PROJECT MANAGEMENT COMPETENCIES THAT LEAD TO PROJECT SUCCESS IN THE AUCKLAND COMMERCIAL CONSTRUCTION MARKET

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ABSTRACT

Project Manager (PM) is a title commonly used in the construction industry and given to people carrying out many roles. Each role having its own particular skill set. This project investigated the skills required of a Clients Project Manager that contribute towards project success within the Auckland commercial construction market. This PM represents the procuring party often referred to as 'the client' in construction projects.

Through a review of existing literature it was found that bodies of knowledge (BOK) exist, these BOK's outline the 'project management approach', which when applied is said to be able to be used internationally and across industries. Other literature reviewed outlines important competence factors for project success; being project manager's style, the company at which the project manager is employed, and relationships between the client and project manager.

The competencies outlined in the Project Management Body of Knowledge (PMBOK) documents are claimed by the Project Managers Institute to be the framework for project management. This research tested part of this claim and other research. Senior Project Managers working in the Auckland commercial construction market were asked to rank the various skills identified in the literature as important to project success. They were also asked to give their opinions on project manager's style, how important company reputation is, and the importance of holding a formal project management qualification.

All of the individual PMBOK competencies were quite tightly clustered in the 'high importance to project success' category. Weightings showed that Cost Management and Scope Management were the most important of the PMBOK areas. However, the competencies were all shown to be important. Client Relationships and the Project Management Style were also of the highest importance to project success. The employing company's reputation was also of high importance and holding a project management qualification was seen as only of average importance.

CONFIDENTIALITY STATEMENT

An agreement was entered into between the participants and the author that all names would be kept confidential. This agreement extends to both personal and company names of participants including any names mentioned by the participants within the data collection process.

The data was collected using an online survey system. This allowed the participant to enter their name if they wished, or to remain completely anonymous. Participant opinions may be grouped by age or gender without identifying the participant.

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GLOSSARY

For the purpose of reading this report in context, the definitions of certain terms and phrases used within the report are given below. This is due to the multiple interpretations of certain terms when used by different parties within the industry.

1. **Production Oriented Project Manager** (PPM) – works for a construction company and has overall site management authority – controls the subcontractors and construction team involved in building the project.
2. **Client Oriented Project Manager** (CPM) – represents the procuring party often referred to as the 'client' in construction projects. The client may be an individual or a group, a developer or an end user. The CPM is involved from project inception to the end of defects liability periods and final accounts settlement. The CPM is liaison between the client and the project.

LIST OF ABBREVIATIONS

For understanding of the abbreviations used within this report please refer to the list below.

BOK   Body of Knowledge

CSF   Critical Success Factor

ICB   International Competency Baseline (Term used by IPMA)

IPMA   International Project Management Association

MCIOB   Member of the Chartered Institute Of Builders

MRICS   Member of the Royal Institute Of Chartered Surveyors

PMBOK   Project Management Body of Knowledge

PMI   Project Management Institute

PM   Project Manager

1   INTRODUCTION

The profession of Project Management has many industry bodies internationally and spans across many sectors. Project Manager is a title that many people possess, but few seem to be able to describe wholly what a project manager does, or what they do well that makes them effective. Project Management is defined in the Guide to the Project Management Body of Knowledge (PMBOK) (1996) as "the application of skills, tools and techniques to project activities in order to meet or exceed stakeholder expectations from a project". Further to this a project is defined by Duncan (1996) as "a temporary endeavor undertaken to create a unique product or service". This investigation will focus on the construction specific role i.e. looking after a construction project for the client, otherwise known as the client's representative or client's Project Manager. A **Client Oriented Project Manager** (CPM) is the person who represents the procuring party often referred to as the 'client' in construction projects. The client may be an individual or a group, a developer or an end user. The CPM is involved from project inception to the end of defects liability periods and final accounts settlement. The CPM is liaison between the client and the project.

 This research will appeal to those who are looking to strengthen their current understanding of project management or those who are looking to head into a project management role/career. The research identifies key project management competencies and breaks down the key themes being developed in international literature. These competencies were drawn from independent studies as well as bodies of knowledge that are published by both national and international industry groups. This study hopes to add to the current literature and help to identify the perceived skills that make New Zealand project managers successful. The research question is:

What are the competencies required of a clients project manager, that lead to project success in the Auckland commercial construction market, in the opinion of senior project managers operating within this market?

2 LITERATURE REVIEW

2.1 Introduction

This chapter provides a background to Project Management, framing the context in which client side project management is viewed. It will look at ideas being put forward as to how project management has evolved and must continue to do so, whilst also outlining what is known as the 'project management approach'.

2.2 Project Management Approach

Bodies of knowledge have come about over the evolution of project management. The 1950's is when project management is considered to have emerged as a profession (Crawford & Blackburn, 1996). From the underlying theory of project management was born the 'project management approach'. This has been added to and modified by the Project Management Institute (of America) over the years and compiled in a document known as the 'Project Management Body of Knowledge' (Dainty, Cheng, & Moore, 2003). This PM approach is said to have varying strengths and weaknesses when used in different fields but has been defined as the underlying set of skills that shape the role no matter what field you are in (Crawford & Blackburn, 1996). Later in this research paper we will look at whether this approach as defined by the Project Management Institute in PMBOK applies to the Auckland commercial construction market and also look to what degree the different areas of project management defined within this document contribute toward project success.

2.3 Bodies of Knowledge

There is a growing body of research around project management competencies and this is being compiled by local/national/international organisations and has been

integrated into working documents or 'bodies of knowledge' as they are now known. It is said by Koskela (2002) that in order for any role to be considered as a profession, it must have a body of knowledge (BOK) and that it must be written down somewhere. This view is supported by Duncan (1996) The BOK's for project management are not specific to construction. However, they have had considerable input from the construction industry in their making. Two of the well known international BOK's are considered as part of this review. These are associated to the Project Management Institute founded in America and the International Project Management Association of Europe. These are discussed in more detail in section 2.5 of this chapter. Construction is one of the original project-based professions and building institutes have had input into the BOK's with regard to the construction-specific role. These competencies seem to be generally based around technical and process driven procedures; a scientific and calculated basis to management. However Dainty Cheng & Moore (2005) argue that despite the growing body of knowledge around behavioral competencies, the BOK's do not seem to acknowledge the importance of these, with relevance to their potential contribution toward project success. It was found that a lot of other research has focused on technical competencies and ranked these without considering behavioral competencies.

 Experience is found to be a key theme when considering competence. This has come out of literature reviewed. Experience does not fall into a skill area but does extend the project manager's overall competence (Kerr, Garvin, Heaton, & Boyle, 2006). Further to this, is the idea that even if a project manager passes the knowledge based competency exam, they may not yet have the skills to apply this knowledge, or possess the skills in the social or business arena's to succeed (Quarterman, Frame, & Coffey, 2010). Drawing from this, a minimum level of experience can be considered a key factor for success. This leads into the importance of project managers gaining post-graduate experience and industry accreditation, which is discussed later in section 2.6 of this chapter. Further to this, the IPMA states that competencies are not a cookbook on how to do projects. Each country has both national and cultural differences in the way they run projects. Therefore, each competence element can be

varied to suit that country with additional competencies added in some cases (Caupin, Knoepfel, Koch, Pannenbacker, Perez-Polo, & Seabury, 2006).

