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The Influence of Project Managers on Project Success Criteria and Project Success by Type of Project

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The importance attached by project managers to project success criteria and the associated rates of project success were assessed for different types of projects, industries and traits of project managers. 959 responses to a web-based survey showed that importance attached to project success criteria and project success rates differ by industry, project complexity and the age and nationality of the project manager. However, the underlying criteria are different and are explained herein. Modeling the relationship between importance assigned to success criteria and reported project success against these criteria showed a link between importance and actual achievements. Managerial and theoretical implications are discussed.

Keywords: Project success, Success criteria, Project types, Project management, Project manager

Introduction

There is growing recognition that different types of projects require different approaches to their management, requiring management procedures tailored to the needs of the project, (Crawford *et al.*, 2005), and project managers selected with appropriate competencies, (Turner and Müller, 2006; Müller and Turner, 2007). Increasing globalization of projects and project management adds to this diverse mix, creating intercultural challenges for project managers, (Müller and Turner, 2004). Professional associations are beginning to recognize this diversification of project management. The Project Management Institute (PMI®) has developed industry specific versions to its body of knowledge, (PMI, 2006), and industry specific versions of its project management maturity assessment tool, (PMI, 2003). It has also translated its body of knowledge into several languages, which recognizes the different cultural traditions inherent in the different ways things are expressed in different languages. The International Project Management Association has gone one step further and produced national specific versions of its body of competence, (IPMA, 2006).

However, while recognizing the need for different management approaches, the literature by and large does not question whether different success criteria are relevant to different types of project, and whether they will perform differently against these different success criteria. Wateridge (1995) suggests that in choosing a project management methodology, the project sponsor or project manager should identify the relevant success criteria, from them determine appropriate success factors to increase the chance of achieving those success criteria, and then select a project management methodology that delivers those success factors. Crawford *et al.* (2005) have developed a categorization system for projects which

they offer as helping to identify appropriate methodologies for projects, but they offer no guidance on whether different success criteria will be relevant for different types of projects, and hence different success factors, and whether different projects will perform differently against those different success criteria. In addition, project sponsors, when selecting project managers to manage their projects, want to know that the manager will focus on the relevant success criteria of the project, and will be skilled in implementing the appropriate success factors. Thus the sponsor wants a project manager not just with appropriate competencies, (Turner and Müller, 2006; Müller and Turner, 2007), but also with appropriate focus for their work.

Thus to complement other research to categorize projects to help choose appropriate methodologies, (Crawford *et al*., 2005), and to select project managers with appropriate competencies for the type of project, (Turner and Müller, 2006; Müller and Turner, 2007), the authors conducted this research to determine whether:

- different success criteria are relevant for different types of projects or for projects from different industries
- different types of project perform differently against the different success criteria
- project managers focus on different success criteria depending on their traits
- project managers perform differently against the different success criteria depending on their traits
- project success varies according to the importance attached to the success criteria

The answers to these questions will help project sponsors to choose project management methodologies and project managers relevant to their types of project.

In this paper, we report the results of this research. After a review of the literature about the relationship between project success criteria and project type, we present a research model to test the questions above. We explore differences by type of project, industry, or demographic profile of the project manager. We find there are few differences in relevant success criteria for projects or the performance of projects against success criteria, and few differences in the focus of project managers or their performance against the criteria. That means project sponsors can use the bodies of knowledge and maturity models, (PMI, 2003; PMI, 2004; IPMA, 2006), with confidence that they are relevant to their projects. They can also select project managers based on their competence and diversity. However, there were a few significant differences, of which sponsors need to be aware, which we report in this paper.

Project Success and Project Type

The project management literature agrees that there are two components of project success, (Jugdev and Müller, 2005; Morris and Hough, 1987; Wateridge, 1998; Turner, 1999)

- project success factors, elements of a project that can be influenced to increase the likelihood of success; these are independent variables that make success more likely
- project success criteria, the measures by which we judge the successful outcome of a project; these are dependent variables which measure project success.

Project success criteria vary from project to project. What is acceptable in one project without impact on perceived success (for instance a five days delay in an IT project to achieve better functionality) is abject failure in another project (the same delay in building an Olympic village). What we ask in this paper is whether such differences are merely dependent on the external context, such as the parent organization's strategic objectives for the project, or whether there is something inherent in different types of project, or projects from different industries such that there will be a common pattern for a given type of project.

