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PROJECT SUCCESS — A SURVEY

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Over the past decade there has been a growing literature on project success criteria, however there has been relatively little empirical data. This paper provides a significant contribution to the knowledge of project success by providing empirical data on the subject, by means of a survey of 150 Australian project managers on the subject of project success criteria. An analysis of the data found two distinct views: those that perceived project success solely in terms of the traditional project objectives of time, cost and quality; and those that considered success in terms of these objectives and the effectiveness of the project's product. The traditional project management success criteria of time, cost and quality still has a strong hold within the project management community in Australia. However, the most important success criterion was considered to be the product success criterion of meeting the owner's needs.

Keywords: Project success; product success; project management success.

1. Project Success

This paper is a continuation of the theoretical framework for project success as proposed by Baccarini (1999), which reviewed the literature on project success and used the Logical Framework Method to delineate a conceptual framework for project success.

It is important to differentiate between success *criteria* and success *factors*. Criteria are used to measure success whilst factors facilitate the achievement of

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success. Project success criteria consists of two components — product success and project management success:

Project Management Success — This focuses upon the project process and has three criteria:

- meeting time, cost and quality objectives;
- quality of the project management process; and
- satisfying project stakeholders' needs where they relate to the project management process (primarily project owner and project team).

Product Success — This deals with the effects of the project's final product and has three criteria:

- meeting the project owner's strategic organisational objectives (goal);
- satisfaction of users' needs (purpose);
- satisfaction of stakeholders' needs where they relate to the product (primarily customer/user).

Baccarini (1999) highlighted the following characteristics of project success:

Project Management Success is subordinate to Product Success

The project management success criteria of time, cost and quality are subordinate to the higher product success objectives of goal and purpose. Consequently, a project that is a project management failure is perceived as a project success because the higher-level objective of product success is met.

Project Management Success influences Product Success

Project management success can influence the achievement of product success. Good project management can contribute towards product success but is unlikely to be able to prevent product failure. For example, project management may help to identify the unfeasible nature of the project, and indicate that it should be abandoned or change. Poor project management in terms of cost and/or time overruns may result in the non-attainment of product success such as profitability or market share.

Project success is affected by time

Each success criterion has its own timescale for measurement. For product success, judgement can only be made once the project's product has been utilized and this can be many years after the project's completion. For project management success, judgement of whether a project has successfully met the objectives of time, cost and quality is a short-term measure made during or at completion of the project. Judgement of whether a project has been conducted in a quality manner and has successfully met the needs of the project team occurs throughout the project.

2. Research Methodology

The research adopted a combination of qualitative and quantitative research methodologies. A questionnaire was developed with a mixture of open-ended qualitative questions, and questions answered by means of numeric scales.

The population for the research was people involved in the project management process as represented by membership of the Australian Institute of Project Management (AIPM), which is the professional body representing project managers and project management users in Australia (AIPM, 1999). The 1999 AIPM Handbook lists 2126 members and their contact details.

The sample was AIPM members that had e-mail addresses, which was 1103. Using e-mail was considered an innovative method of questionnaire distribution that delivered a large sample with minimum use of resources. The e-mails were sent out over a period of approximately one week during September 1999. Taking into account 257 errors in sending e-mails, a maximum of 846 e-mails may have been successfully delivered to the intended respondents. A total of 150 completed questionnaires were ultimately returned for inclusion in the study. This represents a response rate of 18% (150 returned/846 maximum received).

The questionnaire was designed to be answered by respondents at their computer using Microsoft Word 97 and then returned via e-mail back to the researcher. (*Note: The questionnaire contained some questions on critical success factors — these are not analyzed herein but are the subject of a separate paper.*) The questionnaire was divided into three sections:

- demographic information on the respondents;
- project success — definition and criteria; and
- project success — factors (not part of this paper).

3. Analysis of Research

Tables 1 and 2 show the distribution of respondents by organization and industry.

