

CRITICAL ANALYSIS OF RESEARCH ON PROJECT SUCCESS IN CONSTRUCTION MANAGEMENT JOURNALS

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How to deliver project success has become a prominent discourse in both academic and practitioner debates on project management. However, despite years of research, how to improve the likelihood of successfully delivering a project and the criteria for assessing project success still remain unresolved. This study reviews conceptual and empirical research papers on project success relating to project success factors (PSFs) and project success criteria (PSC) published in construction management journals with a view to investigate the link between them and the relative importance of PSFs and PSC. The findings show that the link between many PSFs and PSC remains unexplored with the link only being articulated from a conceptual perspective with less empirical evidence in support of such link. Although relative importance of PSFs and PSC can be analysed from previous studies, there is no evidence that the most important PSFs by mean ranking make a difference to project success in practice or influence PSC across different projects and different stakeholders. These issues present fertile avenue for future research as many project stakeholders continue to grapple with which areas to concentrate limited resources to improve the chance of delivering a successful project.

Keywords: critical analysis, project success criteria, project success factor.

INTRODUCTION

Project success is a complex concept that changes over time and different for different project stakeholders (Griffith et al 1999). Successfully accomplishing a project requires the effective management of various constraints and therefore measuring project success is a complex task as success can be intangible and consensus hardly exists (Chan et al 2002). The success of a project and the influencing factors depend on the nature, the type of activities and the project environment. Therefore, factors affecting success change from project to project (Muller and Turner 2007). The construction industry is complex and dynamic in nature due to uncertainties surrounding rapidly changing technologies, budget constraints, involvement of geographically dispersed virtual teams, changing requirements and impacts of environmental, political and economic changes. Therefore, achieving project success is challenging and both academics and construction practitioners have grappled with the project success dilemma for decades partly because the concept of project success still remains ambiguously defined (Chan et al 2004). As a result, how to improve the likelihood of successfully delivering a project and the criteria for assessing project success remains unresolved. There is a plethora of studies relating to PSFs and PSC.

Muller and Turner (2007) define PSFs as the elements of a project that can be influenced to increase the likelihood of success and are the independent variables that make success more likely. PSFs are therefore distinct from PSC which are measures by which we can judge the successful outcome of a project. PSC are therefore dependent variables which measure project success. Most previous studies have tried to identify PSFs and PSC but only a few have analysed relative importance of PSFs and PSC or relationship between them. Some of these authors have identified such links conceptually through literature whereas some others have identified positive or negative relationships through qualitative, quantitative or combined empirical studies.

Systematic analysis of papers on a chosen topic published in academic journals helps researchers to explore what have been done by others, current status and future research trends (Tsai and Wen, 2005). On this basis, reviewing literature within the domain of project success enables researchers to gain clear understanding on the subject area and helps understanding unresolved issues. In particular, the link between PSFs and PSC and the relative importance of PSFs and PSC are still inadequately explored. An analysis of the body of knowledge in this regard is therefore worthwhile. Therefore, this paper aims to review conceptual and empirical research papers relating to PSFs and PSC in construction management journals with the hope of providing an account of the body of knowledge and identifying research gaps for future research. The rest of the paper is structured in five sections. The next section defines and differentiates PSFs and PSC. The method used in this review is described thereafter. The forth section presents the results of this critical review. Findings and their implications are then discussed subsequently outlining future research focus in the last section.

PROJECT SUCCESS FACTORS AND SUCCESS CRITERIA

The term Critical Success Factors (CSFs) is defined as factors predicting success and critical to the delivery of projects (Sanvido et al, 1992). These are a particular class of PSFs and first used in the context of project management by Rockart in 1982 (Sanvido et al 1992). PSFs in general and CSFs in particular depend on the nature and the type of projects; success factors in one project may become failure factors in another as different types of projects require different approaches to manage (Muller and Turner 2007). Different researchers have analysed PSFs in relation to different types of projects and contexts. For example, Li et al (2005) identified 18 potential CSFs for Public-private partnerships (PPP) or Private Finance Initiative (PFI) projects in the UK and investigated their relative importance. The other example was a qualitative and quantitative study of Songer and Molenaar (1997). They identified PSFs and relative importance of such factors for public sector design and build projects through a survey among 88 public sector design and build personnel and structured interviews of federal agency representatives in the United States.