People also judge the success of projects differently depending on their personal objectives, and it can be the case that one person judges a given project a success, while another judges it a failure. If two managers want to use a project to increase their power base at the expense of the other, only one of them can ''win''. What we ask in this paper is whether a person's individual preferences can be predicted from their demographic profile. If that were the case for a project manager it would influence his or her choices about the use of an appropriate project management methodology for the project he or she is managing.

Turner and Müller (2006) have also shown that a project managers' success at managing his or her project is dependent on their competence, particularly their leadership style comprising emotional intelligence, management focus and intellect. His or her leadership style can be measured using psychometric tests, but we can also ask whether such differences are predictable from easily measured demographic factors.

Very little has been written about these questions. Collins and Baccarini (2004) assessed success criteria across and within industries. They found little difference between industries. However they showed that in the construction industry contractors (suppliers) see minimizing cost and duration as more important than their clients, whereas clients emphasize satisfaction of stakeholders more than contractors. Bryde and Robinson (2005) also showed that in the construction industry clients and contractors place

different emphasis on success criteria. Chan *et al*. (2002) developed a framework of success criteria for design/build projects in the construction industry. They suggest managers should differentiate between objective criteria and subjective criteria and assess success at the pre-construction, construction, and post construction stages using an increasing number of subjective criteria.

Recent research has also looked into differences by nationality. Wang and Huang (2006) showed success is differently determined in China than in the mainstream project management literature. Contrary to the emphasis on time, cost, and quality criteria, Chinese stakeholders and project managers emphasize the importance of relationships (*guanxi*) as the main criterion for overall success in construction projects. Research focusing on the IT industry in India identified scope, and specifically functionality within scope, as the foremost success criteria (Agarwal and Rathod, 2006).

Westerveld (2003) demonstrated a link between success criteria, critical success factors and project types. He identified six groups of success criteria, namely project results (time, cost, quality), and appreciation of the client, project personnel, users, contracting partners and stakeholders. Success factors were grouped into leadership & team, policy & strategy, stakeholder management, resources, and contracting. Using five project types he illustrated different mixes of success criteria and factors are required for different types of project. Other research, such as the CHAOS reports of The Standish Group (1998), or the industry comparison by Ibbs and Kwak (1997) showed also that project success differs by industry.

Research Model

Based on this review, we formulated the following hypotheses to operationalize our research questions:

Hypothesis 1

H1a: The importance attached to the success criteria by the project manager varies by type of project
H1b: The performance of the project against the success criteria (claimed by the project manager) varies by type of project

Hypothesis

H2a: The importance attached to the success criteria by the project manager varies by industry sector
H2b: The performance of the project against the success criteria (claimed by the project manager) varies by the industry sector

Hypothesis 3

H3a: The importance attached to the success criteria by the project manager varies by the traits of the project manager
H3b: The performance of the project against the success criteria (claimed by the project manager) varies by the traits of the project manager

We also investigated the relationship between the success criteria considered important and the reported success against those criteria. So we also investigated a fourth hypothesis:

Hypothesis 4

H4: There is positive relationship between perceived importance of success criteria and perceived success in a project.

The unit of analysis is the project manager. The aim is to identify the factors which influence perceptions on importance of various success criteria in different types of projects, and their relationship with success. The associated research model is shown in (Figure 1).

Independent Variables

The independent variables are project type, industry sector and traits of the project manager.

Project type
Research by Crawford *et al*. (2005) identified an extensive list of features used for categorizing projects, and realized that the potential list was without end. So they grouped the features into fourteen groups of attributes, and these covered all the categorization systems they encountered in their literature

