increasing environmental consciousness and everchanging customer demands are making the achievement of project success increasingly tough and that project success cannot be evaluated from a singular viewpoint. He stressed for a generic model for defining project success. Several previous studies have suggested for the measurement of project success from multiple stakeholders' perspectives (Davis, 2018; Ingle and Mahesh, 2020).

Within the above context, this study is aimed to identify the existing research gaps in multiple stakeholders' CSF models for project success for construction projects located in developing economies like India.

3. Methods

The quality of the literature review depends on the rigor of the research process (Brocke et al., 2009) and therefore the best way to develop a search strategy must be in concert with the research questions aimed in the study. Levy and Ellis (2006) opined starting a literature search in electronic sources and literature databases and then moving on to a keyword string search. Kitchenham and Charters (2007) opined deciding the search strings based on the research questions and including synonyms and alternative spellings. The review stages included establishing research questions, defining conceptual boundaries, setting inclusion criteria (search boundaries, search terms, and time span), and applying exclusion criteria.

The initial exploratory desktop search was carried out in Scopus, Web of Science, and google scholar, from all years till February 2022, and consisted of database search and filtering. The initial unstructured search was performed using the combination of keywords "critical success factors," "construction project performance," "construction project success," "success factors," "project success" and "project performance". The initial search focus was limited to titles, keywords, and abstracts of published papers. After completion of the initial database search, the compiled lists were analyzed to remove duplicate entries. This resulted in a pool of 581 publications for the period from 1970 to February 2022.

Table 1 details the inclusion and exclusion criteria set for the current research to remove articles non-relevant to the current study aims.

Table 1. Inclusion - exclusion criteria used

Inclusion criteria	Exclusion criteria
Peer-reviewed Scopus or web of science indexed journal articles; publications ranked in ABDC list of journals	Non-peer reviewed, non-Scopus, non-web of Science indexed journal articles, magazines, teaching case studies, editorials
Studies focused on CSFs for project success/project performance of construction projects	Focus on emotional intelligence, information technology, software development projects
Full text available	Only abstracts available
Studies written in English	Non-English studies

These publications were further scrutinized to identify the studies investigating CSFs for project success for construction projects located in India by first examining the titles, keywords, and abstracts because these are indicative of the article's content (Crawford et al., 2006). The review was limited to published peer-reviewed studies in the English language. Any article was accepted only if its abstract was relevant to the scope of this study. Additionally, the quality of the article journal was also taken into consideration before short-listing the article for the literature review. This was followed by an intensive search of filtered articles with the aim of developing a theory and identifying CSFs for construction projects located in India. These publications were searched for the keywords "India" or "Indian" in the title, keywords, or abstracts to identify the studies carried out on construction projects located in India. This resulted in the identification of total 21 studies on CSFs done in the context of construction projects located in Indian geography. Full-text versions of these 21 articles were read to examine their eligibility. Out of these 21 studies, five studies pertained to CSFs for construction organizations and one study pertained to benchmarking managerial efficiency. Since these six articles did not relate to this study's research questions therefore these six articles were removed. Table 2 details the remaining 15 articles carried out on CSFs for project success/project performance of construction projects located in India.

Table 2. Previous studies on CSFs for construction project success in the Indian context

S.No.	Author	S.No.	Author
1	Ngullie et al. (2021)	9	Tabish and Jha (2011)
2	Anilkumar and Banerji (2020)	10	Jha and Chockalingam (2011)
3	Chidambaram and Tamilmaran (2020)	11	Jha and Iyer (2007)
4	Hasan and Jha (2019)	12	Jha and Iyer (2006a)
5	Kulshreshtha et al. (2017)	13	Jha and Iyer (2006b)
6	Gupta et al. (2013)	14	Iyer and Jha (2006)
7	Shahu et al. (2012)	15	Iyer and Jha (2005)
8	Tabish and Jha (2012)		

4. Results

4.1. Review of Previous Studies in the Indian Context

The review of previous studies revealed that there is a scarcity of literature on CSF models for project success from multiple stakeholders' perspectives in the Indian context. Two studies (8, 10) are based on scale items identified by Jha and Iyer (2007) and two studies (13, 14) are based on scale items identified by Iyer and Jha (2005). Further, Jha and Iyer (2007) performed their study based on the scale items of Iyer and Jha (2005). As such we understand, six studies (listed at s.no. 8,10, 11, 13, 14, and 15 in Table 2) are broadly based on the scale items identified in a single study by Iyer and Jha (2005). The majority of these identified studies were performed considering limited aspects, that is, these are done either considering only one project type, one project procurement method, limited CSF attributes or are performed with limited stakeholders.