The analysis makes reference to the demographics where a noteworthy trend can be discerned. For example, if a small sub-group (e.g. educators, numbering only 7) provides answers different from the mean responses, this is only reported if the difference is significant.

3.1. *What does the term "Project Success" mean to you? (Question 1)*

The main objective of this open-ended question was to determine whether the respondents focused on product success or project management success or both.

Table 1. Sample grouped by Organization.

Organization	No	%
Consultant	68	45.3
Contractor	25	16.7
Other	24	16.0
Client	19	12.7
Government	14	9.3
Total	**150**	**100**

Table 2. Sample grouped by Industry.

Industry	No	%
Construction	68	45.3
Information Technology	22	14.7
Resources	16	10.7
Telecommunications	10	6.7
Multiple (and Other)	9	6.0
Defence	7	4.7
Manufacturing	6	4.0
Education	7	4.7
"Most" or "All"	5	3.3
Total	**150**	**100**

The respondents generally identified success *criteria,* but a few success *factors* were also submitted. Some respondents noted project success was a complex subject suggesting that "success has many meanings" and that "project success depends on your perspective". This complexity and ambiguity is highlighted in the theory. The following categories of responses could be identified:

- *Project Management Success*
  67 (45%) of the respondents considered project success solely in terms of the achievement of the project management objectives of time, cost and quality. Typical responses in this category included: "delivery of a project that conforms to time, cost and quality parameters"; "a project is successful if it meets the three basic criteria of delivery in the required time frame, at the required quality and within the allocated budget".
- *Product Success*
  16 (11%) of respondents considered project success solely in terms of the performance of the end product. Typical responses in this category included: "Project completed to satisfaction of client, exceeding their expectations"; "project completed as desired by the customer".
- *Project Management Success and Product Success*
  63 (42%) respondents considered project success encompassed both project management success and product success. Typical responses in this category included: "satisfying the needs of the customer(s) within an acceptable timeframe and an acceptable cost";"while completion of the project within its technical, cost and schedule parameters is important, it is secondary to the value that the project adds to our company".
- *No Response* — 4 (2%).

3.1.1. *Question 1 — Analysis*

The results highlight two distinct groups; 45% who perceive project success in the traditional project management context of time, cost and quality; and 42% who

consider success encompasses consideration of both the project management process and the effectiveness of the project's product to satisfy the needs of the owner and users. The latter view supports the theoretical framework of project success. These responses have important project management implications. The fact that a significant number hold a narrow view of project success — limited to time, cost and quality — suggests that many projects will be managed towards an incomplete set of success objectives and could lead to owner dissatisfaction. There appears an urgent need to educate the project management community that there is more to project success than just meeting time, cost and quality objectives.

In Table 3, it is interesting to note that the three largest industry sub-samples — construction, IT and resources, representing 72% of the total sample — gave similar responses, suggesting that opinions do not fundamentally vary across different industries. However, telecommunications (70%) and defence (72%) industries (both small sub-samples) were above mean (mean 42%) for defining project success in terms of both project management and product, which suggests that these industries have a broader understanding of the modern needs of project management (although one must be aware of the small sample size of these two industries).

In Table 4, 56% of contractors defined project success solely in terms of project management success (sample mean 45%). This may be because contractors are often solely engaged in the process that produces the product and have little involvement in the use of the product. Again, this is a cause for concern because contractors should be constantly checking that their activities are supporting the purpose of the project's product, in particular the satisfaction of customer's needs. For example, if the customer's needs change during the project, then the contractor should not rigidly deliver the original specification but should proactively propose alterations to the original quality objectives to meet these changing needs.

3.2. *What criteria do you use to measure project success? (Question 2)*

Table 5 lists 23 project success criteria identified by the respondents. The list is ranked in terms of the number of times each criterion was identified by respondents. Whilst this method of ranking measures the number of responses, it cannot be considered to be a measure of importance of the criteria (the importance of criteria is investigated in Question 3).