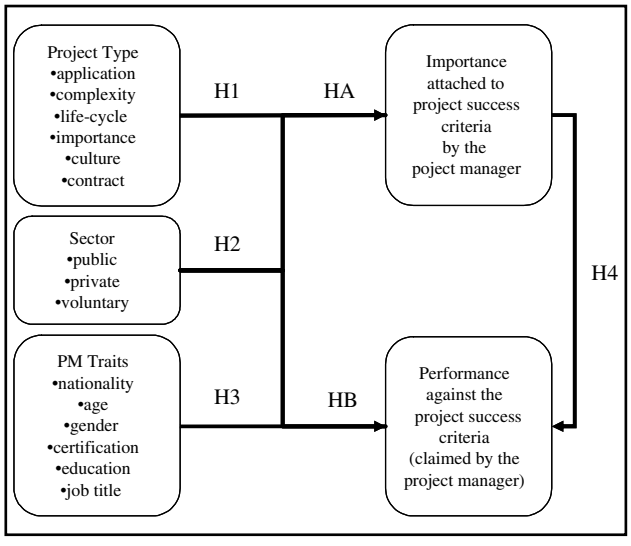

Figure 1 Research Model

review and field work. Within each group there was potential for a limitless number of ways of categorizing projects, dependent on the needs of the user organization. However, they suggested common models of categorization systems used. In the present study we have focused on six of the attribute areas developed by Crawford *et al*. (2005), because we believed they can be treated as independent, and within each attribute area we selected one set of project types, Table 1. This model was validated in our previous study, (Turner and Müller, 2006; Müller and Turner, 2007).

Industry sector
For industry sector we were only able to look at public, private and not-for-profit sectors.

Traits of the project manager
Traits of the project managers considered included their:

- gender
- nationality
- age
- level of education
- project management certification
- job title

This list is not comprehensive. If the hypotheses are supported using this list, they will be supported. However, if they are not supported that does not mean that there are not other demographic factors for which they will be supported. However, this is a common list that might be used in selecting a project manager for a given project. (We recognize that in many countries using any of the first three criteria for selecting project managers may be contrary to equal opportunities legislation, and that in many organizations it would be contrary to internal diversity initiatives. That fact that we found no difference in the preferences of project managers or their performance depending on their gender was a pleasing result. Differences by nationality can be explained by different cultural preferences, and confirms the previous result that project managers are more successful in their home country, Turner and Müller, 2006. There were differences by age, but these reflected differences by years of experience, and so that measure of competence would be used to select project managers, not specifically their age. See (Lee-Kelley and Leong, Loong, 2003; Dolfi and Andrews, 2006).

Table 1 Project Categorizations Used

Project attributes	Project types
Application area	engineering and construction, ICT, or organizational change
Complexity	high, medium, or low
Strategic importance	mandatory, repositioning, renewal
Contract type	fixed price, remeasurement, or alliance
Life-cycle stage	Feasibility, Design, Execution, Close-out, Commissioning
Culture	Project Manager in single culture, host culture, or expatriate

Dependent Variables

The dependent variables are the importance attached to different project success criteria by the project manager, and the performance of the project against the various success criteria claimed by the project manager. The ten measures of success we used were the ten used in the previous study, (Turner and Müller, 2006; Müller and Turner, 2007), shown in Table 2. These measures were validated by the previous study. A more detailed description of their derivation is given in Turner and Müller (2005). To calculate the measure of performance of the project we took the mean of all performance measures listed in Table 2.

Methodology

To gather the data we conducted a worldwide web-based survey, consisting of five sections:

1. We asked respondents to categorize their project from the types in Table 1. They were asked to select one or more attribute area as relevant to their project, and then choose one project type per attribute chosen.
2. We asked the respondents to rate the importance to their last project of the seven success criteria

Table 2 Project Success Criteria and Those Used for Rating Importance

Code	Project Success Criteria	Criteria Rated for Importance
US	End-user satisfaction	End-user satisfaction
SS	Supplier satisfaction	Supplier satisfaction
TS	Team satisfaction	Team satisfaction
OS	Other stakeholders' satisfaction	Other stakeholders' satisfaction
TQ	Performance in terms of time, cost, quality	
UR	Meeting user requirements	
PU	Project achieves its purpose	
CS	Customer satisfaction	Customer satisfaction
RB	Reoccurring business	Reoccurring business
SD	Self-defined criteria	Self-defined criteria

in the right hand column of Table 2 , using a five point Likert scale from 'not at all important' to 'very important'.
3. We asked the respondents to rate the success of their last project against each of the ten success criteria on a five point Likert scale from 'disagree' to 'agree'
4. We asked whether the respondent had project management certification
5. We asked further questions about demographic data including:
   - ❖ gender
   - ❖ nationality
   - ❖ age
   - ❖ education level
   - ❖ job title
   - ❖ industry sector