2.4 Competency in Practice

Drawing upon Davidson-Frame (1999) who states "A review of the economics of competence shows that the most competent performers add far more value than average or sub average performers" highlights the importance of understanding the key elements of one's craft. Many studies have identified that the competence of the project manager in their given construction role is a 'critical success factor' (CSF) for a project to succeed. One such study conducted in India by Jha & Iver (2007) identified through questionnaire responses from 90 sources including senior government officials, public sector and private companies, that only three CSF's are a common response across all of their performance criteria. These are; 'Project manager's competence', 'top management support' (from within the project management firm) and 'owners (client's) competence'. This view is supported by Isik, Arditi, Birgonul and Dikmen(2009) who also find that support from within the project managers employing firm helps contribute to success. Drawing upon Zulu's (2009) exploratory study conducted in the United Kingdom, this reiterates that management support and the project mangers competence are critical success factors. Zulu goes on to add the style of leadership as being important.

Leadership has been defined as "the process of social interaction, whereby the leaders ability to influence the behavior of their followers can strongly influence the outcome" (Kerr, Garvin, Heaton, & Boyle, 2006). This suggests that the Project Manager's leadership style will influence the project outcome. This links to an idea put forward by Dainty et al (2005) that project management can be regarded as a creative activity if one adopts a perspective that project managers are overseer's and coordinators of activities, rather than some people's view that they should be a functional specialist. This view would place far more emphasis on the Project Manager's style.

2.5   Project Management Competencies Defined

As identified earlier in this chapter, competence is key to project management success. In order to measure and put a value on the wider range of skills a project manager requires to be successful in their role, the research looked closely at two international Project Management BOK documents. These are known as PMBOK (Project Management Body of Knowledge) as compiled by the American based Project Management Institute (PMI). Secondly, the European organisation known as the International Project Management Association also produces a baseline competency document. The competencies can be broken down to multiple levels of detail, depending on how specific one wants to focus on a particular competency area. For the purpose of this study, which is looking at all competencies in general terms, too much specific detail regarding each particular competency will not be entered into, as each area could spawn a research project of its own. The International Project Management Association (IPMA) International Competency Baseline (ICB) breaks competencies into three main areas; the technical range, the behavioral range and the contextual range. IPMA has outlined 46 competency elements broken down under these headings, to express the competencies as seen by their 40 European member associations.

A breakdown of the three main competence areas adapted from the IPMA competency baseline version 3.0 is as follows:

> The **technical competence range** - This describes the fundamental project management competence elements. This range covers the project management content, sometimes referred to as 'the solid elements'. The ICB contains 20 technical competence elements.

> The **behavioral competence range** - This describes the personal project management competence elements. This range covers the project manager's attitudes and skills. The ICB contains 15 behavioral competence elements.

The **contextual competence range** - This describes the project management competence elements related to the context of the project. This range covers the project manager's competence in managing relations with the line management organisation and the ability to function in a project focused organisation. The ICB contains 11 contextual competence elements.

(Caupin, Knoepfel, Koch, Pannenbacker, Perez-Polo, & Seabury, 2006, p. 9)

Table 1 shows the IPMA competencies grouped under their three headings of Technical Competencies, Behavioral Competencies and Contextual Competencies. A detailed description of the technical competencies can be found in section 7.2 of the appendices.

Table 1 - Overview of the IPMA competence elements (Caupin et al 2006, p.26)

Technical Competencies	Behavioral Competencies	Contextual Competencies
1.Project Management Success	1. Leadership	1.Project Orientation
2.Interested Parties	2.Engagement	2.Programme Orientation
3.Project requirements and objectives	3.Self control	3.Portfolio Orientation
4.Risk & Opportunity	4.Assertiveness	4.Project,Programme & Portfolio implementation
5.Quality	5.Relaxation	5.Permanent Organisation
6.Project Organisation	6.Openness	6.Business
7.Teamwork	7.Creativity	7.Systems Products & Technology
8.Problem Resolution	8.Results Orientation	8.Personnell Management
9.Project Structures	9.Efficiency	9.Health, security, safety and environment
10. Scope & deliverables	10.Consultation	10.Finance
11.Time & Project Phases	11.Negotiation	11.Legal
12. Resources	12.Conflict & Crisis	
13.Cost & Finance	13.Reliability	
14.Procurement & Contract	14.Values Appreciation	
15.Changes	15.Ethics	
16.Control & Reports		
17.Information & Documentation		
18.Communication		
19.Start Up		

20.Close out		

Perhaps the best known body of knowledge document is published by the Project Management Institute of America and is known as PMBOK (Project Management Body of Knowledge pronounced '*pim-bok*'). This document groups PM competencies by defining nine key competence areas called 'knowledge areas' and details sub knowledge areas or 'processes' under these main knowledge areas. Please refer to Table 2 for a complete list of knowledge areas and processes that make up project management competencies according to PMBOK. A more detailed description of the processes and knowledge areas can be found in section 7.3 of the appendices.

Table 2 - Overview of PMBOK Knowledge Areas and Processes (Adapted from PMBOK 2004)

Knowledge Areas	Knowledge Area Processes
Project Integration Management	Develop project Charter
	Develop preliminary project scope statement
	Develop project management plan
	Direct and manage project execution
	Monitor and control project work
	Integrated change control
	Close project
Project Scope Management	Scope planning
	Scope definition
	Creating work breakdown structure (WBS)
	Scope verification
	Scope control
Project Time Management	Activity definition
	Activity sequencing
	Activity resource estimating
	Activity duration estimating
	Schedule development
	Schedule control
Project Cost Management	Cost Estimating
	Cost budgeting
	Cost control

Project Quality Management	Quality Planning
	Perform quality assurance
	Perform quality control
Project Human Resource Management	Human resource planning
	Acquire project team
	Develop project team
	Manage project team
Project Communications Management	Communications planning
	Information distribution
	Performance reporting
	Manage stakeholders
Project Risk Management	Risk management planning
	Risk identification
	Qualitative risk analysis
	Quantitative risk analysis
	Risk response planning
	Risk monitoring and control
Project Procurement Management	Plan purchases and acquisitions
	Plan contracting
	Request seller responses
	Select sellers
	Contract administration
	Contract closure

2.6 Ongoing Learning

Recent research has looked into the growing shortage of Project Managers in the industry and what can be done to up-skill the current intake of students, in order to bring them to a level that is in-line with industry standards. Quarterman, Frame & Coffey (2010) have looked closely at knowledge areas and addressed the skill required by a Project Manager to apply these types of knowledge. They identify the role of the educational institutions as being essential to achieving professional status. However, they argue that there may be benefits from examining the existing relationship between academic entry and practical training and development (Quarterman, Frame, & Coffey, 2010). These points lead back to the importance of the professional qualification. The local industry bodies need to recognise key skill

requirements within their individual market place. They can do this by making competence in the key skill areas a pre-requisite to achieving their associated industry qualification, be it MRICS, IPMA, MCIOB or other. Alum, Gale, Brown & Kidd (2007) go on to add that internationally companies spend over $50 billion per year on formal training and $180 billion on informal 'on the job' training for project management. Despite this, it is difficult to be sure that the training is effectively translated into improved competence.