Construction organisations judge success of projects differently depending on their own objectives (Chan et al 2002). Parfitt and Sanvido (1993) have shown that the definition of success often changes from project to project and the traditional definition is the degree to which project goals and expectations are met. PSC are the set of principles or standards by which judgement is made about the success of a project (Lim and Mohamed 1999). Project success is viewed from different individual perspectives and goals which can relate to a variety of elements including technical, financial, education, social and professional issues. PSC vary from project to project depending on project size, participants, scope of services and sophistication of owners.

What is viewed as a measure of success on one project may be perceived as an indication of project failure on another project (Muller and Turner, 2007). Similar to PSFs, various researchers have identified PSC for different project types or on different project contexts. For example, Griffith et al (1999) identified PSC and their relative importance for capital facility construction projects and developed a project success index. One of the other examples was a study of investigating the relative importance of PSC for projects on the grounds of Human Resource Management (HRM) by Belout (1998)

Although there are number of research on both PSFs and PSC for projects, the concept of the link between them is still remains unclear with no study systematically pulling this body of knowledge together. It emerges the requirement of relating PSFs to PSC identified in both theory and practice (Westerveld, 2003). There were few studies focusing to investigate relationship between PSFs and PSC. For example, Chan and Tam (2000) investigated the link between PSFs and PSC for building projects in Hong Kong context. The other example was investigating the relationship between PSFs and PSC on the aspect of quality performance in construction projects by Jha and Iyer (2006). That study systematically reviewed the conceptual and empirical link between PSFs and PSC as well as the relative importance of PSFs and PSC.

THE METHOD

This study adapted the critical literature review process as employed by Hong et al (2012) and Wiengarten et al (2013) and involves three stages. A comprehensive desktop search was conducted systematically at the first stage searching on the titles, abstracts and keyword fields using two key search engines; Engineering Village (COMPENDEX, GEOBASE and Referex) and ARCOM. Search keywords included: project success, project success factors, project success criteria, critical success factors and influence factors on project delivery, etc. Citations within the relevant papers were also helpful in identifying further relevant papers in a snowball fashion. Only journal papers were included in this study. The contents of selected papers were reviewed in the second stage and non-construction related papers were removed. Then, relative importance rankings of PSFs and PSC, and evidence their links both conceptually and empirically recorded systematically using such evidence as reported parameter estimates for correlation, linear regression and structural equation modelling, etc. Finally, statistical results were computed as shown on tables in the next section. Some papers showed relative importance of PSFs and PSC through direct rankings whereas some have shown relative importance based on rankings of mean values. In order to provide a common basis to compare rankings, all mean rankings were converted to a 5-point scale.

RESULTS AND ANALYSES

180 papers relating to PSFs and PSC were collected during the initial literature search and 173 papers out of this were from construction management journals. Only few construction management journal papers have focused on analysing relative importance of PSFs, PSC and their link. Details are given in Table 1.

Table 1: Details of papers used in the review

Purpose	Quantity	% of Construction Journal Papers
No of papers analysing the relative importance of PSFs	33	19.1
No of papers analysing the relative importance of PSC	09	5.2
No of papers analysing the link between PSFs and PSC	13	7.5
No of papers analysing relative importance of PSFs and PSC or relationship between them or any one of above	45	26.0

628 PSFs were identified initially from both empirical and conceptual papers, but it was possible to cluster them into 387 factors after removing redundant items. 345 of these factors were identified from the 33 studies in the first category in Table 1. In order to simplify the analysis, PSFs that occurred at least on five papers were selected. Altogether there were 21 such factors and their relative importance were analysed by calculating their average means. Table 2 shows these results. Similarly, this study could cluster PSC identified through 9 studies in the second category in Table 1 into 9 PSC after removing redundant items. Their relative importance is also analysed by extracting mean values from the 9 studies in the second category in Table 1. Details are shown in Table 3. The final analysis was the link between the 21 PSFs and the 9 PSC using empirical evidence extracted from the 13 papers in the third category in Table 1. Results are represented in Table 4.