The questionnaire was piloted with 21 respondents over a period of 2 weeks, resulting in a minor change in wording. Then the survey weblink was distributed to the Presidents of professional organizations for project management, such as PMI®, IPMA, APM and others, as well as to our personal network. In our emails we asked the recipients to forward the weblink to their members. The theoretical sampling frame comprised approximately 300,000 people. Due to the snowball approach to sampling, a traditional response rate can not be calculated. We received 959 responses to the first four sections of the questionnaire, but only 400 of those went on to answer the fifth section. Of the 959 responses 34% were certified project managers. Of the 400 of the respondents who answered the fifth section:

- ❖ 65% were male and 34% female (1% did not answer the question).
- ❖ 21% were from Europe; 56% from North America; 12% from Australia/New Zealand; 12% from other parts of the world.
- ❖ 12% were 35 years old or younger; 14% between 36 and 40; 21% between 41 and 45; 23% between 46 and 50; 15% between 51 and 55; 14% older than 55 years.
- ❖ 67% worked in the private sector, 28% in the public sector and 5% in not for profit.
- ❖ 43% worked in a technical job role; 18% in general management; 6% in R& D; 5% in marketing, Human Resources, Finance; 5% in manufacturing; 21% in other roles.
- ❖ 38% had a professional qualification; 32% a higher degree; 24% a first degree; and the remaining 16% a different education.

Analysis

The analysis was done in three steps:

1. Identification of differences in importance of success criteria and reported project success based on project type and industry sector.
2. Identification of differences in importance of success criteria and reported project success based on project manager traits.
3. Modeling the relationship between importance of success criteria and reported success.

Steps 1 and 2 were also assessed for variance between high and low performing projects. Significance level p was set at .05. Reliability of the data was given through Cronbach Alpha values of .61 for importance of success criteria, and .88 for measures of project success.

Differences in Rating of Success Criteria and Project Success Based on Project Type–all Projects

We used ANOVA analyses with post-hoc Scheffe test on the 959 response sample in order to identify differences in the rating of importance of success criteria and reported success of projects. The following significant differences were observed.

Rating of Success Criteria

Rating of success criteria differed by project complexity, project importance, contract type, and industry sector.

Complexity: Managers of high complexity projects rate the average importance, their own success criteria, and the importance for customer, supplier and stakeholder satisfaction significantly higher than those of low complexity projects. In projects of medium complexity, when compared with low complexity projects, managers assign significantly higher importance on average, as well as particularly on their own success criteria and customer satisfaction. Managers of high complexity projects rate their self defined success criteria significantly higher than those of medium complexity projects.

Project Importance: Differences by project importance were identified in team satisfaction being significantly more important in projects that are a combination of mandatory renewal and repositioning, compared with those being non-mandatory renewal and repositioning.

Contract Type: Differences by contract type were shown by fixed-price contract projects having higher importance for customer satisfaction than alliance projects.

Industry Sector: Not surprisingly, respondents from the private sector assigned a significantly higher importance to reoccurring business than those from the public sector.

These results support hypothesis H1a.

Project Success

Differences in reported project success by project type were not found. Here differences by contract type, complexity and project life-cycle stage were found through the ANOVA analysis, but not at the post-hoc test for differences between groups. These results were inconclusive and are therefore not reported here. Hypothesis H1b is therefore not supported.

Self-selected Criteria

Through the questionnaire we also collected data on the respondents own, self-determined success criteria. Delivery within the set time frame ranked highest with almost 20% of all mentioning, followed by scope, and the combination of time, cost and scope. The different combinations of the traditional time, cost and scope measures stand for 44% of the self determined success criteria. Only the achievement of the business case, end-user satisfaction, as well as communication and team building are more often mentioned than 5% of the time. No differences in project success were found for the various self-determined success criteria.

Differences in rating of success criteria and project success based on project type–high performing projects

To identify best-practices, low performing projects were filtered out. The mean of all project success measures was computed as an overall performance variable. By splitting the sample at the mean of the performance variable, we created sub-samples for low and high performing projects. Not surprisingly, the differences between low and high performing projects were significant ($p = .000$) in all success measures. Success criteria that were rated significantly more important in high performing projects (when compared with low performing ones) were repeat business, satisfaction of customer, end-user, suppliers, teams, and other stakeholders (all at $p = .000$), as well as the self-determined criteria ($p = .001$). We also observed differences in rating of the importance of success criteria on high performing projects.

Rating of Success Criteria

There were differences in the rating of the success criteria on high performing projects depending on the complexity of the project and the industry sector.

