

# **Critical success criteria and success factors in project management: A quest to enhance generic professional practice**

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## **ABSTRACT**

### **Purpose of this paper**

Research was undertaken to move beyond the generally accepted generic knowledge areas and processes in order to evaluate and rank the critical success criteria (the 'what' to be achieved) and the success factors (the 'how' to achieve) in built environment project management.

### **Problem investigated**

To establish if the success criteria and factors in built environment project management may be quantified, ranked and interpreted to improve project management practice.

### **Methodology**

This study is founded on an investigation by Prof. Sr. Wan Maimun Wan Abdullah and Prof. Sr. Dr. Ahmad Ramly in Malaysia.

The study is supported by a literature survey and the collection of primary data by way of questionnaires. The latter is the same as what was used in a Malaysian study. The questionnaires were completed by several groups of delegates taking part in continuing education project management programmes, as well as by members of the Association of Construction Project Managers in South Africa.

### **Findings**

The findings confirmed that the critical success criteria and factors in built environment project management can be measured, ranked and evaluated.

### **Value**

Will be added by future comparative analysis between South Africa and Malaysia, and possibly other countries.

## Conclusion

This research adds to project management knowledge in the built environment, beyond the cornerstone generic project management knowledge areas and processes.

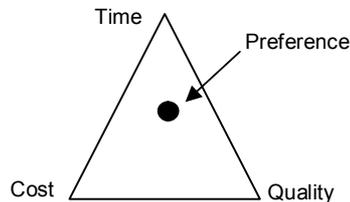
**Keywords:** Education, Learning, Quality, Career, Future.

## 1 INTRODUCTION AND METHODOLOGY

It is regarded prudent in the practice of project management to adhere to the tested and tried Project Management Body of Knowledge (PMBOK). The typical structure as per PMBOK, indicating the nine knowledge areas, namely: Project Integration Management, Project Scope Management, Project Time Management, Project Cost Management, Project Quality Management, Project Human Resource Management, Project Communications Management, Project Risk Management and Project Procurement Management, are in turn, divided into 44 processes (Project Management Institute, Inc., PMI 2004:11).

The PMBOK 'test' is commonly applied in the creation of literature that analyses the discipline of project management. As such it has become a yardstick against which typically handbooks and project management (PM) education are measured to ascertain if the content satisfies 'completeness' or 'holistic' views. In this regard, Knipe *et al.* (2002:1-474), a South African text book, strictly follows PMBOK, whilst Steyn (2008:1-434), also a South African text book, covers the same generic knowledge areas, albeit moving away from the specific PMBOK processes. The latter addresses a variety of sub-knowledge fields. Burke (2007:1-273), also covers the PMBOK areas, also moving directly into the application of knowledge in a self-construed fashion.

Burke (2007:35) notes: "...project management tools and techniques proliferated in the 1960s, were refined in the 1970s, so they were integrated in the 1980s into accepted practices. The integration of time, cost and quality was initially presented as a triangle of balanced requirements – where a change in one parameter could impact the others". See Figure 36.1.



**Figure 36.1** Time, Cost, Quality Triangle (Burke, 2007:35)

The research methodologies considered may be summarised in terms of Leedy and Ormrod (2005:133-245), page referenced below:

### 1.1 Qualitative Research Methodologies

- a) *Qualitative research:*  
*P133:* Firstly they focus on phenomena that occur in natural settings – that is, in the “real world”. Secondly, they involve studying those phenomena in all their complexity.
- b) *Historical research:*  
*P161:* It considers the currents and counter-currents of present and past events, with the hope of discerning patterns that tie them all together. At its core, historical research deals with the meaning of events.