Ngullie et al. (2021) investigated the various CSFs of Indian municipal solid waste management (MSWM) Projects taken up in the PPP mode for two stakeholder groups (public and private sectors). That is, this study was limited to only one project type and one procurement method. They identified 17 sector-specific CSFs. However, CSFs identified were for the successful implementation of the MSWM projects in PPP mode in India, and not for enhancing construction project success. Further, statistical tests indicated a variation in the perception between the two stakeholder groups. Anilkumar and Banerji (2020) have considered only post-disaster housing reconstruction projects (i.e., only a specific project type). They investigated factors that contributed to the successful implementation of tsunami housing projects in Kerala and proposed a model for CSFs for post-disaster reconstruction projects. They identified 23 scale items under four success factor dimensions of institutional mechanism, reconstruction strategy, project implementation, and stakeholder management. They proposed a success factor model for reconstruction projects' success. Chidambaram and Tamilmaran (2020) investigated CSFs for construction projects in the PPP mode and tested the factor prototype using the PLS-SEM approach for 57 scale items under eight success factor dimensions. They covered only one procurement method and collected responses from a small region in India. Hasan and Jha (2019) investigated the factors essential for schedule incentive/disincentive success in construction projects. They identified 21 client-related success factors and 23 contractor-related success factors for Indian schedule incentive/disincentive projects. Kulshreshtha et al. (2017) performed a case study of a single project (Hyderabad Metro project) to identify CSFs for adopting PPP models in urban metro projects. They identified seven success factor dimensions with 18 scale items in the implementation of the Indian urban metro system in the PPP mode. However, investigations were done only for two stages of the metro project.

Gupta et al. (2013) identified and ranked the top ten CSFs for BOT projects in India. They ranked CSFs for project success for the implantation of PPP in India through a three-level hierarchical model with project success at the top of the hierarchy, six CSF factor dimensions forming the second level, and a total of 29 CSFs corresponding to these six success factor dimensions forming the third level. Shahu et al. (2012) investigated the role of a single CSF attribute (flexibility) in reducing risk and increasing the probability of construction project success. Tabish and Jha (2012) proposed a model of success traits for construction project success. They identified seven scale items under two success factor dimensions (human factors, and management actions) and evaluated the effects on three performance criteria (schedule, cost, and quality). Tabish and Jha (2011) investigated success factors for public construction projects and their relative importance in overall performance, compliance with anti-corruption, and financial norms. They identified four success factor dimensions with 20 scale items for the overall success of Indian construction projects.

Jha and Chockalingam (2011) investigated CSFs affecting the schedule performance of Indian construction projects. They identified six CSFs affecting the schedule

performance of Indian construction projects. Jha and Iyer (2007) investigated the critical factors for success/failure and their relative impact on four performance criteria of *schedule, cost, quality, and no-dispute* for Indian construction projects. They identified 11 success factors and nine failure factors with the extent of contribution of these identified factors varying based on the project's current performance rating. They find that there is no factor having a significant influence on all four performance criteria. They concluded that commitment, coordination, and competence are prime factors for achieving on three performance criteria (cost, schedule, and quality). Jha and

Iyer (2006a) investigated to identify significant coordination activities contributing to improved project coordination and proposed a model for the evaluation of these activities for achieving day-to-day coordination. Jha and Iyer (2006b) investigated to evaluate critical success/failure factors affecting the quality performance of Indian construction projects. Iyer and Jha (2006) investigated critical success/failure factors affecting the schedule performance of Indian construction projects. Iyer and Jha (2005) investigated critical success/failure factors affecting the cost performance of Indian construction projects. They identified 30 scale items under seven success factor dimensions.

A review of these studies is presented below.

CSFs and stakeholder groups: Table 3 details the CSFs dimensions/scale items and stakeholders considered in these 15 studies. Out of these 15 studies, six studies were performed without considering any CSF dimension while two studies considered only one CSF attribute (flexibility/coordination). The number of CSF scale items identified in these 15 studies ranged from 1 to 57. Two studies were performed considering only a single stakeholder and five studies were performed considering two stakeholder groups (considering mixed type respondents as two stakeholder groups). Eight studies have been carried out considering three stakeholder groups. However, out of these eight studies, six studies are broadly based on the scale items identified in a single study by Iyer and Jha (2005).