Complexity: Project managers in high complexity projects, when compared with medium complexity projects assign significantly higher importance to the satisfaction of customers, end-users, and other stakeholders. Compared with low complexity projects they assign significantly higher importance to team satisfaction, other stakeholder satisfaction, and their own success criteria. Project managers in medium complexity projects, when compared with low complexity projects, assign significantly more importance to team satisfaction, other stakeholder satisfaction and self defined criteria.

Industry Sector: The private sector assigns more importance than the public sector to reoccurring business and more importance to supplier satisfaction than not for profit firms.

These two results support hypotheses H1a and H2a for high performing projects.

Project Success

There were some differences in rates of project success on high performing projects.

Application Area: On high performing projects, ICT and organizational change projects ranked significantly higher in overall success than engineering projects. This is contrary to the normal view that engineering projects, being concrete, are more likely to be successful than the other two types. That may be explained through the focus on high performing projects only, which is not done in typical cross-industry comparisons of project results.

Project Life-cycle Stage: Overall reported results were significantly lower by those managers executing the feasibility, design and close-out stages of a project, when compared with those managing either the feasibility & design stage, or the feasibility, design and execution stage, or the design, execution, close-out and commissioning of a project.

Project Culture: Looking at culture, customer satisfaction was significantly higher in projects with the project manager working in his or her home country, as compared to those working abroad. Achievements of self-determined success criteria were significantly higher in projects with the project manager working in his/her home country or abroad, when compared with results of expatriate project managers. Later we report differences in the rating of success criteria by nationality. This suggests that what is considered successful is a cultural issue, hence explaining why project managers are more successful when in their home country, and why they are more successful against self-determined success criteria. Project managers working away from home may need training in local cultural traditions.

Contract Type: Differences by contract type were found with fixed-price contracts being associated with significantly higher levels of customer satisfaction and achievement of project purpose, when compared with alliance contracts. Projects with remeasurement contracts also achieved higher customer satisfaction levels than alliance contracts.

These results support Hypothesis H1b for high performing projects.

Differences in importance of success criteria and reported project success by project manager traits–all projects
We did a series of ANOVA analyses with post-hoc Scheffe test on the 400 responses sub-sample to identify different ratings of the importance in success criteria and different levels of project success, based on the traits of the project manager. We also did analysis on the 959 responses to determine if differences occur if the project manager is certificated.

Importance of Success Criteria

Importance of success criteria differed by age and nationality (details see Table 3). Respondents over 55 years of age assign a significantly higher importance to team satisfaction than those up to 40 years of age. Across all age groups the importance of team satisfaction increases linearly with increasing age of the respondents. The largest differences in importance of success criteria were found by nationality. Europeans rated their average importance, as well as the importance for satisfaction of end-users, suppliers, and project teams significantly lower than the defined other parts of the world. In addition, the average European importance rating was also significantly lower than in North America, those for end-user satisfaction lower than Australia/NZ, and stakeholder importance was lower than in North America and Australia/NZ. Importance for supplier satisfaction turned out to be significantly higher in other parts of the world than in North America.

These results supports Hypothesis H3a for age and nationality, but not for gender, job function, education or certification.

Analyzing the median level of importance attached to the success criteria we found that customer satisfaction, end-user satisfaction and the respondents self determined criteria are considered most important. Reoccurring business, team and stakeholder satisfaction appeared second highest, while supplier satisfaction ranked lowest in importance.