2.7   Conclusion

Several conclusions can be drawn from this. Identifying the key skills required within the Auckland commercial construction market, in order to function as an above average Project Manager, will be useful to the local industry when identifying potential candidates for these roles.

Further to this, the correlation between the international research and the opinion of our local senior professionals will be of interest.

It is suggested that training institutes and firms should share a joint responsibility in up-skilling the current and future workforce, in order for potential PM's to be proficient within these roles. It is suggested that local industry bodies however, hold the key to ensuring the appropriate experience and skill-set are developed, especially during the formative years of transitioning any person into a high performing Project Manager.

3 METHODOLOGY

3.1 Introduction

This chapter outlines the methodology chosen to best capture the data related to answering the research question. This aim of this research was to explore the core competencies of a successful project manager in the Auckland commercial construction market. One outcome of the project was the ranking of the core competencies as identified by a select sample group of senior project managers. This data was collected with specific relevance to the Auckland commercial construction market. This reflects what competencies are currently deemed as most important to the local industry. The research would therefore be used for identifying the skill areas a current or prospective project manager should be working toward, within their own professional development. To further define the meaning of successful project manager, in the context of the research question, it is intended to mean; those whose actions which contribute more positively than negatively to the outcome of a project, i.e. meeting or exceeding expected project outcomes. The answers to the questions will in part, depend on the participants own idea of the meaning of success.

3.2 Research Methodology

The aim of this project was to gather opinions on project management competency. Current literature states that taking a qualitative approach toward collecting the data gives greater understanding of the participant's personal knowledge than quantitative methods. Furthermore, if the purpose is to learn from the participants and the way they see and experience a situation, qualitative research is ideal (Morse & Richards, 2002). Morse & Richards go on to state that when verifying current theory a qualitative approach is also most suitable. It must also be considered that because there is a wide scope of competencies to be evaluated here, a questionnaire would

enable more expedient data collection. This will then determine a shorter interaction time, which in turn is aimed at attracting a wider sample group. The target sample group is made up of very busy professionals. Therefore, the time required for a full interview would have been detrimental to achieving the sample group size needed to achieve reliable conclusions to the research. Also of interest to this research is how the internationally recognised competencies for project management across all industries compare to the Auckland construction market, with relevance to the research question.

To choose a research method Morse & Richards (2002) go on to say that we need to consider methodological congruence – that is, the fit between:

1. The research problem and the question.
2. The research question and the method.
3. The method, the data, and the way of handling data.

There are many techniques that affect the integrity of data collection. Techniques and strategies differ and become relevant only when their relationship to the methodology is understood. Therefore, certain methodologies cannot be chosen and incorporated outside of the methodological context (Morse & Richards, 2002). Therefore the best methodological approach is to be considered before investigating strategies and techniques.

The trial run was undertaken whereby one must consider the different outcomes through using the differing methods available. Qualitative methods differ a lot and so do the results that come from them (Morse & Richards, 2002). An investigation of these methods was undertaken, looking into three types of qualitative research; Phenomenology, Ethnography and Grounded Theory.

Phenomenology looks at phenomena, whereby researcher may spend a lot of time with or even live with the participants of the study so as to understand and explain the reality of the situation (Morse & Richards, 2002). This approach was not suitable for the gathering the information required for this research.

Ethnography is concerned with researching culture, with the assumption that cultural beliefs are learned, patterned and may change. Although there are cultures within

project management, this is a deviation from the intent of this research. Therefore, this method was not chosen, as it does not best represent the key information gathering of the research i.e. competencies.

Grounded Theory is another area of qualitative research. The 'Grounded Theory' method is suitable for the identification of new theory being discovered in the competency areas. Grounded Theory is best suited to 'process' related questions, concerning changing experiences over time (Morse & Richards, 2002). It was the intent of the research to learn from the participant's way of experiencing things and research shows this can be done by having a qualitative component.

Grounded Theory methods are deemed the best fit for this research. Although Grounded Theory methods will be used, this will not be taken to a level where theory can be produced, due to the small sample size used. Grounded theory is the most heavily used research style when it comes to qualitative research methods and is often taken as synonymous with the term qualitative (Morse & Richards, 2002).

It is apparent from the literature review that there are comprehensive bodies of knowledge documents in place. These have been developed in the large American and European economies to cover the many facets of project management as they exist today. The New Zealand market does not have the scale to develop its own body of knowledge, so further insight into the New Zealand competencies is sought by this research. It is the aim of the project to highlight the important competencies, as utilised within the Auckland commercial construction market, not to expand on the current known theory.

While the benefits of qualitative research are now understood, the ways of collecting this qualitative data needs to be considered. Within the time constraints of this project, a questionnaire approach using a Likert scale was found to be most suitable for ranking the competencies, as presented within the current Bodies of Knowledge.

A quantitative approach is statistical by nature and often uses a questionnaire. However, it is also possible to collect qualitative data using a questionnaire. Much of

the literature reviewed used a Likert scale to rank or show agreement/disagreement, with topics in relation to construction. This was a deciding factor in using this approach when conducting this research. The numerical data created by a Likert Scale can be clearly presented in graphs and charts. It is for these reasons, and also it's concise and clear approach to data analysis that this methodology was chosen to collect the data for this study.

It must however be reiterated that qualitative data can still be counted and presented in a mathematical way; as it is the data gathering itself that is of a qualitative nature. Data coding and numbering sequences can also be used to break down themes within the data and draw conclusions. This is why it is important to be thorough in the research design and have an understanding of how to measure the outcome, but not have an outcome in mind, when doing research (Morse & Richards, 2002).

A weakness of the questionnaire approach is that the participant may spend very little time considering the questions and fill in the answers without much thought. To mitigate this risk, an online system will be used, whereby the participant can re-enter the survey at a later stage and change their answers. Although the flexibility of an online system is an advantage, this does present the possibility that the respondent may not be the person who you requested. These risks are acceptable to the research, given the topic and the level at which the research is being carried out.

It is therefore, the outcome of the review of this theory that a qualitative survey approach should be used to get the desired outcome from this project, using an online questionnaire to gather the raw data. This will now be looked at in detail within section 3.3.

3.3   Construction of data collection instruments

Survey research is the most common approach to research; starting out with a question, designing a survey to collect necessary data, then processing and analysing

the data to form a conclusion. This study used a 'survey research' approach. The surveys were conducted online and contained some open ended questions to give the participant a voice in the study. This enabled the survey to capture some of the interviewee's perspectives that the survey design may not have accounted for. The data collection instrument was an online survey system that allowed the participants to respond at their leisure 24 hrs a day.

The online survey system named Survey Monkey was chosen for data collection, due to a number of reasons. The questions and information presented to the participant is uniform when read from the pages of the survey. Although an interviewer may be able to further explain the intent of the question to a participant in an interview situation, that interviewer may also 'lead' that participant to a certain answer when doing so. Presenting uniform questions in an online format leaves the interpretation up to the participant. The online system also resulted in a number of advantages, with regard to data management. Data security is high with these systems, as no resultant loss of data will be likely to occur. The survey was password protected to ensure confidentiality was maintained. Another benefit of this system was the scope in offering the Likert Scale as an answering option, which was consistent with the chosen research method.