### 1.2 Quantitative Research Methodologies

- a) *Descriptive research:*  
*P179:* This type of research involves either identifying the characteristics of an observed phenomenon or exploring possible correlations among two or more phenomena. In every case, descriptive research examines a situation as it is.
- b) *Experimental and Ex Post Facto designs:*  
*P217:* However, ultimately, we often do want to know what causes what; in other words, we want to identify cause-and-effect relationships. A researcher can most convincingly identify cause-and-effect relationships by using an experimental design. In such a design, the researcher considers many possible factors that might cause or influence a particular condition or phenomenon.

The research undertaken in this case study required that research methodologies described in 1.1(a) and (b) and 1.2(a) and (b) were utilised to satisfy the stated objectives.

This study is thus based on the sighting of relevant literature. Against this a position is taken to establish in practice what PM practitioners perceive the success criteria and success factors of PM to be. The traditional PMBOK is by no means challenged; it is complemented by the outcomes of the above criteria and factor survey results. The questionnaires utilised for this purpose follow a Malaysian study by Abdullah and Ramly (2009:1-12), as reported at the Pacific Association of Quantity Surveyors (PAQS) Congress, Edmonton, Canada. Permission

and co-operation was obtained from the above authors to conduct this comparative survey.

The questionnaires were completed by several groups of delegates taking part in continuing education PM programmes, as well as members of the Association of Construction Project Managers, in South Africa (ACPM). The programme delegates provided a 100% survey of 3 groups, 29 delegates. The ACPM response provided a return of 10 questionnaires, via e-mail, from 213 sent out, being a 4.69% response.

## 2 OBJECTIVE

The objective of this study is: To establish if the success criteria ('what' to be achieved) and success factors ('how' to achieve) in built environment projects may be quantified, ranked and interpreted to improve PM practice.

## 3 LITERATURE OVERVIEW

The literature reviewed in Section 1 above has been cited in order to highlight the typical 'learning' environment regarding PM education. Abdullah and Ramly (2009:1-12) expanded this platform further, by citing imperatives other than structured bodies of knowledge and the time, cost and quality triad, to determine success criteria and factors in practice. This may be 'what' has to be achieved and 'how' it is to be achieved in practice.

In this regard they inter alia cited the following literature abstracts:

"Shenhar *et al.* (2002) conclude that there is no conclusive evidence or consensus on the factors for project success through the numerous studies that have been carried out. However, the need to choose appropriate critical success factors at the start of the project is of utmost importance (Wateridge, 1995) as these critical success factors can be used as a guide to stakeholders' behaviour (Liu and Walker, 1998), and a key determinant of project success (Kanter and Walsh, 2004). In addition, Clarke (1999) argues that managing equally all the success factors at the same time would be impractical and unachievable. He advocates adopting the Pareto principle of "separating out the important few from the trivial many" by giving attention to and concentrating on the critical factors that would most likely ensure project success. Kanter and Walsh (2004) reiterate this point stating that the key to success is identifying the critical success factors and expend all the energy on these factors instead of the many lesser important factors.

Shenhar *et al.* (1997) note that project success is probably the most frequently discussed topic in the field of project management, yet it is the least agreed upon.

Wateridge (1995) notes that previous researches appear to differ on defining project success. Liu and Walker (1998) state that project success

is a commonly discussed topic but rarely agreed upon. In an effort to find a generic definition of project success, Baccarini (1999) concludes that literatures on project management by various authors do not present a consistent interpretation of the term project success. According to him, a standardised definition of project success, except in quite general terms, does not exist, nor is there an accepted methodology of measuring it. Jugdev and Muller (2005) observe that the difficulty in pinning down an exact definition of project success is akin to defining 'good art'; while others insist that to date project success still remains ambiguously defined (Liu and Walker, 1998, Chan *et al.*, 2002, Frigenti and Comninos, 2002, and Chan *et al.*, 2004). Prabhakar (2005) conclude that most researchers have agreed to disagree on what constitutes project success.