Table 3 Regression Results of Success Criteria and Reported Project Success

Regression Model				Coefficients			
Success	***Model sign. (p)***	***R-square***	***Adjusted R-square***	***Success criteria***	***B***	***Beta***	***Sign. (p) success criteria***
Overall success	.000	.088	.084	Constant	2.099		.000
n = 472				Team satisfaction	.323	.259	.000
				Customer satisfaction	.205	.119	.008
Meeting user requirements	.000	.066	.060	Constant	2.984		.000
n = 471				End-user satisfaction	.137	.135	.006
				Team satisfaction	.122	.138	.003
				Customer satisfaction	.117	.094	.049
Meeting project purpose	.000	.036	.032	Constant	3.992		.000
n = 469				Reoccurring business	.075	.138	.003
				End-user satisfaction	.098	.110	.018
Customer satisfaction	.000	.150	.146	Constant	1.739		.000
n = 471				Customer satisfaction	.478	.339	.000
				Team satisfaction	.151	.162	.000
Reoccurring business	.000	.347	.344	Constant	1.290		.000
n = 427				Reoccurring business	.560	.575	.000
				End-user satisfaction	.127	.085	.031
End-user satisfaction	.000	.170	.166	Constant	2.047		.000
n = 464				End-user satisfaction	.404	.353	.000
				Team satisfaction	.145	.151	.001
Supplier satisfaction	.000	.227	.223	Constant	1.923		.000
n = 409				Supplier satisfaction	.428	.430	.000
				Team satisfaction	.120	.099	.036
Team satisfaction	.000	.257	.255	Constant	2.173		.000
n = 469				Team satisfaction	.530	.507	.000
Stakeholder satisfaction	.000	.175	.171	Constant	1.872		.000
n = 456				Stakeholder satisfaction	.411	.370	.000
				End-user satisfaction	.155	.129	.003
Self-defined success criteria	.000	.086	.080	Constant	1.523		.000
n = 469				Customer satisfaction	.243	.170	.000
				Team satisfaction	.180	.174	.000
				Self-defined criteria	.223	.112	.013

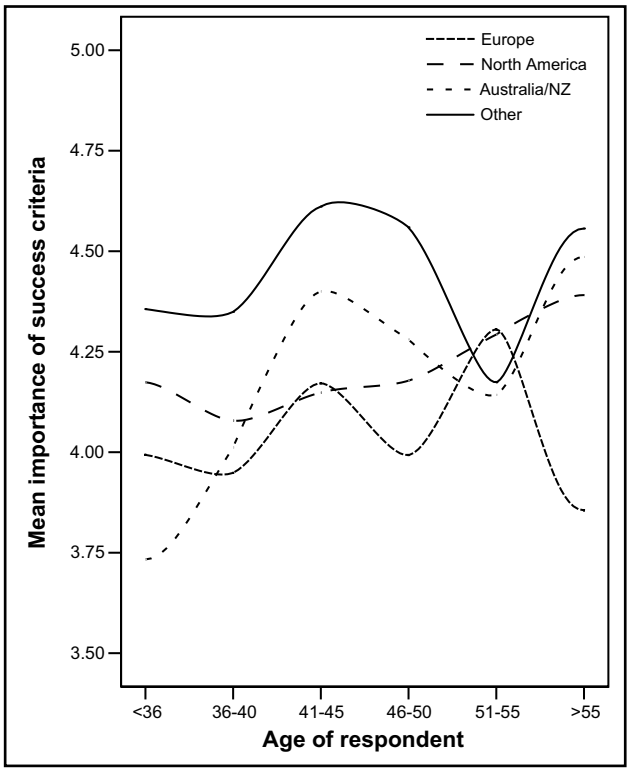

Figure 2 Mean Importance of Success Criteria by Project Manager Age

The development of the average (mean) importance across age groups and geographies indicates that North Americans have an almost linear increase in importance over age, while importance in all other geographies peaks at an age of approximately 41 to 45 years and then declines, (Figure 2). The declining trend is reversed at different ages in different geographies. Europeans start assigning more importance to success criteria again at the age of 46 to 50, peak again at 51 to 55 and then decline after the age of 55. The development in Australia/NZ and other parts of the world is almost complementary. Their importance of success criteria declines until the age of 50 to 55 and then increases strongly beyond 55.

Project Success

Reported project success differs by nationality. Both North America and Australia/NZ report higher levels of stakeholder satisfaction than Europe. Other parts of the world report higher achievements of user requirements than Europe.

This supports hypothesis H3b for nationality.

Looking at project success over age groups and geographies shows for Europe a similarity between importances assigned to success criteria and project success. However, the developments elsewhere are not that similar. Project success peaks at the age of 51 to 55 for project managers in Europe, North America and Australia/NZ, but at the age of 41 to 45 in other parts of the world.

Comparing certified and non-certified project managers across all projects, we neither found a difference in importance of success criteria nor a difference in project success. However, we did found that certified project managers perform better on high performing projects, as reported below.

Differences in importance of success criteria and reported project success by project manager traits – high performing projects

Again we also split the sample into high performing and low performing projects and analyzed the data for high performing projects as above. The results were not as significant as for all projects, but some differences were found by nationality both for rating of the importance of success criteria and performance against the criteria. We also found differences in success for certificated project managers.