Project types/procurement methods/response measurement: Table 4 details the project types, procurement methods, and measurement coverage considered in these 15 studies. Three studies have considered only one type of project (municipal solid waste management (MSWM), post-disaster housing project, and metro rail) whereas one study has considered only public sector projects.

CSF models identified: Out of 15 studies, only four studies have proposed CSF models for increasing the likelihood of project success on Indian construction projects (i.e., construction projects located in India) while the remaining 11 studies have not proposed any model. The research gaps identified in these four studies are discussed in detail in Section 4.2.

Table 3. CSFs and stakeholder groups

S.No.	Authors	No. of CSF dimensions (scale items) identified	Stakeholder groups / Stakeholder classification				
			Client / Owner	Contractor	Consultant	Project manager	Others
1	Ngullie et al. (2021)	Nil (17)	-	-	-	-	Mixed type respondents (Public sector and private sector)
2	Anilkumar and Banerji (2021)	4 (23)	Yes	Yes	-	-	Community leaders, social & religious groups, architects, engineers, contractors
3	Chidambaram and Tamilmaran (2020)	8 (57)	Yes	-	-	Yes	-
4	Hasan and Jha (2019)	Nil (21 and 23)	Yes	Yes	Yes	-	-
5	Kulshreshtha et al. (2017)	7 (18)	-	-	-	-	Mixed type respondents (public sector and private sector)
6	Gupta et al. (2012)	6 (29)	Yes	Yes	Yes	-	-
7	Shahu et al. (2012)	Nil (1)	-	-	-	Yes	-
8	Tabish and Jha (2012)	2 (7)	Yes	Yes	Yes	-	-
9	Tabish and Jha (2011)	4 (20)	-	-	-	Yes	-
10	Jha and Chockalingam (2011)	Nil (6)	Yes	Yes	Yes	-	-
11	Jha and Iyer (2007)	Nil (11)	Yes	Yes	Yes	-	-
12	Jha and Iyer (2006a)	Nil (1)	Yes	Yes	-	-	-
13	Jha and Iyer (2006b)	5 (42)	Yes	Yes	Yes	-	-
14	Iyer and Jha (2006)	6 (41)	Yes	Yes	Yes	-	-
15	Iyer and Jha (2005)	7 (30)	Yes	Yes	Yes	-	-

Table 4. Project types/procurement methods/ measurement

S.No.	Authors	Project types		Procurement method		Pan-India measurement	
		All	Specific	All	Specific	Yes	No
1	Ngullie et al. (2021)	No	Municipal solid waste management	No	PPP (BOT)	Yes	-
2	Anilkumar and Banerji (2021)	No	Post-disaster Housing Reconstruction Projects	-	-	-	No
3	Chidambaram and Tamilmaran (2020)	No	-	No	PPP	-	No
4	Hasan and Jha (2019)	-	-	-	Schedule incentive /disincentive	Yes	-
5	Kulshreshtha et al. (2017)	No	Metro rail	-	PPP	-	No
6	Gupta et al. (2012)	Yes	-	-	PPP (BOT)	Yes	-
7	Shahu et al. (2012)	Yes	-	Yes	-	-	No
8	Tabish and Jha (2012)	Yes	-	Yes	-	Yes	-
9	Tabish and Jha (2011)	-	Public sector	Yes	-	Yes	-
10	Jha and Chockalingam (2011)	Yes	-	Yes	-	Yes	-
11	Jha and Iyer (2007)	Yes	-	Yes	-	Yes	-
12	Jha and Iyer (2006a)	Yes	-	Yes	-	Yes	-
13	Jha and Iyer (2006b)	Yes	-	Yes	-	Yes	-
14	Iyer and Jha (2006)	Yes	-	Yes	-	Yes	-
15	Iyer and Jha (2005)	Yes	-	Yes	-	Yes	-

Four studies have considered only the public-private-partnership (PPP) procurement method and one study has considered only schedule incentive/disincentive projects. The collection of responses in four studies was limited to a particular region in India, that is, these four studies lacked pan-India measurement.