3.2.1. *Question 2 — Analysis*

An elaboration of the criteria set out in Table 5 is provided:

Time — Some respondents noted that the measure of estimated time should include extensions and/or reductions due to variations in the original scope of the works, rather than measuring against the original baseline.

Table 3. Project Success, by Industry.

"Project Success" focuses on:	Sample $n = 150$	Constrn $n = 68$	IT $n = 22$	Resources $n = 16$	Telecom. $n = 10$	Defence $n = 7$	Manufact. $n = 6$	Multiple/ Other $n = 9$	Educn $n = 7$	"All" or "Most" $n = 5$
Project management success (%)	44.7	39.7	45.5	50.0	20.0	14.3	100.0	66.7	71.4	40.0
Product Success (%)	10.7	11.8	18.2	6.3	10.0	14.3	0.0	0.0	0.0	20.0
Project management Success and Product Success (%)	42.0	47.1	31.8	37.5	70.0	71.4	0.0	22.2	28.6	40.0
No response (%)	2.7	1.5	4.5	6.3	0.0	0.0	0.0	11.1	0.0	0.0
Total (%)	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4. Project Success, by Organization.

"Project Success" focuses on:	Sample $n = 150$	Consultant $n = 68$	Contractor $n = 25$	Other $n = 24$	Client $n = 19$	Gov. $n = 14$
Project management success (%)	44.7	41.2	56.0	45.8	42.1	42.9
Product Success (%)	10.7	11.8	4.0	12.5	5.3	21.4
Project management Success and Product Success (%)	42.0	45.6	40.0	37.5	47.4	28.4
No response (%)	2.7	1.5	0.0	4.2	5.3	7.1
Total (%)	**100**	**100**	**100**	**100**	**100**	**100**

Table 5. Project success criteria identified by respondents.

Project Success criteria	No. Identified	% Identified	Product Success	PM Success
Time	127	84.7		√
Cost	117	78.0		√
Quality/Meeting Specification	83	55.3		√
Client Satisfaction	61	40.7	√	
Cooperation	34	22.7		√
Organizational Goals	33	22.0	√	
Stakeholder Satisfaction	28	18.7	√	√
Project Management Process	27	18.0		√
Profit	23	15.3	√	√
High Standard of work	22	14.7		√
Achieving Scope	22	14.7		√
Team Members Satisfied	22	14.7		√
Cost Efficiency of Product	18	12.0	√	
Risks Managed	17	11.3		√
Change & Change Management	17	11.3		√
Repeat Work	14	9.3		√
Meeting Standards	11	7.3		√
Safety	11	7.3		√
Project Recognition	11	7.3	√	√
Satisfies Users Needs	9	6.0	√	
Community Acceptance	8	5.3	√	
Personal Development	8	5.3		√
Continuing Relationships	7	4.7		√
Environmental	5	3.3		√

Cost — Some respondents noted comparison should be made between agreed project costs, not necessarily the contracted price. One respondent suggested that a cost deviation of ±5% to ±10% is acceptable, but greater deviation than this would indicate failure.

Quality/Meeting Specification — Respondents noted that success could be measured by determining "was the project completed to specifications" or whether the project demonstrated "fitness for purpose".

Owner Satisfaction/Meeting Owner's Needs — Some respondents stated that owner satisfaction is ultimately all that matters and that all other success criteria are subordinate to this measure.

Cooperation — Cooperation includes smooth project team coordination, an efficient and harmonious project team, good relations with the owner, no unresolved disputes, and cooperation between stakeholders, authorities, vendors and purchasers.

Organisational Goals — Respondents observed that meeting the objectives of the project agreed at the inception of the project can be considered a measure of success, however the particular objectives of each project are unique.

Stakeholder Satisfaction — Some respondents did not specifically differentiate between the different types of stakeholders, but did identify "stakeholder satisfaction" as a success criterion. The importance of owner, customer, or owner satisfaction has previously been discussed; however there are other stakeholders in the project process and their satisfaction was also identified by respondents.