The concept of a project success can have a different meaning to different people. This led to disagreements, because of varying perceptions and perspectives, as to whether a project is successful or not (Liu and Walker, 1998, Skulmoski and Hartman, 1999, Gray, 2001, Chan *et al.*, 2002, Rad, 2003, and Iyer and Jha, 2005). Shenhar *et al.* (2002) agree that there is no conclusive evidence or consensus that has so far been achieved to determine whether the project is a success or failure. Due to the ambiguity, Baker *et al.* (1988) suggest the use of the term "perceived success of a project". Frigenti and Comninos (2002) point out that the question of whether a project is a success or failure, will depend on who asks the question.

Historically, studies on project success started in the mid-1900s and its attributes are being equated to Cost, Time and Quality. For over 50 years, project success has been linked to the achievement of the "Iron Triangle" of Cost, Time and Quality (Atkinson, 1999). The traditional view for project success is to deliver projects on time, in budget and to scope (Morris, 2001, Chan *et al.*, 2002, Bryde and Brown, 2004, Jha and Iyer, 2005), or to achieve the narrow view of the "so-called golden triangle" (Westerveld, 2002). De Wit (1988) and Belassi and Tukel (1996) note that early project management literature advocates that project success will be realised when the project achieves the three major objectives of completion on time, within budget and to quality or performance specifications. These authors agree that most of the early studies associate project success with time, cost and quality and if these are not met, the project is considered a failure.

In the 1960s and 1970s the outlook regarding the components of project success began to expand beyond the time, cost and quality attributes into the project management techniques. Avots (1969) reflects that companies that used project management techniques successfully may initially have had a competitive advantage over others. Rockart (1979) suggests utilising the critical success factors that include management techniques and process. Consequently, Liu (2005) concludes that studies during this period began to focus on organisational management success.

Then in the 1980s until late 1990s, further studies began to research deeper in defining project success, where it was concluded that apart from the iron triangle and project management techniques, other dimensions affect the success or failure of a project. Several authors began to link project success to stakeholders. According to De Wit (1988) other authors began to highlight other stakeholders, apart from the client and contractor, who may affect the outcome of the project. In considering project success, it should not only be restricted to the time, cost and quality objectives but also to that of the stakeholders of the project (Wateridge, 1998, Lim and Mohamed, 1999, Globerson and Zwikael, 2002, Kerzner, 2003). Pinto and Slevin (1989) developed a classic ten factors critical to project success, which include client consultation and client acceptance. *A Guide to the Project Management Body of Knowledge* (2004) states that "The project management team must identify the stakeholders, determine what their needs and expectations are, and then manage and influence those expectations to ensure a successful project." Van Aken (1996), as cited by Westerveld (2003), agrees and defines project success as "The satisfaction of all stakeholders".

At the time, De Wit (1988) seemed to have made a breakthrough from the standard researches and studies of listing the variables critical to project success. He was among the earliest authors to express three different lines of thought to project success: (1) to express the view that there are differences between project management success and project success (2) to construct a project success framework; and (3) to express the view that there are two different components to project success. Subsequently various authors formulated project success models or a framework that shows the components of project success.

The concept of two dimensions of project success, namely success criteria and success factors propagated by De Wit (1988), is echoed by subsequent researchers (Turner, 1994, Wateridge, 1995, Morris, 2000, Diallo and Thuillier, 2004). Wateridge (1995) expresses the view that for projects to be implemented successfully, the two dimensions of project success must be clearly defined, agreed and progressively reviewed by all parties.

Cooke-Davies (2002) and Collins and Baccharini (2004) define the success criteria as the benchmark to measure or judge success or failure and that success factors are the management inputs and systems that would lead to project success. Westerveld (2003) is simpler in his identification of the two components of project success, terming them as the 'What' and the 'How'. He postulates that for a project to be successful it has to identify and focus on: firstly the result areas that are the success criteria which he terms as the 'What' and secondly, the organisational areas that are the success factors, which he terms as the 'How'."

