PROJECT MANAGEMENT COMPETENCIES:

A SURVEY OF PERSPECTIVES FROM PROJECT

MANAGERS IN SOUTH EAST QUEENSLAND

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ABSTRACT

The findings are presented of a competency survey of project managers in South East Queensland, Australia. This was designed to capture the 'real world' experiences and skills of current practicing project managers, and investigate the most important project management skills that a project manager must possess, and obtain any additional skills and/or issues that a project manager should possess and be aware of in the twenty-first century.

In terms of project management skills, it was found that the ability to communicate, ability to meet project objectives and make decisions are the most important skills needed. In contrast, ability to use computer/project management software and ability to manage legal issues are the least important skills. In terms of current skills, the older managers, with the exception of the use of computer/project management software, have a greater degree of project management skills than their younger counterparts. The biggest gap between skills needed and skills possessed is in communication.

The issues and skills that a project manager should be aware of and possess in the foreseeable future were found to comprise industrial relations, workplace health and safety,

environmental issues, adaptability/innovative/flexibility, stakeholders management skill, coaching/transfer of knowledge skill, client related skill, networking skill and business skill.

Keywords: Project; Project Management; Project Manager; Skills; Competency; Experience.

INTRODUCTION

The project manager is the central figure in accomplishing project success and the most important factor in successful project management (Cleland, 1984 p.575; Kezsbom *et al*, 1989 p.181; Nicholas, 1994 p.189), with the role of project manager being so central that 'without it there would not even be project management - the project manager being the glue holding the project together and the mover and shaker spurring it on' (Nicholas, 1994 p.172). This involves project managers possessing a wide variety of skills (Kezsbom *et al*, 1989 p.183) related to the standard objectives of project completion within a set specification under time, cost, and quality constraints (Harrison, 1992 p.10; Cleland and Gareis, 1994; Baguley, 1995; Meredith and Mantel, 1995 p.8; Munns and Bjeirmi, 1996 p.81; Chen, 1997 p.27; Kerzner, 1998 p.2 and 2000 p.1; Pryor in Perce, 1998 p.392; Cleland, 1999 p.3; Gido and Clements, 1999 p.17-18; Keeling, 2000 p.2).

Of the vast literature on the subject, the most recurring project management skills are summarised in Table 1. The research described in this paper aimed to survey the extent to which these major pertinent skills are perceived to be of importance for project managers in South East Queensland. In addition, the survey sought to document the extent to which these

skills are actually possessed by project managers and any additional skills for the forseeable future. Details of the results are provided below.

RESULTS

The survey

The survey was conducted among project management related practitioners working in the South East Queensland region of Australia via a postal questionnaire. The questionnaire was divided into three parts. Part 1 sought details of the background, academic development and experience of practising project managers. Part 2 sought views on (1) the importance of each of a list of 19 project management skills identified from the literature and (2) their current ability to use these skills. The respondents were requested to evaluate the skills on a five-point scale. Part 3 consisted of an open-ended question seeking additional important project management skills for the future.

A total of 250 questionnaires were sent out by a combination of conventional (with prepaid return envelopes) and electronic mail during October 2002 and 113 useable responses were obtained, representing a response rate of 45.2%.

General Background

Most respondents (94%) are male, with the majority (66%) employed in the engineering industry - manufacturing, management consulting and telecommunication constituting the remainder. The majority of respondents (47%) are project managers, followed by general managers (14%), with the remainder comprising chief executive officers, managing directors, project adminstrators and principal and project management consultants. 63% and 28% respectively have completed under-graduate and post-graduate education. 43% of the respondents are 30-40 years old, 34% are 41-50 years old and 23% of respondents are 51-65 years old.

The majority of respondents attained managerial status in their 30s - generally accumulating at least six years of prior work experience during which the majority (58%) passed through up to five different posts. 29% of the managers completed up to 10 projects before attaining their current status. However, 26% and 29% worked on 21-50 projects and over 50 projects respectively - suggesting their experience to be mainly on small to medium projects of a relatively short duration. It is also interesting to note that 27% of respondents are currently managing more than five projects simultaneously, which may be an indication of a relatively good current economic situation in the region.