Project Management Process — Respondents observed good project management practices as a criterion of project success. Good project management included the owner being satisfied with the project management process, the project remained under control at all times, accurate reporting in a timely manner, efficient resource usage, monitoring and controlling, accuracy in forecasting, appropriate change control methodology, and ease of project delivery.

Profit — Respondents varied in their description of who should make a profit, ranging from "profit for all concerned" to "profit for us". The amount of profit expected ranged from "healthy" to "meeting expected margin". One respondent identified achieving the specific objectives of "business financial objectives set for the project (i.e. NPV, IRR, payback)".

Team Members Satisfied — Stakeholder satisfaction is considered to be a measure of project success. Project team members are a specific stakeholder group and their satisfaction was identified separately to stakeholders in general. Respondents indicated that team members should all derive a benefit and satisfaction from working on the project including job satisfaction, having their professional and personal aspirations met, be proud of the project, and have high morale.

High Standard of Work — Respondents stated that a high standard of workmanship is required. Work undertaken should be above industry standard based on national or international benchmarks. Some respondents noted that defects should be limited and minimum rework required compared with the overall project effort.

Achieving Scope — Achieving scope requirements was identified as a separate criterion to the issue of quality or technical performance. Respondents noted that achieving scope objective can be judged in terms of whether the original extent of the project was completed and all elements of the project delivered. This was considered to be a success criterion independent of meeting the specification requirements.

Cost Efficiency of Product — This criterion relates to the product of the project over its operational life. Success criteria were identified as costs and returns meeting planned outcomes, running costs meet expectations, maintenance costs minimised, value for money, life cycle cost expectations met, target revenue generated, acceptable margin over the project's life, and cost benefit realization.

Risks Managed — Risk management and the mitigation of risk was identified separate from the criterion "project management process". Respondents specifically looked for clear risk identification, allocation and management; risk mitigation; along with only identified risks occurring, i.e. no unpleasant surprises or crises occurring.

Change Management — Change orders and variations are a part project work, however, respondents noted the way the change process is managed, and the number of changes to the project, is a success criterion. Respondents believed good procedures to manage change reflected success whilst others determined success by the number of changes made. To some, "nil variations" and "(small) number of change requests" was the success criterion.

Repeat Work — Respondents felt that retaining and expanding their owner base was a success criterion. This could be achieved through either repeat business with existing owner or by referral or follow-on business as a result of a particular project.

Meeting Standards — Different from the criteria of "quality/meeting specification", in this instance "meeting standards" generally referred to meeting quality standards, being independently certified, and limiting non-conformances. Appropriate standards identified were QA standards, ISO (particularly ISO 9001) Standards, Australian Standards and "all relevant engineering and other standards".

Safety — Safety criteria included safety targets were met or exceeded, a safe project, no accidents, excellent safety record, no accidents or injuries during delivery, and achieving satisfactory safety.

Project Recognition — The criterion of project recognition refers to peers' opinion, positive publicity received about the project, awards won by the project (if any), board recognition, recognition by peers and competitors, good market or public opinion of the product and publicity is favourable.

Satisfies User's Needs — Respondents identified another specific stakeholder group, "product users". Project owners and users are often combined together as one group, although the two groups can be very different. Satisfying user's needs refers to concern for the end user or operator of the product.

Community Acceptance — A further stakeholder group is the community or public. Respondents identified community and public acceptance or approval, meeting the social objectives, standards and expectations of the community as success criteria.

Personal Development and Enjoyable Project Environment — As well as team members being satisfied with the outcome of the project, respondents also noted the need

for personal development. This involves the creation of a constructive, supportive and enjoyable project team environment where team members can grow personally and professionally.