Table2: Relative importance of project success factors

Project Success Factor	No of Studies	Average Mean	Rank
PSF1 : Effective Project Team Formation	20	3.35	15
PSF2 : Effective Communication	20	3.98	04
PSF3 : Top Management Support	17	3.93	05
PSF4 : Allocation of sufficient resources	16	3.63	09
PSF5 : Clearly defined goals and objectives	15	3.70	08
PSF6 : The level of Technology	12	3.40	14
PSF7 : Financial stability & adequate funding	12	3.76	07
PSF8 : Project Manager's competence	12	4.18	02
PSF9 : Project monitoring and feedback	12	3.47	12
PSF10: Motivation and incentives	09	2.95	20
PSF11: Established budget and monitoring	09	3.44	13
PSF12: Client's consultation and involvement	08	4.40	01
PSF13: Clear and detailed procurement process	08	3.61	10
PSF14: Project Risk Management	08	3.06	19
PSF15: Project Plans and schedules	07	3.30	16
PSF16: Frequent progress meetings	07	3.07	18
PSF17: Commitment to the project	07	4.12	03
PSF18: Well defined Technical specifications	06	3.82	06
PSF19: Political support	05	3.30	16
PSF20: Social support	05	2.80	21
PSF21: Effective quality assurance programme	05	3.54	11

Sources: Li et al 2005; Nguyen et al 2004; Yong and Mustaffa 2012; Aksorn and Hadikusumo 2008; Songer and Molenaar 1997; Chua et al 1999; Belassi and Tuckel 1996; Belout and Gauvreau 2004; Chen and Chen 2007; Black et al 2000; Cheng et al 2010; Pinto and Prescott 1988; Li et al 2007; Jha and Iyer 2006; Toor Ogunlana 2009; Cheng and Li 2002; Famakin and Ogunsemi 2012; Shokri-Ghasabeh and Kavousi-Chabok 2009; Phua 2004; Jha and Iyer 2007; Idrus et al 2011; Ahadzie et al 2008; Charlos and Khang 2009; Park 2009; Nitithamyong and Tan 2007; Yu and Kwan 2011; Yu et al

2006; Hwang and Lim 2013; Yang et al 2009; Kog and Loh 2012; Wang et al 2010; Tabish and Jha 2011

Table 3: Relative importance of project success criteria

Project Success Criteria	No of Studies	Average Mean	Rank
PSC1 :Budget/Finance/Cost performance	7	2.76	6
PSC2 :Technical performance	5	3.03	5
PSC3 :Schedule performance	4	2.36	8
PSC4 : Stakeholder satisfaction	3	3.76	1
PSC5 : Time performance	3	3.13	4
PSC6 : Customer satisfaction	3	2.39	7
PSC7 : Quality performance	3	3.20	3
PSC8 : User satisfaction	2	1.88	9
PSC9: Productivity / efficiency	2	3.59	2

Sources:

de Wit 1988; Griffith et al 1999; Belout 1998; Songer and Molenaar 1997; Chua et al 1999; Shokri-Ghasabeh and Kavousi-Chabok 2009; Bryde and Robinson 2005; Nitithamyong and Tan 2007; Collins and Baccarant 2004

DISCUSSION AND IMPLICATIONS

This paper set out to review conceptual and empirical research papers relating to PSFs and PSC in construction management journals with the hope of providing an account of the body of knowledge and identifying research gaps for future research.

The results in Table 1 show that many past studies have been conducted on project success, but significantly less attention has concentrated on investigating the critical issues of relative importance of PSFs (i.e. only 19% of studies) and PSC (i.e. only 5% of studies), and the link between them (i.e. only 8% of studies). PSFs and PSC are therefore much talked about and written about however their relative importance and relationships are hardly backed by empirical evidence as only 26% of studies in construction management journals actually involve empirical examination. The interest appear to be in identifying PSFs and PSC, rather than understanding which are important and in what ways or how PSFs actually influence PSC and to what degree. This focus is limiting in so far as it does not allow key decision makers to decide based on empirical evidence where limited resources should be directed to ensure that projects are delivered successfully and consistently.