#### 4 COMPONENTS OF PROJECT SUCCESS

Abdullah and Ramly (2009:6), from their literature survey, identified the following component of criteria (see Table 1), also citing the following reference: "Various researchers attempt to group these success factors for easy acceptance. These authors claim that instead of analysing individual factors affecting the outcome of the project, these factors should be grouped as the combined effects which would eventually lead to either the success or failure of the project (Schultz *et al.*, 1987, Clarke, 1999, Westerveld, 2003, Nguyen *et al.*, 2004, and Bryde and Brown, 2004).

As such, this study categorised the success factors into four main groups based on the literature review of the principles of management, namely Human management, Process, Organisation and an additional category of Contractual and Technical based on the implementation of a construction project. Factor analysis was carried out using the principal component method of extraction and varimax rotation method. The four factor groups are extracted, with their respective factor items, factor loadings, percent of variance, cumulative variance and reliability coefficients. The first factor group, 'Human management' contains four factors, namely, team and leadership, project manager, communication and stakeholder management. The second factor group 'Process' comprises planning, scheduling, monitoring and control, quality management, and risk management. The third factor group 'Organisation' comprises organisation structure, financial resources, policy and strategy, learning organisation, and external environment. The fourth factor group 'Contract and Technical' comprises procurement and contract, contractor, technical and innovation. All factors were reasonably reliable as the Alpha's coefficients were above the threshold value of 0.70.

Based on the literature review, the various dimensions of project success, comprising the success criteria and success factors, are tabulated in Table 36.1.

**Table 36.1** Success Criteria and Success Factors

SUCCESS CRITERIA	SUCCESS FACTORS
1. Stakeholders' appreciation	1. Team & Leadership
2. Completes within Time	2. Project Manager
3. Meets the required Quality	3. Communication
4. Completes within Cost	4. Stakeholder management
	5. Planning
	6. Scheduling
	7. Monitoring and Control
	8. Quality Management
	9. Risk Management
	10. Organisation structure
	11. Financial Resources
	12. Policy & Strategy
	13. Learning from experience
	14. External Environment
	15. Procurement and

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	Contract
16.	Contractor
17.	Technical
18.	Innovation

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As explained above, the concept of project success comprises the two dimensions of 'What to achieve' and 'How to achieve'. Consequently, this study defines project success as achieving the success criteria of stakeholders' appreciation, completion on time, within cost and quality through the success factors of human management, process, contractual and technical, and organisation. This is shown diagrammatically in Figure 36.2.

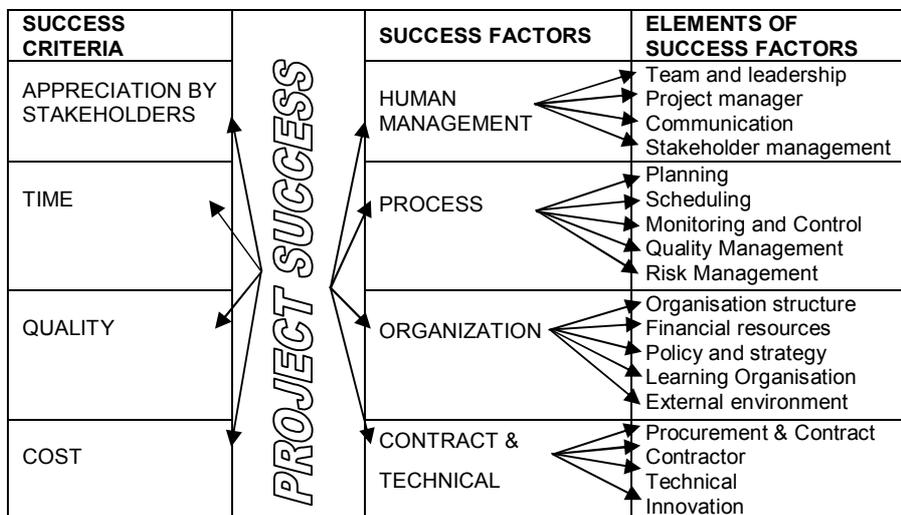


Figure 36.2 Project success

## 5 CRITERIA AND FACTORS OF PROJECT SUCCESS IN SOUTH AFRICA

This section reports the results emanating from the South African study. Of obvious importance would be further detailed comparisons to evaluate correlations between the South African (SA) and Malaysian (MS) findings. The tables which follow indicate the mean scores of importance on a scale of 1, which is the least, to 5, which is the most.