3.4 Ranking of Competencies

The majority of the questions were related to the ranking of the project management competencies.
The list of competencies outlined in PMBOK 2004 was chosen (as described in Table 2). The reason for this is that PMBOK has more knowledge areas than IPMA. It was the intent of the research to gain two points of view from the participants. The first was to rank the 45 processes that make up the nine knowledge areas. The second was to rank the groupings or Knowledge Areas, by giving these a weighting in terms of their importance project success. The participants were asked to apportion a total of 100 percentage points across the knowledge areas, giving more points to the

knowledge area they believed to be more important. It cannot be taken as a fact that all of the processes within the Knowledge Area were seen as equally important to project success as the knowledge area itself. This was outlined in the literature review by the IPMA that these do vary between professions, remembering that PMBOK is not construction specific.

3.5   Sampling

The make-up of the sample group is pivotal to the reliability of the project, as the opinions of those in the sample group will be taken as representing the entire sample population for the purpose of this research. The questions asked were quite specific and of a basis whereby, only specialists in the field of project management would be able to answer the questions in the context required.

Random sampling would certainly not be effective in a study of this size, even if a large group of project managers were available to choose from. This is partly due to the details of all project managers not being freely available. For these reasons Purposive Sampling techniques were used. Filter questions were used to identify 'senior' Project Managers as those with 5 or more year's industry experience within a project management role. Some sampling bias will occur due to the sample group not necessarily being representative of the entire market. This is deemed acceptable to the research given the small scale of the study and the size of the sample group available. This project targeted key senior project managers using Purposeful Sampling, as these people are in a position to be more expert within their field and therefore represent the sample population more effectively.

A risk to the quality of the outcome of this research was that participants would not be available to complete the questionnaire. It is for this reason that some Snowball Sampling was used. This entails a request of each participant, as to whether they can recommend others who are in a similar role to themselves, who may be interested in being part of the research. This aim was to expand the current sample group from a minimum of 10 participants, therefore allowing for the initial sample group response

rate to fall below 100%, while still achieving the minimum target response rate of 10 completed questionnaires.

3.6 Data collection procedure

The participants were contacted personally and asked to take part in the research. The questionnaire was then distributed to the participant via e-mail link. As the questionnaire is online there is no control around finding suitable neutral surroundings for the participant to be able to use when responding. However, this is acceptable when considering the small scale of the study. The online survey system being used was able to collate the number of responding participants, while keeping raw data secure.

3.7 Data analysis procedure

The response questions were compiled and will be presented in both visual and descriptive form in chapter 4 and 5. The online survey system being used was able to check and verify the returns. Questions were grouped in their appropriate coding areas as entered by the questionnaire designer. Moore (2000) describes the need to clean data by identifying and removing rogue data to prevent distortion of results.

3.8 Reliability and validity / Trustworthiness

Due to the limited sample size and varying opinions across the industry, the reliability of this study is not high. To increase the reliability of data collection, a more comprehensive look at interviewee's backgrounds and experience would be needed to sort people into sample groups. Ideally, this requires many more participants than those that could be reached within reason for this research project. The small size of this study does not permit sample groups to be used so has

randomly sampled from people who hold senior project management positions in the industry, regardless of formal training, background, experience or otherwise. However, the number of Client Project Managers in the Auckland commercial construction market is not significant; therefore, being able to capture 12 to 15 senior members would be a reasonable representation of opinions for the purpose of this research. Some demographic data was collected in order to achieve some cross tabulation of different groups; this is described in more detail in section 4.4 of the data collection chapter.

3.9   Ethics considerations

No person or organisation is identified in this project. This was made known to the participants, through the participation consent process. The specific information collected for this research is not sensitive by nature or particularly confidential. The data collected is to be referred to as the opinions of Senior Project Managers in general. Therefore, giving names of participants is in no way useful to the outcome of the research. For this reason, a choice was made to keep participant details confidential.

3.10 Summary

A qualitative approach was used to collect the opinions of the Senior Project Managers involved in this study. These people were contacted personally and sent an e-mail link to an online survey system, which they could fill in at their leisure. It is hoped that the methodology chosen has maximised the data collection given the small amount of time these PM's have available. Although the information collected is not of a confidential nature the opinions of the participants will remain anonymous.

4   DATA COLLECTION

4.1   Introduction

In this chapter the data collection process is reviewed. The chapter is broken down into the corresponding data collection phases in the order which they occurred. Firstly, the data collection process as carried out is reviewed. Some differences between the planned methodology and data collection in practice are also outlined. The data management process is then looked at in detail. The resulting raw data is presented and the results reviewed with key themes, trends or contradictions identified.

The ability of the data to answer the research question is also reviewed. Further to this, the results of a critical analysis carried out to review the process outlines any weaknesses realised during the data collection. This then goes on to identify in retrospect, where improvements may have been made.

4.2   Data Collection Process

Prospective survey respondents were personally contacted by the researcher and asked whether they would like to participate in the survey. The sample group was unfortunately smaller than first hoped; it did however meet the minimum criteria whereby ten Senior Project Managers consented to being part of this research. The participation consent forms outlining the research, along with the ethics procedures to be used when collecting and storing data were circulated to the sample group. This was done in e-mail form which also contained an electronic link to connect to the survey. As an online survey system was being used, collection of the signed consent forms was avoided by using a participation acceptance question early on in the survey. Should a participant not give their consent at this stage, they were unable to proceed with the survey.

A response rate of 90% was expected, based on prior discussions with the participating group. This was calculated based on the ten participants spoken to who had agreed to take part in the survey. While participants are willing they will not always be able to find the time to complete the survey.

4.3   Data Management Process

Data management can be broken up into different areas, data storage, data security, and the manipulation and interpretation of data by way of cross tabulation and storing the data in a usable format (Melbourne_University, 2010). This leads into coding of data for grouping of answers and identifying patterns (Moore, 2000). Research data is deemed to be authentic, accurate and reliable. The data is required to accurately reflect what was communicated or done. Consideration must be given to the data being collected in a suitable form, so that it is adequate for results verification (Melbourne_University, 2010).

Data management was considered at an early stage. An example of the way data was retrieved and stored by the online system was achieved by trialing the functions of the software. Smaller pilot studies were created for this purpose. The resulting pilot data was then able to be displayed, using the online software. This also allowed the graphing functions to be trialed. This in turn demonstrated that the way in which the questions were entered into the software altered the final presentation of the data. It was found that not all of the data was able to be displayed in its final form straight from the survey software. Some data would be required to be exported to Microsoft Excel software and additional calculations would need to be made to enable it to be represented in its most understandable and useful form. This process enabled a fair understanding of how the questions should be categorised and how the resulting data would be compiled and presented within the online system. Categorising of the data is discussed further in section 4.4 of this chapter. The pilot studies also enabled an understanding of how the data could be further manipulated from here. The options within the software involved creating customized cross tabulation of any two questions and its answers. It is then able to create multiple styles of graphic

representations from this information. Furthermore, the data is unable to be corrupted, as all of these functions are derived from the original survey data without modifying it. This made the data security and storage factors very robust. The online survey system was hired for the nominal fee of $37.00 per month, for the three months the software was being used.