Success criteria: Table 5 details the success criteria considered in these 15 studies. Five studies did not measure the effects against any of the four success criteria of time, cost, quality, or client satisfaction. Five studies have evaluated the effects for only one performance criterion. Five studies have evaluated the effects against three performance criteria.

Limitations identified: Table 6 details the major limitations identified in these 15 studies.

4.2. Research Gaps in Multiple Stakeholders' CSF Models Identified in the Indian Context

Review under Section 4.1 led to the identification of four studies that have proposed CSF models for increasing the likelihood of project success on construction projects located in India. The research gaps identified in these four studies are discussed below:

Anilkumar and Banerji (2020) considered only a specific project type (post-disaster housing reconstruction projects) and proposed a model for reconstruction project success identifying 23 scale items under four success factor dimensions of institutional mechanism, reconstruction strategy, project implementation, and stakeholder management. The collection of responses was limited to a small area from a single state of India. Therefore, the measurement was not representative of the whole country. This study did not evaluate these CSFs on any of the four performance criteria. Further, the CSF dimensions primarily characterize only project management dimensions and did not consider CSFs related to the project (size, cost, design, functionality, etc.), context (political, environmental, etc.), and other CSF dimensions.

Jha and Iyer (2006a) proposed a model for the evaluation of coordination activities for achieving routine construction project coordination. This study considered only one CSF attribute (coordination). Tabish and Jha (2012) proposed the model considering only two CSF dimensions (human factors and management actions). They identified a total of seven scale items under these two CSF dimensions and evaluated the impact of these CSFs on three performance criteria (schedule, cost, and quality).

Jha and Chockalingam (2011) developed a model for predicting the schedule performance of Indian construction projects. The study concluded six factors affecting schedule performance on Indian construction projects.

The two studies (i) Tabish and Jha (2012) and (ii) Jha and Chockalingam (2011) are primarily based on the scale items identified by Iyer and Jha (2005) and therefore inherently suffer from the limitations of Iyer and Jha (2005) which are discussed below.

Iyer and Jha (2005) identified success and failure factors affecting the cost performance of Indian construction projects. This study identified a single set of 55 attributes for the cost performance criterion. Authors, based on the mean score of responses, classified these 55 attributes as either a success factor (having mean scores of responses > 4.5) or a failure factor (having mean scores of responses < 3.5). The authors categorized 30 items as success attributes (under seven success factor dimensions) and 23 items as failure attributes (under seven failure factor

dimensions). However, the classification of success/failure attributes was based on a mean score from a single set of attributes. We argue that success factors and failure factors are two different categories and a failure factor cannot be defined as the absence of a success factor (Montequın et al., 2016). Moreover, respondents were asked to choose a project of their choice therefore there may be an element of biasness since respondents might like to tell only success stories.

Further, the study by Iyer and Jha (2005) suffers some serious discrepancies like highly similar scale items and repetition of multiple identical scale items under different dimensions as detailed below:

- Scale items "*lack of understanding of operating procedure by the PM*" and "*conflicts among team members*" were included under two dimensions namely "*conflict among project participants*" and "*ignorance & lack of knowledge*".

- Scale items "*conflicts between PM and other outside agency such as owner, sub-contractor or other contractors*" and "*conflicts between PM and top management*" were included under two dimensions namely "*conflict among project participants*" and "*presence of poor project specific attributes and non-existence of cooperation*".

- Scale item "*reluctance in timely decision by top management*" was included under two dimensions namely "*conflict among project participants*" and " *reluctance in timely decision*".

- Scale item "*harsh climatic condition at the site"* was included under two dimensions namely "*hostile socio economic and climatic condition*" and "*aggressive competition at tender stage*".

- Scale item "*holding key decisions in abeyance"* was included under two dimensions namely "*presence of poor project specific attributes and non-existence of cooperation*" and "*aggressive competition at tender stage*".

Another major discrepancy observed in this study is that the authors identified *"project manager's competence"; "top management's support"; " project manager's coordinating and leadership skill"; "coordination between project participants"; "committed project participants"; "monitoring and feedback";* and *"owners competence and favorable climatic condition"* as the CSF dimensions with each of these having multiple scale items. However, these CSF dimensions have been identified as scale items in other studies under project management literature.