Continuing Relationships — Somewhat similar in nature to the project success criteria "Repeat Work", some respondents believed that it was important to develop a good relationship throughout the duration of the project and then continue these relationships (or be able to continue a relationship) with project participants that are firm enough for the next project. It was hoped by respondents that stakeholders (major stakeholders were identified in particular) have the same respect and rapport at the completion of the project as they did at the beginning, that relationships would not only be upheld but also enhanced, and that all project participants would want to work together again.

Environmental — Respondents noted meeting environmental obligations, regulatory compliance, and targets as a success criterion.

Table 5 shows a clear pattern — respondents strongly identified project success in terms of the *project management success* criteria of time, cost and, to a lesser extent, quality. Overall, the 23 stated criteria show a predominance of project management success criteria. This highlights the traditional perspective of project success. The responses to Question 2 raise the same concerns as Question 1. There is an overemphasis on the narrower success criteria of time, cost and quality, and the *product success* criterion of owner satisfaction was only mentioned by 40% of the respondents.

3.3. *Typically in your projects, how important are the following criteria in judging project success? (Question 3)*

While Question 2 required respondents to only list success criteria, Question 3 asked respondents to rate the importance of eight common success criteria identified from the project management literature:

- project completed on time;
- project completed on budget;
- meeting the specification;
- efficiency of the project management effort;
- the project team members are satisfied;
- project satisfies owner's needs;
- users of the project are satisfied; and
- third parties affected by the project are satisfied.

The first five criteria relate to project management success and the latter three to product success. The responses were analyzed and the mean calculated — see Table 6.

Table 6. Relative importance of project success criteria.

Rank	Criteria	Mean	Band
1	The product satisfies owner's needs	1.18	A
2	Meeting specification	1.45	B
3	Project completed on budget	1.50	
4	The users of the project are satisfied	1.54	
5	Project completed on time	1.56	
6	Efficiency of the project management effort	2.18	C
7	The project team members are satisfied	2.41	
8	Third parties affected by the project are satisfied	2.52	

1 = very important; 2 = important; 3 = moderately important; 4 = of little importance; 5 = unimportant.

3.3.1. *Question 3 — Analysis*

Some respondents specifically noted that the importance placed on criteria is normally owner-driven and that their relative importance is likely to change from project to project. All eight criteria were considered to be important, as respondents identified all criteria on average to be greater than "moderately important". This suggests that the criteria in Table 6 reflect relevant success criteria. The mean importance of criteria falls into three distinct bands:

A — the product satisfies owner's needs;
B — meeting specification, project completed on budget, users of the project are satisfied, project completed on time; and
C — efficiency of the project management effort, project team members are satisfied, third parties affected by the project are satisfied.

The responses show strong support for the importance of the product satisfying owner's needs. These findings concur with the theory that identified project management success as subordinate to product success. The implication is that project management processes, particularly scope and quality management, must be rigorously and comprehensively applied so that the owner's needs are articulated, adhered to and met. There is a tendency in projects to rush through the planning process in an eagerness to progress toward the implementation phase of a project. This must not be to the detriment of properly understanding the owner's needs and converting them into an appropriate specification.

Table 7 shows the ranking of process success criteria to be similar for different industries. For example, all industries ranked the top success criterion as "the product satisfies owner's needs", followed by the project management success criteria of meeting specification, completion on budget, and completion on time; and all industries had the same three lowest criteria as efficiency of the project management effort, project team members are satisfied; and third parties affected by the project are satisfied. One clear difference was the resources industry, which ranked

Table 7. Relative importance of project success criteria, by Industry.