Together, these general background results were taken to indicate that the respondents are qualified to participate in the survey and hence the results should reflect the current and important project management issues addressed by the survey.

Project Management Skills

Generally

Respondents were asked to rate 19 project management skills identified from the literature for *importance* for an effective project manager. This involved the use of a five point scale, spanning 1 for not important, to 5 for critically important. Their associated *current level of ability* for each skill was also requested on the same scale. A weighted average score (WAS) was used to rank the skills in order of perceived level of importance and current ability . This indicates that, in terms *perceived level of importance*, all except one of the skills have a WAS of at least 4. The highest rated skill, with a score of 4.88, is an ability to communicate. This is consistent with Humphrey and Stokes' (2000) survey, in which more than 83% of survey respondents identified communication as the most important skill. The second most important skill, with a score of 4.72, is the ability to meet project objectives, followed by an ability to make decisions, with a score of 4.65. In contrast, the least important skill, with a score of 3.47, is the ability to manage legal issues.

The skill of using computers and project management software with a score of 3.51, is ranked the second last on the list. This contrasts with Lientz and Rea (1998), Gido and Clements (1999), Humphrey and Stokes (2000) and White and Fortune (2002) who suggest that computers can help the project manager to be more efficient and effective at the job, which in turn gives project managers more time to direct the project team. In fact, 75 percent of Humphrey and Stokes' respondents indicated the ability to use computers as being one of the most important set of skills for a project manager to possess and practice. As Lientz and Rea (1998) say: 'Anyone attempting to compete and succeed without these modern tools will be

handicapped and their risk of failure will increase'. One explanation for this discrepancy may be due to many of the respondents working on small to medium size projects where computer skills may not be highly required.

In terms of *current level of abilities,* the project managers' ability is relatively high, with a WAS of at least 4 for most of the skills set. The current level of ability for communication is 4.15, with an ability to meet project objectives and make decisions rated at 4.22 and 4.26 respectively. The skills with scores of less than 4 are the ability to manage risk, resolve conflicts, motivate project team, negotiate, delegate tasks, build project team, use computer/project management software and manage legal issues. In particular, as with perceived importance levels, the ability to use computer/project management software and managing legal issues, with scores of 3.35 and 3.38 respectively, are relatively lower than others.

In terms of the conventional success criteria of project management, the ability to complete projects on cost, on time and meeting project's quality are not perceived as the most important skills for project managers, being ranked fourth, seventh and fourteenth respectively.

Communication skill also has the biggest difference (0.75) between the respondent's perceived level of importance and their current level of abilities - suggesting that there is some room for improvement in this area.

Differences between respondent groups

Table 2 summarises the significant differences between respondent groups based on t-tests (p<0.05). For engineering industry respondents, the ability to control cost is perceived to be more important than it is for respondents from other industries, with means of 4.689 and 4.359 respectively. This result is perhaps due to typical engineering projects having less budgetary flexibility than other industries. The ability to listen and build project teams with a mean of 4.500 and 4.189 respectively, is also perceived to be more important for engineering respondents compared with those from other industries. This is perhaps due to involvement of many different organisations and professionals in engineering projects, making listening to others and building a project team a more important activity than in other industries.

In terms of ability to use the skills, the only industry based difference is in the ability to communicate. For engineering respondents, their ability to communicate, with a mean of 4.068, is less than those respondents from other industries (mean=4.321). This result is consistent with the result above, where communication skill was found to have the biggest difference (0.75) between perceived level of importance and their current level of abilities.

For respondent position, there are no significant differences in perceived level of importance. However, in terms of abilities, a project manager's ability to use computer/project management software (mean=3.660) is greater than other personnel (mean=3.092). This result is likely to be due to the fact that the project manager is the person in a project who carries out the actual planning and scheduling using computers and project management software. The project manager's ability to control cost (mean=4.208) is also higher than other personnel (mean=3.933).