The conclusion arrived at by the authors in this study is also in contradiction with the other studies in the CSF area. The authors concluded that "*the critical success factor remains the same irrespective of geographical boundaries.*" (Iyer & Jha, 2005) which is in contrast to published literature in project management highlighting (i) the geography-specific nature of CSFs and (ii) the need for identification of CSFs catering to the local construction industry.

Table 5. Success criteria considered

S.No.	Authors	Success criteria				
		Time	Cost	Quality	Client satisfaction	Others
1	Ngullie et al. (2021)	No	No	No	No	No
2	Anilkumar and Banerji (2021)	No	No	No	No	No
3	Chidambaram and Tamilmaran (2020)	Yes	Yes	Yes	No	Effective coordination
4	Hasan and Jha (2019)	Yes	No	No	No	No
5	Kulshreshtha et al. (2017)	-	-	-	-	-
6	Gupta et al. (2012)	-	-	-	-	-
7	Shahu et al. (2012)	Yes	Yes	Yes	-	-
8	Tabish and Jha (2012)	Yes	Yes	Yes	No	No
9	Tabish and Jha (2011)	-	-	-	-	Overall performance, compliance with anti-corruption, financial norms.
10	Jha and Chockalingam (2011)	Yes	No	No	No	No
11	Jha and Iyer (2007)	Yes	Yes	Yes	No	No-dispute
12	Jha and Iyer (2006a)	Yes	Yes	Yes	No	No-dispute
13	Jha and Iyer (2006b)	No	No	Yes	No	No
14	Iyer and Jha (2006)	Yes	No	No	No	No
15	Iyer and Jha (2005)	No	Yes	No	No	No

Table 6. Limitations identified in these 15 studies

S.No.	Authors	Limitations / Remarks
1	Ngullie et al. (2021)	1. The study was limited to only one project type and one procurement method. 2. The critical success factors identified were for the successful implementation of the MSWM PPP project in India and not for enhancing construction project success. 3. Statistical tests indicated different perceptions between two stakeholder groups for CSFs.
2	Anilkumar and Banerji (2021)	1. Study was limited to only one project type. 2. Collection of responses was limited to a small region in Kerala state.
3	Chidambaram and Tamilmaran (2020)	1. The study was limited to construction projects executed through the PPP procurement method. 2. Collection of responses was limited to a small region in Tamil Nadu state. 3. Study's main objective included analyzing the effect of the demography in determining the success rate of the PPP projects.
4	Hasan and Jha (2019)	1. Small sample size.
5	Kulshreshtha et al. (2017)	1. Case study of a single project. 2. Investigations are done for only two stages of the project.
6	Gupta et al. (2012)	1. Small sample size. 2. The study was limited to construction projects executed through the BOT (PPP) procurement method.
7	Shahu et al. (2012)	1. Very small sample size (26 responses). 2. Collection of responses limited to a small region in Maharashtra state.
8	Tabish and Jha (2012)	1. Small sample size.
9	Tabish and Jha (2011)	1. Small sample size.
10	Jha and Chockalingam (2011)	1. Small sample size.
11	Jha and Iyer (2007)	1. Small sample size.
12	Jha and Iyer (2006a)	1. Small sample size.
13	Jha and Iyer (2006b)	1. Small sample size.
14	Iyer and Jha (2006)	1. Small sample size.
15	Iyer and Jha (2005)	1. Highly similar scale items. 2. Multiple identical scale items repeated under different dimensions. 3. Small sample size. 4. Authors concluded that "*the critical success factor remains the same irrespective of geographical boundaries*" (p.293) which is in contrast to published literature highlighting the geography-specific nature of CSFs and the need for identification of these factors catering to the local construction industry.

5. Discussion

In this study we addressed the following two research questions:

RQ1. Do previous references exist for a multiple stakeholders' CSF model for construction projects in the context of developing economies like India?

RQ2. What are the existing gaps in the Indian scenario?

Based on the results in section 4, we find that there are very limited previous references of CSF models for project success from multiple stakeholders' perspectives in the Indian scenario. Further, the majority of studies have considered limited aspects of projects, that is, one project type, one project procurement method, or one CSF attribute and limited stakeholders.