Criteria	Sample $n = 150$	Constn $n = 68$	IT $n = 22$	Resources $n = 16$	Telecom. $n = 10$	Defence $n = 7$	Manufact. $n = 6$	Multiple/ Other $n = 9$	Educn $n = 7$	"All" or "Most" $n = 5$
The product satisfies owner's needs	1.18	1.16	1.19	1.19	1.10	1.29	1.33	1.11	1.20	1.20
Meeting specification	1.45	1.49	1.38	1.31	1.50	1.43	1.33	1.44	1.60	1.40
Project completed on budget	1.50	1.40	1.71	1.56	1.90	1.43	1.50	1.44	1.40	1.80
The users of the project are satisfied	1.54	1.57	1.52	1.56	1.40	1.57	1.17	1.67	1.20	1.80
Project completed on time	1.56	1.54	1.67	1.31	1.60	2.00	1.67	1.44	1.43	1.80
Efficiency of the project management effort	2.18	2.13	2.33	2.31	2.10	2.71	2.17	1.89	2.00	2.00
The project team members are satisfied	2.41	2.48	2.29	2.5	2.10	2.86	2.17	2.11	2.20	2.60
Third parties affected by the project are satisfied	2.52	2.49	2.67	2.31	2.10	2.86	2.83	2.67	2.00	3.00

Table 8. Relative importance of project success criteria, by Organization.

Criteria	Sample $n = 150$	Consultant $n = 68$	Contractor $n = 25$	Other $n = 24$	Client $n = 19$	Gov. $n = 14$
The product satisfies owner's needs	1.18	1.15	1.16	1.08	1.37	1.21
Meeting specification	1.45	1.45	1.36	1.50	1.42	1.50
Project completed on budget	1.50	1.52	1.24	1.58	1.74	1.57
The users of the project are satisfied	1.54	1.50	1.68	1.29	1.79	1.57
Project completed on time	1.56	1.56	1.36	1.54	1.63	1.86
Efficiency of the project management effort	2.18	2.18	2.04	2.04	2.26	2.57
The project team members are satisfied	2.41	2.35	2.40	2.08	2.63	2.93
Third parties affected by the project are satisfied	2.52	2.48	2.80	2.25	2.53	2.64

"project completed on time" higher then other industries. This may be because this industry is strongly influenced by market conditions for their product, consequently there is a time imperative to meet market demand or a window of opportunity.

Table 8 shows the ranking of project success criteria is similar for different types of organization. However, contractors identified higher than average importance for "project completed on time", "project completed on budget" and "efficiency of the project management effort". This emphasis on project management success criteria may reflect the typical procurement arrangement whereby contractors are engaged to undertake the process that produces the product and then depart the project. Consequently, contractors have little involvement in the use of the product. As analyzed in Question 1, this is an undesirable focus and contractors need to be aware of the critical importance of constantly linking their activities to the product's purpose in terms of meeting users' needs.

Contractors ranked "project completed on time" higher then other industries. This may be because they are often contractually bound to deliver products by a stipulated date, and therefore the imperative to complete on time. Contractors also ranked "project completed to budget" higher than other organizations, perhaps because the need to meet a competitively set budget directly determines their profit from a project.

3.4. *If the time, cost and quality objectives of a project are achieved, how will this influence the success of the product during its operational life? (Question 4)*

This question sought to identify if respondents felt there was a link between the two separate concepts of project management success and product success. The results of this question are shown in Table 9.

Table 9. Relationship, project management success and product success.

When PM successful, Product is:	*n*	%
Always successful	8	5.4
Generally successful	93	62.4
Sometimes successful	20	13.4
Rarely successful	0	0.0
No correlation	28	18.8
Total	**149**	**100**

3.4.1. *Question 4 — Analysis*

Most respondents (68%) believed there was "always" or "generally" a positive relationship between success of the project management effort and product success, suggesting strong support for the theory that project management success and product success are related. The implication is that the project management team must adopt a holistic approach to the project and constantly review whether the project management effort is in alignment with the project's purpose.

The second most frequent response was "no correlation" (18%); whilst 13% identified that the product would "sometimes" be successful if the project management objectives were met. These results, whilst seemingly contradictory, are consistent with the theory that also suggests project management success does not ensure product success. One might have expected a lower percentage to consider that there was "no correlation" because in today's globally competitive environment, the need to complete projects quickly and economically (i.e. project management success) is critically important to contributing towards a product's success.