### 5.1 Criteria for project success

The four identified project success criteria, which are ranked according to the level of importance, are tabulated in Table 36.2. The success criteria for projects are quality, stakeholders' appreciation, time and cost. Within the

South African study, the respondents needed to identify the level of importance of the criteria when working towards project completion. The respondents then needed to specify the importance of certain issues within each of the identified criteria according to project completion. The South African response can then be compared with the Malaysian study to determine differences or similarities. Observe the results in Table 36.2.

**Table 36.2** Project success criteria ranking for project completion

Rank	Criteria	SA Study		MS Study	
		Average score	Level of importance	Mean of issues	Mean value
1	Quality	<b>4.32</b>	<b>4.33</b>	4.32	3.98
2	Stakeholders' appreciation	4.30	4.23	<b>4.37</b>	<b>4.18</b>
3	Time	4.26	4.31	4.22	3.88
4	Cost	4.20	4.28	4.12	3.65

From the results, it is clear that quality is the most important success criterion to the South African respondents, followed by stakeholders' appreciation, which is the most important to the Malaysian respondents, then followed by quality. Time and cost seem to be more important to the South Africa respondents (4.26 and 4.20), than to the Malaysian respondents (3.88 and 3.65).

The mean scores for all four project success criteria in the South African study are above 4 and are, therefore, considered as quite important criteria with respect to project completion, thereby having a definite role of importance towards the quest for successful project completion in the future.

## 5.2 Factors of project success

The importance of the success factors, namely, human management, process, contract and technical and organisation in completing a project within the four identified success criteria of quality, cost, time and stakeholders' appreciation was questioned, with the results following in Table 36.3. Again, a comparison is drawn between the results of the South African and Malaysian respondents.

**Table 36.3** Project success factors ranking

Rank	Success Factor	Ave. Score	SA Study	MS Study
1	Contractual and	3.67	<b>3.98</b>	3.36

Technical				
2	Human management	<b>4.20</b>	3.95	<b>4.44</b>
3	Process	3.86	3.95	3.77
4	Organisation	3.35	3.72	2.97

The above table suggests that contract and technical factors, according to South African respondents, are regarded as the most important project success factors within all the success criteria with a mean value of 3.98. The Malaysian respondents differed from this perception, placing contract and technical factors third amongst the four success factors. Human management and process followed in importance, both with 3.95. In the Malaysian study human management is the most important success factor with a mean value of 4.44. Both groups of respondents feel neutral regarding organisation as a project success factor with an average value of 3.35.

### 5.3 Success factor elements

Within each of the identified factors for project success, certain sub-factors exist which are components of the core factors, identified as project success elements. Table 36.4 portrays the most important elements for each factor ranked according to the South African responses.

**Table 36.4** Elements of success factors ranking

Rank	Factors/Elements	Ave. Score	SA	MS
<b>Human Management</b>				
1	Team and leadership	<b>4.62</b>	<b>4.55</b>	<b>4.68</b>
2	Communication	4.40	4.43	4.37
3	Project manager	4.38	4.33	4.43
4	Stakeholder management	4.11	4.05	4.16
<b>Process</b>				
1	Scheduling	4.19	<b>4.35</b>	4.02
2	Planning	4.22	4.33	4.10
3	Risk management	3.81	4.30	3.31
4	Control and monitoring	<b>4.25</b>	4.26	<b>4.24</b>
5	Quality management	3.99	4.23	3.75
<b>Organisation</b>				
1	Financial resources	4.13	<b>4.43</b>	3.83
2	Policy and strategy	4.11	4.40	3.82
3	Learning organisation	3.89	4.25	3.53
4	Organisation structure	<b>4.21</b>	4.14	<b>4.27</b>
5	External environment	3.43	3.68	3.17
<b>Contract and Technical</b>				
1	Technical	4.23	<b>4.43</b>	4.03