For the ability to manage legal issues and meet project objectives, the project managers' ability to use these skills is again significantly higher than other personnel. This is likely to be due to project managers being the people solely responsible for projects at the operating level. As a result, they spend more time and acquire more skills than other personnel in dealing with daily contractual, and other project related, issues.

In terms of respondent qualifications, the one significant difference is the ability to complete projects on time. More respondents with under-graduate qualifications perceive the ability to complete project on time (mean=4.531) to be more important than those respondents with post-graduate qualifications (mean=4.219). However, the ability to meet project objectives is considered to be significantly lower by under-graduate qualified managers than managers with post-graduate qualifications. This result may be an indication that post-graduate training is considered beneficial in terms of teaching skills to people to achieve project'objectives more effectively. Alternatively, it may be due to "post-graduate" respondents having higher positions in the organisation so that they have to increasingly focus on managing project objectives

The one significant difference in perceived level of importance between the younger and older respondents is the ability to negotiate. As can be seen, for some reason, the middle respondent group perceive the ability to negotiate as less important than their younger and older counterparts. This is inexplicable and may be a spurious result. In terms of ability, however, there are several significant differences, comprising: the ability to use computer/project management software, ability to make decisions, ability to lead a project team, ability to negotiate and ability to mange risks. As the respondents become more

mature, their ability to use the skills generally gets better. The oldest respondents' ability to use these skills is higher than both the middle and younger respondents, which suggests that the ability to use project management skills is directly related to working experience. However, the exception to this the ability to use computer/project management software, where the oldest respondents (mean=2.885) found it more difficult to use computers than the younger respondents (mean=3.612).

The results of the analysis in terms of respondents' experience are shown in Table 3. As can be seen, in terms of respondent's perceived level of importance, there are more significant differences associated with question 9 (related to number of years spent in project management) than other questions. Similarly, in terms of ability to use the 19 listed project management skills, there are 14 significant differences associated with question 9 than question 8 with only nine significant differences. Thus, it is clear that *experience* is an important factor and has a positive effect on the ability to use project management skills. Therefore, question 9 was used to investigate the differences between (1) the group with up to six years and (2) the group with more than six years experience in project management. The results are then compared in terms of the respondent's perceived level of importance and respondent's current level of ability to use the project management skills.

As Table 3 shows, question 9 is associated with significant differences relating to the ability to delegate tasks, ability to manage legal issues, ability to motivate a project team and ability to build a project team. Respondents with more than six years spent in project management generally considered these four skills to be more important than respondents with less than six years of project management experiences. It is also interesting to note that three of these (motivate project team, delegate tasks and build a project team) are related to project

teamwork. This result is perhaps an indication that the longer the period a manager has worked in project management, the greater the responsibilities the manager has in terms of looking after the project team. Recalling Bishop (1997 p.210) - as a project manager, it is important to recognise what the individuals on the team can and cannot do because this knowledge can then be analysed and used to position individuals on the team successfully. Once project managers understand team members' capacities, they can direct each job (ability to delegate tasks) to the person who will most effectively complete that work. Project managers are then be able to get the best from the available talent in their teams.

In terms of managing legal issues, respondents with up to six years of experience in project management do not consider this skill as important as the respondents with more than six years of experience do. This is perhaps due to the fact that the respondents with more than six years of experience have greater responsibilities working at a higher operational level in managing contractual issues than those respondents who have less responsibilities working at a lower operational level.

In terms of the respondent's current abilities, it can be seen from Table 3 that question 9 is associated with 14 significant differences:

1. ability to meet project objectives,

2. ability to make decisions,

3. ability to control cost,

4. ability to lead project team,

5. ability to organise,

6. ability to plan,

7. ability to resolve conflicts,

8. ability to solve problems,

9. ability to motivate project team,

10. ability to meet project's quality,

11. ability to negotiate,

12. ability to delegate tasks,

13. ability to build project team and

14. ability to manage legal issues.