In Tables 10 and 11, all industries and organizations have the same top ranking — when project management is successful, the product is "generally successful". Hence, this factor does not vary greatly between industries and may be proposed as a general principle. One interesting variation is that 86% of government organizations stated that the relationship was "generally successful", which is noticeably higher than the sample mean (62%). This may be because these respondents are likely to be project owners and therefore are involved in both the project management process and the consequent use of the project's product. They would have experienced the nexus between process and product, and observed a strong link between the success of the project management process and the consequent success of the project's product.

3.5. *When should the achievement of time, cost and quality objectives of project success be measured? (Question 5)*

Question 5 sought to obtain respondents' understanding of when the measurement of *project management success* should be undertaken — see Table 12.

Table 10. Relationship, project management success and product success, by Industry.

When Project Management is successful the PRODUCT is:	Sample $n = 150$	Constn $n = 68$	IT $n = 22$	Resources $n = 16$	Telecom. $n = 10$	Defence $n = 7$	Manufact. $n = 6$	Multiple/ Other $n = 9$	Educn $n = 7$	"All" or "Most" $n = 5$
Generally successful (%)	62.4	64.2	59.1	81.3	60.0	42.9	83.3	66.7	40.0	28.6
No Correlation (%)	18.8	20.9	13.6	0.0	20.0	28.6	16.7	11.1	40.0	42.9
Sometimes successful (%)	13.4	11.9	18.2	12.5	10.0	14.3	0.0	22.2	20.0	14.3
Always successful (%)	5.4	3.0	9.1	6.3	10.0	14.3	0.0	0.0	0.0	14.3
Rarely successful (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total (%)	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 11. Relationship between project management success and product success, by Organization.

When Project Management is successful the Product is:	Sample $n = 150$	Consultant $n = 68$	Contractor $n = 25$	Other $n = 24$	Client $n = 19$	Gov. $n = 14$
Generally successful (%)	62.4	53.7	72.0	58.3	68.4	85.7
No correlation (%)	18.8	26.9	8.0	16.7	15.8	7.1
Sometimes successful (%)	13.4	17.9	12.0	4.2	15.8	7.1
Always successful (%)	5.4	1.5	8.0	20.8	0.0	0.0
Rarely successful (%)	0.0	0.0	0.0	0.0	0.0	0.0
Total (%)	**100**	**100**	**100**	**100**	**100**	**100**

Table 12. When to measure project management success.

When should the achievement of time, cost and quality objectives of project success be measured?	n	%
Anytime in the project lifecycle	96	65.8
Project completion	26	17.6
After the product has been in use	24	16.4
Total	**146**	**100**

3.5.1. *Question 5 — Analysis*

The majority of respondents (65%) observed that the measurement of *project management success* should occur anytime in the project life cycle. These results align with the theory that suggests that project management success is a short-term measure made during or at the completion of the project. The implication is that an appropriate project management process for measuring and reporting the status of the project's performance in terms of cost, time and quality is required, such as the application of earned value. Without these processes, it is very difficult to ensure that project management success is being achieved or to take corrective actions to ensure it is achieved.

Tables 13 and 14 shows that all industries and organizations held the same majority view that the measurement of *project management success* should occur anytime in the project life cycle. This indicates a strong general principle for when project management success should be measured.

3.6. *When should the achievement of success of the product be measured? (Question 6)*

Question 6 sought to obtain respondents' understanding of the time scales for measuring product success — see Table 15.

Table 13. When to measure project management success, by Industry.

When should the achievement of time, cost and quality objectives of project success be measured?	Sample $n = 150$	Construction $n = 68$	IT $n = 22$	Resources $n = 16$	Telecomm. $n = 10$	Defence $n = 7$	Manufact. $n = 6$	Multiple/ Other $n = 9$	Educn $n = 7$	"All" or "Most" $n = 5$
Anytime (%)	65.8	62.7	68.2	50.0	88.9	85.7	50.0	77.8	71.4	66.7
Project completion (%)	17.8	16.4	22.7	25.0	11.1	0.0	16.7	11.1	26.8	33.3
After the product has been in use (%)	16.4	20.9	9.1	25.0	0.0	14.3	33.3	11.1	0.0	0.0
Total (%)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**98.2**	**100.0**

Table 14. When to measure project management success, by Organization.