4.4   Coding and Categorising

The data was categorized into three main areas. The first area was background information on the participants. This confirmed the number of years the person had been working as a Project Manager, what their background experience was prior to the role, whether or not PM was their sole profession, also their age and gender. This information would be used to cross tabulate answers for further explanation and to identify whether certain demographics answered in a particular way. The smaller than planned sample size of six participants has affected the reliability of the patterns identified within the data. This is taken into consideration when conclusions are being drawn in Chapter 5.

 The second category questioned was that of the PMBOK competencies. This part of the survey was the main drive of the research question. In this section the participants were asked their familiarity with the PMBOK document. They were then given a small excerpt from the PMBOK guide to identify the nine key knowledge areas and the 45 sub processes that made up the nine. A copy of the full survey questionnaire is in the appendices item 8.2. The participants were asked to rank the 45 sub processes, then allocate 100 percentage points across the knowledge areas as they saw them being important to project success. The percentage weighting for all nine should total 100%. The outcome of the weightings and the rankings are shown in the raw data tables (Table 4 & 5) in the following pages.

The final area categorised was that of project management style and relationships. Again, this category looked at the importance of these factors on project success.

These items were identified in other research papers such as Dainty et al (2003) that criticised PMBOK for not highlighting project management style and relationships enough.

The following pages and tables 1 – 6 show the raw data as collected.

Table 3 shows the data collected from the first category, which are demographics of the participants. It was of interest to the research to be able to identify possible split in opinions or alignments in ideas between different genders, age groups or participant backgrounds. It was also of interest to the research whether or not participants familiar with the PMBOK document answered differently to those who were unfamiliar. However, the small sample group did not enable any conclusions to be drawn on this basis.

Table 3 - Category 1 Demographics

Please enter your gender		
Male	83.3%	5
Female	16.7%	1
Please enter your age		
25 - 35 years	0.0%	0
36 - 45 years	50.0%	3
46 - 55 years	16.7%	1
56 years and over	33.3%	2
What is your background?		
I have always done a client side PM role	33.3%	2
Consultant - other fields	33.3%	2
Construction - PM	16.7%	1
Other (please specify)	16.7%	1

This survey is largely based on PMBOK (Project Management Body of Knowledge) competencies published by the Project Management Institute. Please indicate your familiarity with this document.		
No, I am not familiar with the document	33.3%	2
I know the document but not in detail	16.7%	1
I have some idea of how the document works	33.3%	2
I have a good understanding of the document	16.7%	1
I hold a qualification with the Project Management Institute	0.0%	0

Table 4 shows how participants have chosen to rank each of the 45 processes using an importance rating of between 1 and 5. Competencies ranked as most important were given a score of 5, and least important were given a score of 1. As shown in the raw data table below, there is a range of answers for each competency. It is noted that no one process has been ranked the same by all of the participants.

Table 4 - Category 2 PMBOK Competencies Ranked by Importance to Project Success

Project Management Areas - PMBOK Guide (2004) - Responses						
Knowledge Areas	**Knowledge Area Processes**	**Number of people who have chosen each rating shown below 5 = Very important 3 = Avg importance 1 = Least important**				
	Ratings 1 – 5	1	2	3	4	5
Project Integration Management	Develop project Charter			1	2	3
	Develop preliminary project scope statement				3	3
	Develop project management plan			1	2	3
	Direct and manage project execution			1		5

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Knowledge Area	Process					
	Monitor and control project work				2	4
	Integrated change control			1	1	4
	Close project			2	2	2
Project Scope Management	Scope planning			1	2	3
	Scope definition				1	5
	Creating work breakdown structure		1		3	2
	Scope verification			2	1	3
	Scope control			1	1	4
Project Time Management	Activity definition			1	3	2
	Activity sequencing			1	3	2
	Activity resource estimating			1	2	3
	Activity duration estimating				4	2
	Schedule development			1	3	2
	Schedule control		1		2	3
Project Cost Management	Cost Estimating				1	5
	Cost budgeting				4	2
	Cost control				2	4
Project Quality Management	Quality Planning			3	1	2
	Perform quality assurance			2	3	1
	Perform quality control			2	4	
Project Human Resource Management	Human resource planning			2	1	3
	Acquire project team					6
	Develop project team					6
	Manage project team		1	1		4
Project Communications Management	Communications planning				2	4
	Information distribution				2	4
	Performance reporting		1		1	4
	Manage stakeholders			1	1	4
Project Risk Management	Risk management planning			1	2	3
	Risk identification			1	1	4
	Qualitative risk analysis			1	4	1
	Quantitative risk analysis			1	4	1
	Risk response planning			1	3	2
	Risk monitoring and control			2		4
Project Procurement Management	Plan purchases and acquisitions			1	3	2
	Plan contracting			2	3	1
	Request seller responses			1	2	3
	Select sellers			1	1	4
	Contract administration				3	3
	Contract closure			2		4

Table 5 shows the weightings given to the knowledge areas when considered separately from their respective processes. This shows which knowledge areas are considered most important for project success when compared to one another. This is done without considering whether or not every process contained in that knowledge area is equally as relevant. This shows that just because a Knowledge Area is important, not every process in PMBOK is as important. It is worth remembering the PMBOK is not specific to the construction industry. In the discussion and findings chapter this will be reviewed in more detail.

Table 5 - Category 2.1 PMBOK Knowledge Area Weightings

Knowledge Area Weightings							
Please give a percentage weighting to the following Knowledge Areas, to indicate your opinion of their importance to project success in the Auckland commercial construction market. Note: When added together the total of these should equal 100%. Please refer to the supplementary documentation which tables the Knowledge Areas and Competencies information for easy review. Please enter a whole number i.e. for 25% enter 25							
	Participant Weightings (6 Participants shown left to right)						
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**Average Weighting**
Project Integration Management	5	10	10	10	5	5	7.5
Project Scope Management	20	25	15	30	5	25	20
Project Time Management	20	5	10	5	24	10	12.3
Project Cost Management	20	15	10	5	23	15	14.7
Project Quality Management	5	15	10	10	10	5	9.2
Project Human Resource Management	10	10	10	15	2	10	9.5
Project Communications	5	5	15	10	3	10	8

Management							
Project Risk Management	5	5	10	10	23	10	10.5
Project Procurement Management	10	10	10	5	5	10	8.3

Table 6 shows the participants opinions on the importance of project management style, client relationship, project management qualifications, and business reputation.

Table 6 - Category 3 PM Style and Client Relationship

How important is it to you, to hold a project management qualification, when practicing in Auckland?		
Answer Options	**Response Percent**	**Response Count**
2 - Less than average	16.7%	1
3 - Average importance	50.0%	3
4 - More than average	33.3%	2
How important is it to your clients that they have a good relationship with you, assuming your competence at the role is satisfactory?		
5 - Highest importance	100.0%	6
How important is the reputation of your business to the client when he/she is making a decision to give a project management commission, regardless of the Project Manager who may be fulfilling the role?		
4 - More than average	16.7%	1
5 - Highest importance	83.3%	5
How important is the project manager's management style to the success of a project in Auckland?		
2 - Less than average	16.7%	1
5 - Highest importance	83.3%	5

4.5 Results

The raw data in the above tables has shown that not all of the knowledge areas and process in PMBOK are equally important to project success. The data however does show that the rankings of the processes are generally toward the average to high importance end of the scale of importance to project success. This goes on to support the claim that the 'Project management Approach' as defined by the Project Management Institute, may include all of the competencies required by a clients side project manager, to achieve project success in the Auckland commercial construction market.