The abilities of respondents with more than six years work experience spent in project management in relation to these 14 skills are generally higher than the respondents with only up to six years of work experience. This result once again confirms that the more experience a manager has, the higher abilities possessed in using these 14 project skills. Once again, the only exception is the ability to use computer/project management software. In this case, the ability of respondents with up to six years of work experience in project management using computer/project management software is higher than the respondents with more than six years of work experience.

Skills for the future

In this part of the questionnaire, respondents were asked to give their opinions on what important skills are likely to be needed by project managers in the forseeable future. Of the total of 90 responses to this question, 21 respondents commented on the importance of *technical skill*, such as 're-design and construction matters', 'site conditions and constructability', 'knowledge of 'latest building methods and materials'. This had been

deliberately omitted from the earlier part of the questionnaire as a check on respondents' interest in this latter section. The importance of technical skill here agrees with the findings by Humphrey and Stokes (2000 p.14), Thamhain in Pinto and Trailer (1998 p.47) and Verma (1995 p.26-27). Respondents also suggested that project managers do not need to have the same technical expertise as the experts in the field, but a basic knowledge across all disciplines to assess impacts and make decisions. This agrees with Kerzner (1998 p.172) and Thamhain in Pinto and Trailer (1998 p.47) as they recognise that project managers rarely have all the technical expertise to direct the multidisciplinary activities at hand nor is it necessary for project managers to have all the technical, administrative, and marketing expertise needed to direct the program single-handedly. In fact, Sahlin (1998 p.36) recognises that a project manager needs to have enough technical knowledge to weed through the numbers and derive the true meaning of reports. Sahlin (1998) highlights that the primary responsibility as a project manager is to lead the project team, not to be the single point of contact for technical issues.

16 respondents commented on the importance of *Industrial Relations (I.R.), Workplace Health and Safety (WHS), and Environmental issues*, including 'the need to be aware of and handle both workplace health and safety and environmental issues', 'manage industrial relations, minimise disruption and managing conflicts' and 'understand the broader social and environmental issues'. 16 respondents were also concerned with *adaptability, innovativeness and flexibility* to 'the ever changing world of business, laws, insurance, construction and planning methods etc.', 'technology changes', 'in human relations as society pressures change and increase', 'different project requirements' and 'innovation'. A further 16 respondents mentioned *people skills*, including interpersonal skills with emphasis on the personal', 'ability to realise capabilities of colleagues', 'listen to people' and 'motivate'.

14 respondents were concerned with *legal understanding*, including 'contract law knowledge', 'knowledge of contracting options', the statutory approval process' and 'local authority and code requirements' It is interesting to note that this relatively high level of responses contrasts with the earlier results in which the importance of managing legal issues as perceived by all respondents is ranked *last* on the list and may indicate a misunderstanding of the earlier part of the questionnaire.

The remaining respondents pointed out the importance of *client related issues* (10 respondents), *stakeholder management* (8 respondents), *cost management* (8 respondents), *information technology* (6 respondents), *anticipate future problems* (6 respondents), *time management* (5 respondents) followed by *coaching/transfer of knowledge, networking and business skills.*

CONCLUSIONS

This paper presents the results of a combined postal and electronic survey of 113 project management related personnel in South East Queensland during October 2002.   These show that the most important skills that an effective project manager should possess are the ability to communicate, followed by ability to meet project objectives and ability to make decisions in general. In contrast, the least important skills are the ability to manage legal issues and ability to use computers/project management software. In terms of the actual current level of ability to use these skills, the abilities to make decisions is the highest followed by ability to organise and ability to meet project objectives. Surprisingly, in view of the literature, the

ability to use computer/project management software and to manage legal issues are the lowest of all. Equally surprising is that the ability to complete projects on cost, on time and meeting project's quality are not the most important skills that a project manager must possess, with the importance of cost control ranked forth on the list, and the ability to complete project on time and meet project's quality ranked seventh and fourteenth respectively.