2	Procurement and contract	<b>4.30</b>	4.36	<b>4.24</b>
3	Contractor	4.22	4.26	4.18
4	Innovation	3.57	3.89	3.25

In Table 36.4 it is apparent that team and leadership are regarded as highly important elements within human management by both groups of respondents. Communication and the project manager are also fairly important showing similar results between the two responding groups and Stakeholder management is the least contributing element, remaining important nonetheless.

Regarding the process success factor, the South African respondents regard scheduling and then planning as the most important elements, above control and monitoring, which is the Malaysian respondents' most important ranked element under the success factor process. Risk management is perceived as more important to the South African respondents than to the Malaysian respondents, where it has the least importance of 3.31, which is an above-neutral feeling. It should also be noted that if the average of the five elements, according to the South Africans, is calculated, a mean value of 4.29 will be achieved which is higher than the Malaysian rank for their highest element 'control and monitoring' of 4.24. This means that the South African respondents perceive a greater level of importance over the 'process' success factor elements than the Malaysian respondents.

'Financial resources' is regarded as the most important element under the project success factor organisation according to the South African respondents, whereas the Malaysian respondents feel organisation structure, with 4.27, is the most important above financial resources, with 3.83. The external environment is perceived as less important than policy and strategy as well as learning organisation by both responding groups.

Within the contract and technical factor, technical elements are perceived as more important, with 4.43, by the South African respondents than procurement and contract elements, with 4.36, which is the Malaysian respondents' most important project success element.

## 6 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were drawn from the Malaysian study (Abdullah and Ramly, 2009:10): "This study suggests the definition of project success, as achieving the success criteria ("What to achieve") of stakeholder's appreciation, completion on time, within cost and quality through the success factors ("How to achieve") of human management, process, contract and technical, and organisation. Among the criteria studied, 'Stakeholders' appreciation' was found to be the most important among the respondents, which suggests that the respondents would normally give high priority to clients' needs. This is followed by the criteria

of 'Quality' and 'Time'. The least consideration was given to the criteria of 'Cost'. In fact when the correlation coefficient was calculated between project success and 'Cost', the value had low significance. This is in contrast to the relationships between project success and 'Stakeholders' appreciation', 'Quality', and 'Time'.

With regard to project success factors, the analysis ranked 'Human Management' as the critical success factor, followed by 'Process', 'Contract and Technical' and 'Organisation'. In addition, the analysis suggests 'Team and leadership' as the highest ranked element for human management; 'Control and monitoring' as the highest ranked element for process; 'Organisation structure' as the highest ranked element for organisation and 'Procurement and contract' as the highest ranked element for contract and technical."

The following conclusions may be drawn from the South African study: The definition of project success as defined in the Malaysian study may be defined as such in the South African study as well.

'Quality' is regarded as the most important success criterion, followed closely by 'Stakeholders' appreciation', which may indicate that a project may be deemed successful if the quality criteria are met and the clients' needs are satisfied. 'Contract and technical' was ranked above 'Human management' and 'Process' as the critical success factor with 'Organisation' as the least critical. Under 'Human management', 'Team and leadership' was the most vital element and under 'Process' the 'Scheduling' element was the most critical with 'Planning' being almost as critical. 'Financial resources' is seen as the most important 'Organisation' element.

The project success factors with all their identified elements may ensure that the project be completed according to the identified project success criteria.

It may be recommended to take the study further by comparing the findings of this study to the IPMA (International Project Management Association) Competence Baseline Model, better known as the ICB Model.

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