Due to consideration of limited facets of construction projects, the CSFs identified by most of the authors showed significant variations. We argue that the wide variations in the CSFs identified in studies reviewed are on the account of (i) consideration of limited stakeholders thereby failing to find the CSFs common to all the stakeholders, (ii) measurement of responses from a limited region in India, (iii) consideration of limited CSF dimensions and (iv) non-evaluation of all four performance criteria (time, cost, quality, and client satisfaction).

The large number of CSFs presented in these studies may pose a problem in their implementation on the projects. Tabish and Jha (2012) observed that "*statisticians have suggested that the inclusion of irrelevant variables can result in poor model fit and that the number of variables should be restricted.*" However, a large number of CSFs identified in these studies is in contrast to observations by Tabish and Jha (2012).

The complex, dynamic and unpredictable nature of construction poses challenges in modeling the construction process. Over the last few decades, construction projects have become increasingly large and complex. They involve multiple teams across different locations or geographies. Construction projects are increasingly being executed through many newer and, more collaborative design-build procurement methods such as PPP, design-build-operate-transfer, turnkey, hybrid annuity models, and so on. Therefore, a fresh relook at the CSFs in this changed scenario is much needed.

This study has found limited previous references of CSF models for project success from multiple stakeholders' perspective in the Indian context which reveal an important

existing research gap, that is, the need for the development of a CSF model for construction project success taking into account (i) multiple project types (ii) multiple project procurement methods (iii) multiple stakeholders' perspective (iv) pan-India measurement and (v) evaluation on all performance criteria (time, cost, quality, and client satisfaction). Considering all these parameters for measuring project success will potentially allow all stakeholders to share the common CSFs thereby increasing the likelihood of achieving success on construction projects. This shall reduce the chances of projects' failures on the account of different interpretations of project success by different stakeholders. Therefore, the development of such model will help project practitioners to improve project success on construction projects. Further, will have potential use in studies relevant to problems encountered in construction projects in other developing countries with similar economic and political environments.

This study has summarized the current state of knowledge in the CSF area for developing economies like India. For researchers, this study provides an overview of related publications in Indian context thereby providing a direction for future research. This shall help in improving the rigor of the project management research.

The growing interest in the CSF area is a sign that this area is still a fertile ground for future research and can make meaningful theoretical and practical contributions to project management literature. The present study contributes to the project management literature by identifying an important research gap that further spurs conceptual and empirical research in this area.

6. Limitations and Future Research

The limitation of this study includes focusing only on construction projects located in India. Future research can focus on the studies done in other developing countries and perform a cross-country comparison of multiple stakeholders' CSF models for project success to find out the CSFs common to different geographies in developing economies. Further, this research may be limited by deficiencies in data collection and analysis, as a limited number of previous references were found for the review during the manual search of selected databases. Some of the relevant studies might have missed.

Author Contributions

Virender Kumar contributed to conceptualization, visualization, data search and review, draft preparation and analysis. Dr. Amrendra Pandey contributed to scoping review, search strategy, draft review, manuscript editing, and assisting in attending review comments. Dr. Rahul Singh contributed to methodology, direction, supervision, assistance in attending review comments and final review before submission

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Virender Kumar is a senior business manager and a certified project professional (IPMA-B) with complex project management certification from France. He has more than 28 years of professional work experience in engineering design and supervision, construction, and project management consulting works. His professional experience includes working at senior roles in world's leading firms like AECOM, EGIS, Yooshin Engineering Corporation etc. in India. He is a research scholar at Birla Institute of Management Technology. His research focuses on project management, project finance, project success, Entrepreneurship, artificial intelligence, critical success factors, and success criteria.

Dr. Amrendra Pandey is an Assistant Professor at the Kautilya School of Public Policy. He is an economist and researcher with expertise in text mining, machine learning, monetary economics, macroeconomic policy regulation, and econometrics. He has been Visiting Professor at the Indian Institute of Management, Lucknow, and a Course Coordinator for the PGDM program at Birla Institute of Management and Technology. Dr. Pandey has numerous research papers and articles to his credit.

Dr. Rahul Singh is a Professor of Strategy and Globalization, and Chair of the Strategy, Innovation, and Entrepreneurship Area at the Birla Institute of Management Technology. He is also a European Higher Education Expert by European Union and visiting professor at FH Joanneum University Austria and KEDGE Business School, France. His primary areas of research are Strategic Management, Globalization, Emerging Markets, and Sustainability. He has published in top-tier journals and has been the founding editor-in-chief of two international journals.