When should the achievement of time, cost and quality objectives of project success be measured?	Sample $n = 150$	Consultant $n = 68$	Contractor $n = 25$	Other $n = 24$	Client $n = 19$	Gov. $n = 14$
Anytime (%)	65.8	63.1	80.0	60.9	73.6	50.0
Project completion (%)	17.8	21.5	0.0	30.4	21.1	7.1
After the product has been in use (%)	16.4	15.4	20.0	8.7	5.3	42.9
Total (%)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 15. When to measure product success.

When should the achievement of success of the product be measured?	n	%
Anytime in the project lifecycle	31	21.2
Project completion	14	9.5
After the product has been in use	103	69.6
Total	**148**	**100**

3.6.1. *Question 6 — Analysis*

The majority of respondents (69%) responded that the measurement of product success should be made after the project's product has been in use. This aligns with the theory. The implication is that review processes must be set up and implemented to determine whether product success is or has been achieved sometime after the project itself has been completed. It is easy to move onto the next project and quickly forget to undertake a review of product success. The importance of recording lesson learnt for continuous improvement is well recognized, so a formal review of product success is a key obligation of the project management team.

Tables 16 and 17 shows that all industries (except Defence, which had a small sample) and organizations held a majority view that the measurement of product success should be made after the project's product has been in use. This suggests that a general principle may be proposed.

4. Conclusion

The analysis of the survey provided insights into the way 150 members of the AIPM understand project success. The major contribution of this paper is to present empirical data on the subject of project success, which is presently lacking in the literature.

Table 16. When to measure product success, by Industry.

When should the achievement of success of the product be measured?	Sample $n = 150$	Construction $n = 68$	IT $n = 22$	Resources $n = 16$	Telecomm. $n = 10$	Defence $n = 7$	Manufact. $n = 6$	Multiple/ Other $n = 9$	Education $n = 7$	"All" or "Most" $n = 5$
Anytime (%)	20.9	17.9	13.6	25.0	40.0	42.9	16.7	22.2	14.3	25.0
Project completion (%)	9.5	10.4	9.1	6.3	0.0	14.2	0.0	22.2	14.3	0.0
After the product has been in use (%)	69.6	71.7	77.3	68.7	60.0	42.9	83.3	55.6	71.4	75.0
Total (%)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 17. When to measure product success, by Organization.

When should the achievement of success of the product be measured?	Sample $n = 150$	Consultant $n = 68$	Contractor $n = 25$	Other $n = 24$	Client $n = 19$	Gov. $n = 14$
Anytime (%)	20.9	18.2	20.0	20.8	36.8	14.3
Project completion (%)	9.5	9.1	12.0	16.7	0.0	7.1
After the product has been in use (%)	69.6	72.7	68.0	62.5	63.2	78.6
Total (%)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

The key contributions made by the research are:

- There is a preponderance of success criteria defined in the narrow terms of time, cost and quality. This suggests that many projects will be managed towards an incomplete set of success objectives. There appears an urgent need to educate the project management community that there is more to project success than just meeting time, cost and quality objectives.
- It is significant that the most important success criterion was the product criterion of meeting the owner's needs. This shows that the project management community is aware of the need to ultimately satisfy the customer. The significant implication is that the project management team must extract from the customer a clear and complete articulation of their requirements through rigorous scope and quality management processes.
- The research shows evidence of a positive relationship between project management success and product success. This infers that the project management team must constantly monitor their project management performance (i.e. time, cost and quality objectives) and reflect how this performance affects the achievement of product success.

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