It is also seen that Project Management Style & Relationships are extremely important to project success as outlined by Dainty, Cheng & Moore (2003) in the literature review.

There has been a disappointing result on the open ended question put to the participants. It was intended that giving the respondents a voice may have bought out some information that had not been considered. There was no response to this question. This may be due to the length of the survey being 56 questions long. As this is the last question in the survey, participants may not have had further time to spend at this late part of the survey.

The resulting data did have some weaknesses due to the phrasing of some of the questions. There was some ambiguity created due to the phrasing used in two of the survey questions. Where it was asked "How important is the project management style to project success in Auckland" this was phrased correctly. However in contrast where it was asked "How important is it to your clients that they have a good relationship with you, assuming your competence at the role is satisfactory" we are asking the project manager's view of the client's opinion and not asking the client directly. This question could have been re-phrased as "How important is a good relationship with the client to project success, assuming your competence at the role is satisfactory". The latter is more reliable data as it is a direct opinion as opposed to an indirect opinion. While the online system can establish authenticity of data, the validity of the data can be undermined by this incorrect phrasing. However the result

is still the opinion of the project manager, upon whose sole opinion is the basis of this survey, as outlined in the research question.

4.6   Answering the Research Question

The data has answered the research question. It has identified that the competencies of the internationally recognized 'Project Management Approach' are all relevant in varying degrees to project success in the Auckland commercial construction market. The project management style and client relationship areas, as identified by Jha & Iver 2007, are rated extremely highly by the participants in their role of playing a part in project success. The detailed findings will be discussed in Chapter 5.

5   DISCUSSION AND CONCLUSIONS

5.1   Introduction

In this chapter the results of the data collection are discussed in more detail. Some of the key themes and trends are looked at more closely in relation to the data collected. Unexpected or significant findings are also identified along with some discussion around where the research may have been improved. Conclusions are drawn and explained with relation to the literature.

5.2   Findings

5.2.1   Project Management Approach

It was found that the project management approach is of high importance to project success in the Auckland commercial construction market. This has been shown by the results in Figure 1 whereby the number of times the participants ranked a PMBOK competency as 'very important' or 'important' to project success totaled 84% of total responses given, with 62% of those responses indicating the highest ranking of 5.
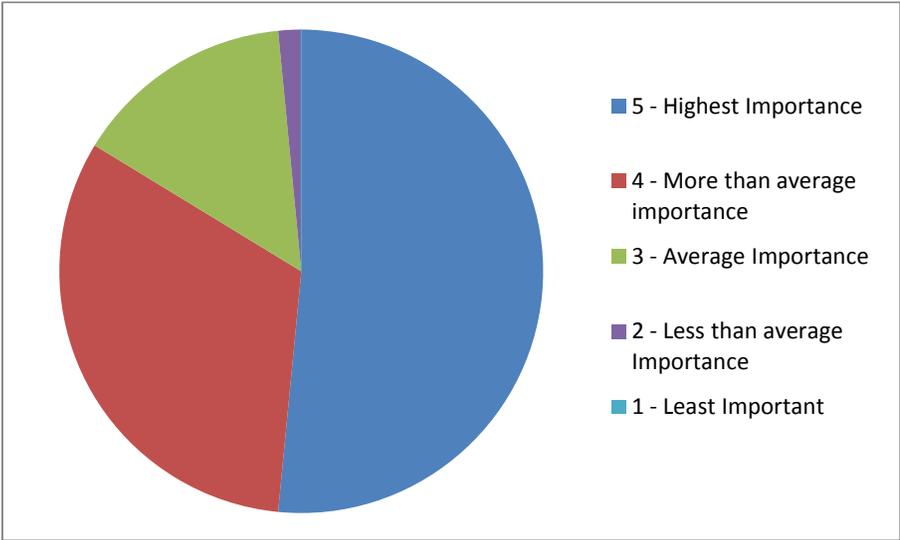

Figure 1 - PMBOK Summary of rankings given to all competencies by number of possible choices

However, these rankings are not uniform across the competencies as shown in Table 4. This will be looked at in more detail through the next sections of this chapter. The ranking of the competencies was a two stage process. After having ranked the 45 individual Processes that make up the nine Knowledge Areas, the participants were asked to weight the Knowledge Areas. They did this by allocating 100 percentage points across the nine Knowledge Areas The higher percentage point weighting being given to the Knowledge Area that was most important to project success. The result ranked the knowledge areas in the order shown in Table 7. The rankings are listed down the left hand side of the table. The percentages show the average weighting given to each competency by the survey participants as derived from the raw data in table 5.

Table 7 - Knowledge Area Weightings in order of importance to project success

Rank	Knowledge Area	Weighting
1	Project Scope Management	20%
2	Project Cost Management	15%
3	Project Time Management	12%
4	Project Risk Management	11%
5	Project Human Resource Management	10%
6	Project Quality Management	9%
7	Project Procurement Management	8%
8	Project Communications Management	8%
9	Project Integration Management	8%

These results show that while the majority of the knowledge areas are all fairly evenly spread, Scope Management and Cost Management have a slightly more important part to play in project success.

In table 8 the rankings of the Processes are compared to the Knowledge Areas. This was calculated using a system as shown in section 7.4 of the appendices. This calculated the average ranking given to the group of Processes within each Knowledge Area. These are shown in order of importance to project success in this table. The Knowledge Area ranking shown in table 7 is displayed in the left hand column; this enables a comparison to its original position in the Knowledge Area Weightings. The result of the Knowledge Area ranking does appear in contrast to the

average score given to the Processes. It is shown clearly that Cost Management processes are seen as important to project success. The Cost Management Knowledge Area also rated highly. Scope Management processes ranked number one in the weightings, while these are ranked number four in the Processes. However it can be seen by looking at the process of scope definition, that it has an individual score of 4.83 which is the second highest when looking at the Processes individual rankings in table 9. It is also noted that the rankings given to the Processes are clustered high in the importance range with only one of the nine knowledge areas dropping below the rating of 4 out of 5. The comparison shows that while opinions do vary as to which are the most important factor for success when looking at PMBOK competencies, all are important to know. The knowledge area that ranks below 4 is Quality Management. However Quality be seen as inspections of project quality and the monitoring and control of quality on site. While these are part of the Project Manager's responsibility, they will often fall under the direct responsibility of the Architect for inspection's and the site management for quality management. It is important to note that quality management is not just the finish of a building but processes and a way of a company going about their work to ensure a consistent outcome no matter who performs the task (Wikipedia, 2011). It appears that while some overall responsibility does sit with the Project Manager. There are other people in the project team that will take care of this so it does not rank highly as a PM competency.