The analysis also shows that the most important PSFs and PSC by mean ranking have not necessarily received greater research interest. For example, 'client's consultation and involvement' which is the number 1 ranked PSF, has been examined in only 8 studies whereas the 15th ranked factor, 'effective project team formation', has been examined in 20 studies. Similarly, the first ranked PSC, 'stakeholder satisfaction', attracted only 3 studies whereas the 6th rank factor has been examined in 7 studies. Consequently, evidence of utility and relative importance of these factors across different projects and contexts is limited. Further, there is also no evidence that the most important PSC by mean ranking is used to measure project success by different stakeholders. There are several possible explanations to the pattern of results in this analysis. Most past studies have analysed relative importance of PSFs or PSC conceptually or by concentrating on selected project types or contexts, for example, HRM, or different procurement arrangements. Therefore, computing mean ranking by averaging across studies without controlling for this may have distorted the results.

Table 4 reveals the relationship between PSFs and PSC and as shown, the link is still relatively unexplored as no evidence of studies exploring relationships between many PSFs and PSC were found. This suggests that not only there is less research focus on analysing the links between PSFs and PSC we are also unable to conclude on what influence some PSFs may have on some PSC. The relative lack of focus on exploring empirically the links between most PSFs and PSC in previous studies is curious and represents a huge lacuna in the construction management literature. The findings of this study, albeit limited, provide fertile avenues for future research to build on to move the debate on delivering projects successfully and more reliably as well consistently in the construction industry.

Table4: Link between project success factors and success criteria

	Project Success Criteria								
	√ Conceptual	+ Positive Relationship (Quantitative)				- Negative Relationship (Quantitative)			
	# Positive Relationship (Quantitative + Qualitative)				* Negative Relationship (Quantitative + Qualitative)				
	PSC1	PSC2	PSC3	PSC4	PSC5	PSC6	PSC7	PSC8	PSC9
PSF1	√#		+#	√		√+	√	++++ # -	
PSF2		+	+			+		+++	
PSF3	+		+					+++++ -	
PSF4	√#		#	√		√	√	#+++++	
PSF5									
PSF6						√++			
PSF7									
PSF8	+√		+			√		++++++ ++++++ + - ++++	
PSF9	+	+	++			+		++++	
PSF10									
PSF11									
PSF12	++	+	+ -	+	+	++	+++++		
PSF13	√				√	√		√	
PSF14	#		#		++	#			
PSF15									
PSF16							+++		
PSF17	+		-				++		
PSF18									
PSF19									
PSF20									
PSF21					++		+++		

Source:

de Wit 1988; Belout and Gauvreau 2004; Chan and Tam 2000; Jha and Iyer 2006; Jha and Iyer 2006; Westerveld 2003; Bryde and Robinson 2005; Ahadzic et al 2008; Jha and Misra 2007; Yang et al 2010; Ika et al 2012; Alzahrani and Emsley 2013; Doloi et al 2011

CONCLUSIONS

This paper has given an overview of project success research in construction management journals relating to specific areas of PSFs and PSC. The study provides an account of the status of studies on the relative importance of PSFs and PSC as well as their relationships. This literature review has shown that construction project success is a broad, contentious and a difficult subject; PSFs and PSC are two related areas of project success; construction organisations judge project success differently depending on their objectives; PSFs depend on the nature and the type of projects; a success factor in one project may become a failure factor in another project. Yet the review highlights the inadequacy of research on understating relative importance of PSFs and PSC, and the link between them remains relatively unexplored. Such links appears more clearly articulated from a conceptual perspective and less so from an empirical perspective as there is no empirical evidence that the most important PSFs by mean ranking make a difference to project success across different projects and contexts and different stakeholders. These issues highlight clear avenues of future research on this subject area.

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