Communication skill was associated with the biggest differences between the respondent's perceived level of importance and their current level of abilities, suggesting that communication skill is an area in which project managers still have a need for improvement. Since communication skill is identified as being the most important skill for an effective project manager to possess, this is perhaps one of the areas in which further training can be beneficial. Another area in which training courses perhaps is likely be beneficial is in the area of computing and the use of project management software.

Engineering respondents were found to have less ability to communicate than their counterparts in other industries, and project managers generally have higher ability to use project management skills than other personnel (project administrators, general managers or other titles) in an organisation. The ability to meet project objectives also improves with post-graduate qualifications. Finally, with the exception of computer/project management software, the oldest respondents have higher abilities in using skills compared to the younger respondents.

The most inter-respondent differences were found to be associated with experience. There are 14 out of 19 skills that are significantly different depending on the number of years these

respondents have spent in project management. The results show that abilities are in direct proportion to the number of years spent in project management. Again, with the exception of computer/project management software, respondents with more than 6 years project management experience generally have a higher level of abilities than those respondents with less than six years experience.

Finally, the survey identified the important issues and skills project managers should be aware of and possess for the foreseeable future to be:

1. Technical skill

2. Industrial Relations (I.R.) / Workplace Health and Safety (WHS) / Environmental issues

3. Adaptability / Innovation / Flexibility

4. People skills

5. Legal understanding

6. Client related skill

7. Stakeholders management skill

8. Cost management skill

9. Computing skill

10. Risk management skill

11. Time management skill

12. Coaching / Transfer of knowledge skill

13. Networking skill

14. Business knowledge

It should be noted in conclusion, that several previous studies have been conducted on this topic. However, these were based on overseas research and particularly in the United Kingdom and Nigeria. The study reported here is specific to Australia and to a major part of the engineering industry. It reflects the current view of background, qualification and experiences of project managers in Australia and identifies the skills that it is perceived effective project manager must possess to competently work in their managerial roles. This knowledge is likely to be of value to organisations, and people who intend to be involved in project management. In particular, it is likely to be of value to the project management industry and tertiary institutions when designing future post-graduate educational courses or training courses. By the same token, this knowledge may be of some assistance when recruiting project managers for engineering related projects.

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Table 1: Recurring project management skill themes

Source	Communication	Computing	Cost control	Conflict resolution	Decision making	Delegation	Leadership	Listening	Legal	Motivation	Negotiation	Organisation	Meet project objectives	Planning	Problem solving	Quality management	Risk management	Time management	Team building	Technical
Andersen, 1987	•						•					•		•						
Baguley, 1995	•				•			•			•			•						
Barkley and Saylor, 2001					•															
Barnes and Wearne, 1993																	•			
Baumgartner, 1963														•						
Bender, 1997	•																			
Bishop, 1997								•		•	•									•
Blake and Mouton,1978				•																
Briner et al, 1996							•					•								
Chapman and Ward, 1997																	•			
Cleland, 1984			•							•	•	•				•				
Cleland, 1999	•				•		•	•						•					•	
Clifford and Erick, 2000																			•	
Covey, 1989											•									
Davis, 2000		•																		
Dinsmore, 1990				•	•															
Drucker, 1994	•																			
Edum-Fotwe and McCaffer, 2000															•	•		•		
Einsiedel, 1984					•		•													
Eunson, 1994											•									
Gido and Clements, 1999	•	•			•	•	•					•		•	•					
Griffin, 1999	•			•					•	•				•				•		
Gushgar et al 1997														•				•		
Hannaway and Hunt, 1992														•	•	•		•		
Harrison, 1992			•	•														•		
Humphrey and Stokes 2000	•	•														•		•	•	•
Kerzner, 1998				•	•		•					•	•	•		•			•	•
Kerzner, 2000	•																			
Kezsbom et al, 1989											•			•						
Lientz and Rea, 1998	•	•							•											
Lock, 2000									•											
Lockyer and Gordon, 1996			•																	
Lovejoy, 1993					•															
Magenau 1998											•									
Meredith and Mantel, 1995				•																
Nicholas, 1994	•	•			•		•			•								•	•	•
Odusami, 2002													•			•		•		
Perce, 1998											•									
Pinto and Trailer, 1998																			•	