Table 8 – Knowledge Area ranked by sub-process scores

Rank	Rank from Table 7	Knowledge Area	Average rating given to sub- process within knowledge area
1	2	Project Cost Management	4.61
2	5	Project Human Resource Management	4.58
3	8	Project Communications Management	4.54
4	1	Project Integration Management	4.43
5	9	Project Scope Management	4.37

6	7	Project Procurement Management	4.28
7	3	Project Time Management	4.22
8	4	Project Risk Management	4.22
9	6	Project Quality Management	3.78

The consistent high ranking of the processes by the participants goes to back up the claim that the Project Management Approach while not construction specific can be applied to construction with confidence. It is found that the PMBOK Knowledge Areas and Processes are of high importance toward project success. It can be concluded that they could form part of the competencies required to be a successful Project Manager in the Auckland commercial construction market. Drawing from Davidson-Frame (1999) who states that "the most competent performers add far more value than average or sub average performers" can be considered with regard to the results above. This would indicate that a thorough knowledge of all of these Knowledge Areas and Processes would certainly help a PM to perform at a top level. Whether or not all of them are used and on what size projects they become more or less important is not assessed here. However, the appropriate use of the competencies can be related to the Project Manager's experience.

Table 9 - Ranking of Processes

Processes Sorted Most Important to Least Important by Average Ranking		
Knowledge Area	Process	Average Ranking
Human Resource Management	Acquire project team	5.00
Human Resource Management	Develop project team	5.00
Scope Management	Scope definition	4.83
Cost Management	Cost Estimating	4.83
Integration Management	Direct and manage project execution	4.67
Integration Management	Monitor and control project work	4.67
Cost Management	Cost control	4.67
Communications Management	Communications planning	4.67
Communications Management	Information distribution	4.67
Integration Management	Develop preliminary project scope statement	4.50

Integration Management	Integrated change control	4.50
Scope Management	Scope control	4.50
Communications Management	Manage stakeholders	4.50
Risk Management	Risk identification	4.50
Procurement	Select sellers	4.50
Procurement	Contract administration	4.50
Integration Management	Develop project Charter	4.33
Integration Management	Develop project management plan	4.33
Scope Management	Scope planning	4.33
Time Management	Activity resource estimating	4.33
Time Management	Activity duration estimating	4.33
Cost Management	Cost budgeting	4.33
Communications Management	Performance reporting	4.33
Risk Management	Risk management planning	4.33
Risk Management	Risk monitoring and control	4.33
Procurement	Request seller responses	4.33
Procurement	Contract closure	4.33
Scope Management	Scope verification	4.17
Time Management	Activity definition	4.17
Time Management	Activity sequencing	4.17
Time Management	Schedule development	4.17
Time Management	Schedule control	4.17
Human Resource Management	Human resource planning	4.17
Human Resource Management	Manage project team	4.17
Risk Management	Risk response planning	4.17
Procurement	Plan purchases and acquisitions	4.17
Integration Management	Close project	4.00
Scope Management	Creating work breakdown structure	4.00
Risk Management	Qualitative risk analysis	4.00
Risk Management	Quantitative risk analysis	4.00
Quality Management	Quality Planning	3.83
Quality Management	Perform quality assurance	3.83
Procurement	Plan contracting	3.83
Quality Management	Perform quality control	3.67

Project Management Qualifications

The results have shown that all knowledge areas and processes in PMBOK are valuable to project success. Therefore, it was concluded that it would be advantageous to be familiar with the Project Management Body of Knowledge. This body of knowledge has been compiled to benchmark the project management profession and outline the skills required to perform it well. When participants were asked about PMBOK, not all were familiar with the document. The range of responses is shown in Figure 2.
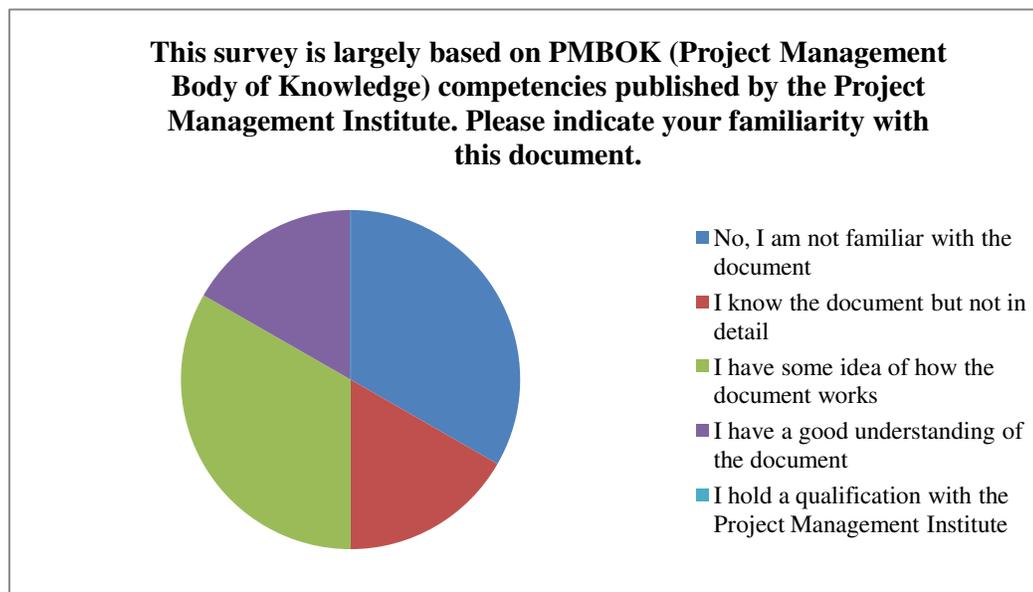
Figure 2 - Participants Understanding of the PMBOK document

The results in Figure 2 identify that of the participants surveyed none holds a qualification with the Project Management Institute. The opinions of whether or not project management qualifications are seen as important are shown in Figure 3. It does not appear that holding a formal qualification in project management is critical to project success. However it is of medium importance to those surveyed. To gain a qualification with the Project Management Institute you are tested on your understanding of the PMBOK document and asked to show examples of you having carried out the many processes that go toward making up the knowledge areas. This is consistent with the IPMA approach. A weakness identified in this questioning is

that it could have been asked as to how many participants hold a project management qualification of another sort which may have put the qualifications question in a better context. These participants may hold the European qualification of IPMA or other which is equivalent. Alternatively they may have been given training over the years based on a BOK which was not identified here. The topic of what qualifications and training have contributed the most to a Project Manager's competence could be the basis of future research to expand on this topic.
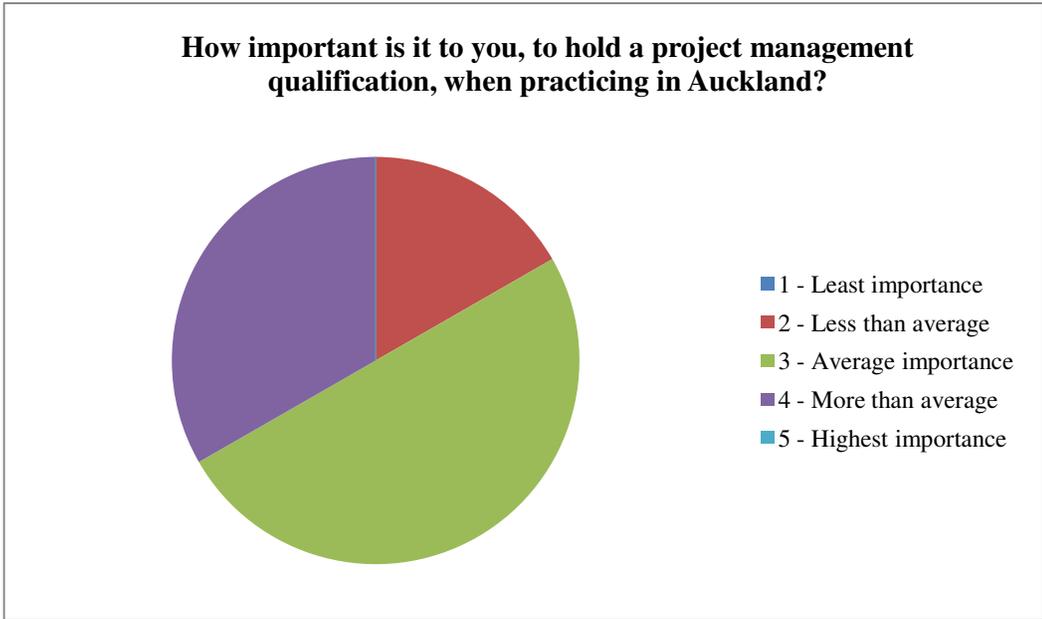
Figure 3 - Participants opinion on the importance of holding a project management qualification