Nationality

The defined other parts of the world (not North America, Europe, or Australia/New Zealand) assign more importance to supplier satisfaction than North America. That supports hypothesis H3a for high performing projects. In high performing projects customer satisfaction is significantly higher in other parts of the world than in Europe. This supports hypothesis H3b for nationality in high performing projects. Again this indicates cultural differences of which project sponsors should be aware.

Certification

We found no difference in importance ratings between certified and non-certified project managers. However, on high performing projects, certified project managers scored significantly higher in terms of project success than non-certified ones. This was due to certified project managers scoring significantly higher in achievement of user requirements. This supports Hypothesis H3b for certified project managers for high performing projects, but not Hypothesis H3a. No difference in performance was found between certified and non-certified project managers on all projects, just high performing projects. This suggests that certification makes high performing project managers better, but with low performing project managers other competencies need to be improved before seeking certification.

Modeling the relationship between importance of success criteria and perceived success in projects

We modeled the relationship between rating of importance of success criteria and reported success, to identify whether higher importance in a success criteria leads to higher success ratings in the same or other criteria. Underlying assumption was that a success criterion, such as customer satisfaction, can be perceived as being important by the project manager,

Table 4 Relationships Between Success Criteria and Reported Project Success

Success	*Importance of Success Criteria*						
	Reoccurring business	**Customer satisfaction**	**End-user satisfaction**	**Team satisfaction**	**Stakeholder satisfaction**	**Supplier satisfaction**	**Self defined criteria**
Overall success		+**		+****			
Meeting user requirements		+*	+**	+***			
Meeting project purpose	+***		+*				
Reoccurring business	+****		+*				
Customer satisfaction		+****		+****			
End-user satisfaction			+****	+***			
Team satisfaction				+****			
Stakeholder satisfaction			+***		+****		
Supplier satisfaction				+*		+****	
Meeting self defined criteria		+****		+****			+*

*significant at $p < .05$.
**significant at $p < .01$.
***significant at $p < .005$.
****significant at $p < .001$.
+positive correlation.

but this level of importance must not be related to a high level of success in customer satisfaction. Multivariate regression analysis was used for analysis. Table 3 shows the regression models. High predictability for success in reoccurring business, supplier and team satisfaction is given through high R-square values, which indicate high practical significance.

Success against the measured success criteria can be achieved to a large extent by managing the importance of the underlying success criteria. Importance assigned to team and end-user satisfaction influences almost all success measures. This supports hypothesis H4. The significant relationships are summarized in Table 4. It shows that importance assigned to:

1. team satisfaction impacts most of the success measures, such as overall success, meeting of user requirements, and self-defined criteria, satisfaction of customer, end-user, team, and supplier.
2. end-user satisfaction, impacts meeting of user requirements and project purpose, reoccurring business, satisfaction of end- users and stakeholders.
3. customer satisfaction, impacts perception of overall success, meeting of user requirements, and self defined criteria, customer satisfaction.
4. reoccurring business, impacts meeting project purpose, and reoccurring business. All correlations are positive.

Conclusions

The study looked at the differences in the importance of success criteria and reported project success by project type, industry and project manager traits. A sequential mixed-method approach was used, with 959 responses to a global web-based questionnaire. The research questions can now be answered:

Do project managers on different types of projects and from different industries perceive different success criteria as being important?

There are differences in the rating of success criteria by project type. On high complexity projects and fixed price contracts, customer satisfaction is thought to be significant. On high performing projects the needs of an even wider group of stakeholders is focused on. Repeat business is more important in the private sector than public sector.

Do project managers from different types of project and from different industries report different rates of success against the criteria?

Across all responses, results do not differ by project type or industry. In high performing projects, however, a number of differences were found:

- ❖ Geography: Europe scores lowest on achieving user requirements and stakeholder satisfaction
- ❖ Culture: projects done in the project managers' home culture are more successful
- ❖ Project type: ICT projects report higher success than other projects

This indicates an interaction effect between the first two bullets. If projects are less successful with project managers brought in from abroad, then the multi-

tude of cultures in Europe may have an adverse effect on project results. This might be addressed through further research.

Do different project managers attach different levels of importance to success criteria on projects according to their traits?