Table 1 (Contd): Recurring project management skill themes

Author																
Pruitt, 1983									●							
Rad and Levin, 2002															●	
Ritz, 1990	●				●	●	●					●			●	
Sahlin, 1998					●	●									●	●
Schermerhorn *et al*, 1996									●	●		●				●
Shepherd, 1997															●	
Sievert, 1986	●															
Standards Australia, 1999															●	
Thamhain and Wilemon in Kerzner, 1998				●												
Thamhain in Pinto and Trailer, 1998																●
Thamhain, 1998															●	
Thoms, 1998									●							
Toney, 2002									●							●
Tudor and Srića in Treven, 1998									●							
Tuman and McMackin, 1997		●														
Turner *et al*, 1996	●									●						
Turner, 1999	●				●				●		●		●	●	●	●
Verma, 1995					●	●					●					●
Watson and Williams 1997			●					●	●				●			
Whetten and Cameron, 1998									●				●			
White and Fortune, 2002		●														
Young, 1996															●	

Table 2: Significant variables (skills) in relation to general background (industry, position, qualification and age)

Part 1 - Questions	Significant variables (skills)						
	Importance			Ability			
Q1 - Industry	Ability to	Mean		Ability to	Mean		
		Engineering	Other (IT, Finance & other)		Engineering	Other (IT, Finance & other)	
	Control cost	4.689	4.359	Communicate	4.068	4.321	
	Listen	4.500	4.205	-	-	-	
	Build project team	4.189	3.769	-	-	-	
Q2 - Position	No significant variables			Ability to	Mean		
					Project manager	Other (Project director, General manager & other)	
				use computer/ PM software	3.660	3.092	
				Control cost	4.208	3.933	
				Manage legal issues	3.566	3.167	
				Meet project's objectives	4.358	4.100	
Q3 - Qualification	Ability to	Mean		Ability to	Mean		
		Under-grad.	Post-grad.		Under-grad.	Post-grad.	
	Complete project on time	4.531	4.219	Meet project's objectives	4.148	4.406	
Q4 - Age	Ability to	Mean			Ability to	Mean	
		Young	Middle	Mature		Young	Middle	Mature
	Negotiate	4.224	3.974	4.346	use computer/ PM software	3.612	3.355	2.885
	-	-	-	-	Make decisions	4.082	4.342	4.462
	-	-	-	-	Lead project team	3.816	4.118	4.346
	-	-	-	-	Negotiate	3.571	3.855	4.192
	-	-	-	-	Manage risks	3.653	4.053	4.385

Table 3: Summary of significant variables (skills)

	Project Management Skills	Part 1 - Questions									
		Background				Experiences					
	Ability to	Q1	Q2	Q3	Q4	Q6	Q7	Q8	Q9	Q10	Q11
Importance	communicate						♦				
	use computer/PM software										
	control cost	♦									
	resolve conflicts										
	make decisions										
	delegate tasks					♦			♦		
	lead the project team										
	listen	♦									
	manage legal issues								♦		
	motivate project team								♦		
	negotiate				♦						
	organise										
	meet project's objectives										
	plan										
	solve problems										
	meet project's quality										
	manage risks										
	complete project on time			♦							
	build the project team	♦				♦			♦		
Ability	communicate	♦						♦			♦
	use computer/PM software		♦		♦	♦					
	control cost		♦			♦		♦	♦		
	resolve conflicts								♦		
	make decisions				♦	♦		♦	♦		
	delegate tasks					♦			♦		
	lead the project team				♦	♦			♦		
	listen										
	manage legal issues		♦			♦	♦	♦	♦		
	motivate project team								♦		
	negotiate				♦	♦		♦	♦		
	organise								♦		
	meet project's objectives		♦	♦				♦	♦		
	plan							♦	♦		
	solve problems							♦	♦	♦	
	meet the project's quality							♦	♦		
	manage risks				♦						
	complete project on time										
	build the project team						♦		♦		