Older project managers assign higher importance to teambuilding than their younger colleagues. That indicates learning through experience. The results of the study show the crucial role of team satisfaction for all results measures. Older, and potentially more experienced project managers, seem to intuitively give priority the greatest significance. This is in line with Lee-Kelley and Leong, Loong (2003), Prabhakar (2005) and Dolfi and Andrews (2007) all of whom found a significant correlation between project manager experience and project success.

Perspectives on importance differ by geographies. European project managers put lower importance on satisfaction of end-users, suppliers, teams, and other stakeholders. That may explain the low scores for meeting user requirements and stakeholder satisfaction in Europe.

Do different project managers achieve different rates of success against the criteria according to their traits?

Certification makes a difference in high performing projects. This indicates that the best project managers are certificated, but poor certificated project managers perform as badly as poor non-certificated project managers. Certification is a necessary condition for high performance, but not a sufficient condition. Geographically, team satisfaction and stakeholder satisfaction is lowest in Europe.

How does project performance vary by different levels of importance attached to varying project success criteria?

The importance assigned to team and end-user satisfaction influences almost all reported success measures. These two criteria, and to a minor extend customer satisfaction too, have a crucial effect on the entirety of success measures. Their impact on project success should not be under-estimated. So the importance of:

- team satisfaction differs by nationality, project importance and age of project manager
- stakeholder and supplier satisfaction differs by nationality and project complexity
- end-user satisfaction differs by nationality
- reoccurring business and customer satisfaction differs by contract type.

The 'soft' criteria make a difference. Nationality and perceived complexity have the strongest impact on the perceptions about importance of success criteria and success measures.

The importance of the project managers' nationality for both success criteria and project success shows the need for project manager training on cultural differences, awareness building for different cultural value systems and the associated difference in success criteria and success achievement. Along with that further training should be provided in assigning appropriate priority to success criteria, also in low complex projects, and the proper communication thereof.

Implications

The results suggest implications for sponsors, when assigning or managing project managers:

1. In terms of managing the importance of projects success factors:
   - Project managers seek challenging projects. Higher complexity in projects and fixed price contracts increase awareness and importance of success factors. Project managers should not be assigned to projects that are below their management capabilities.
   - Project managers with greater experience emphasize the importance of the most influential success criterion, team satisfaction. That should be taken into account when assigning project managers to business critical projects.
2. In terms of managing projects towards successful outcomes:
   - Those project managers responsible for the wider project life cycle, not only planning, execution and close-out, tend to be more successful. Project managers should therefore be assigned at the earliest stages and lead their project up to the commissioning stage.
   - Despite their inherent risks, fixed price projects are managed more successfully than their remeasurement counterparts. Sponsors should be aware of that when deciding on the contracting strategy.
   - Project managers working in their own culture tend to be more successful than their expatriate counterparts. Project managers should be assigned from the local team. If needed mentored by a more senior manager, who may comes from abroad.
   - Project management certification alone does not guarantee good project management execution. However, a track record of good projects plus a certification is a very strong indicator of a high performing project manager.
3. In terms equal opportunities and diversity.
   - There are no differences in either the rating of success criteria, nor in performance against

them based on gender. Male and female project managers are equally good.

- There are differences in both the rating of success criteria and performance against them by nationality. The differences in rating of criteria appear to be cultural in origin. This means that if faced with a choice between two otherwise equally qualified project managers, the project sponsor may prefer the local person rather than somebody from overseas. To maintain equal opportunities and diversity training should be offered.
- There are also differences in rating of success criteria and performance against them by age, confirming previous studies, (Lee-Kelley and Leong, Loong, 2003; Prabhakar, 2005; Dolfi and Andrews, 2006). This seems to reflect growing confidence with experience.

The challenge handed over to the project manager, in form of project complexity and contract type, appears to be a major factor for regulating importance of success criteria and associated results. Under-utilizing the capabilities of project managers lead to negative project results. The sponsors challenge lies in identifying the right project manager for a given type of project. Turner and Müller (2006) provide advice on this.

The strength of the study lies in the mixed-method approach and the large sample size, both providing for credible results. Weaknesses are in the relatively rough categorization of nationalities for Europe, North America, Australia/NZ and others. Besides showing the importance of cultural fit, the study identified project complexity as a major factor for determining success criteria. The concept of project complexity, however, is not yet well researched. In light of its importance it should be further investigated. Project managers (and other stakeholders) should be aware of the implications listed above, especially in international projects.

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