How important is the project managers management style to the success of a project in Auckland?

- 1 - Least importance
- 2 - Less than average
- 3 - Average importance
- 4 - More than average
- 5 - Highest importance
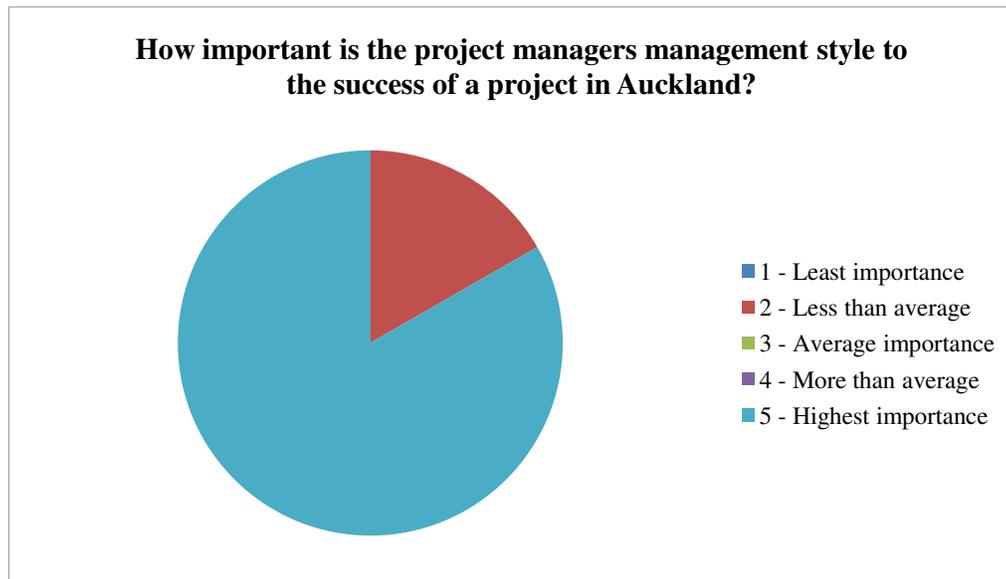
Figure 4 - Participants opinion on the importance of project management style

There was one outlier response which due to the small sample size has distorted this data. However, also due to the small sample size it has not been removed. If the sample size was larger the variance in opinion may have been slightly different with a wider range of opinions. The data does support the idea put forward by Dainty, Cheng and Moore (2005) that the Project Manager's ability to influence others through their management style does influence the project outcome. Therefore, it can be concluded that the PM's management style is of high importance to project success in Auckland. This question may not have been phrased as well as it could be. It has not identified leadership directly. The PM style was meant to include leadership style. If this topic was re-done it would include more questions on Leadership Style and cover at least a few of the factors that go to make this up. The outlier in the data may also be due to the question being vague and not identifying the style factors in enough detail.

How important is it to your clients that they have a good relationship with you, assuming your competence at the role is satisfactory?

- 1 - Least importance
- 2 - Less than average
- 3 - Average importance
- 4 - More than average
- 5 - Highest importance
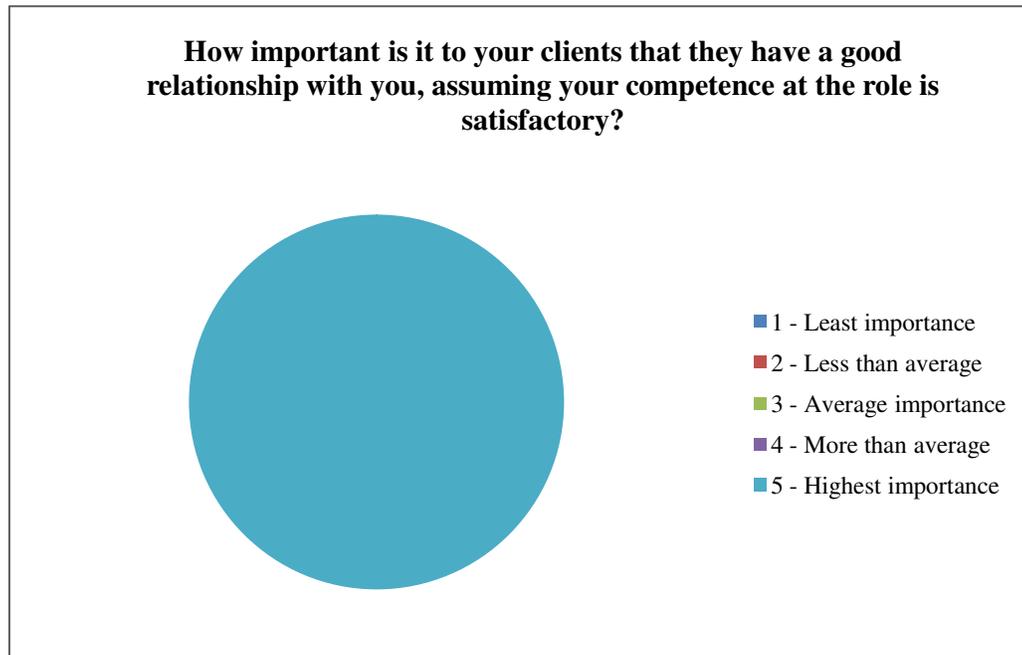
Figure 5 - Participants opinion on client relationships

It is also the opinion of the project managers that the relationship with the client is paramount to project success. This is the only question that has achieved a unanimous opinion. According to participants, the relationships you build with the client are the most important factor to project success. Unfortunately this question is framed in the sense that it asks the clients opinion without asking the client. However the results for this survey are based on the project manager's viewpoint and this is taken as read.

5.3 Conclusions and discussion

There are a number of weaknesses when attempting to draw conclusions from a study of this size. The sample group was quite small so the answer of only one person being in contrast to others was able to sway the results greatly. A much larger sample size was needed to give more consistency in the findings. Unfortunately Project Managers have been found to be often too short of time to participate in such surveys.

It was found in the literature review that education needed to give students a solid grounding before they are able to go into industry, to get the invaluable experience they require and learn to use this knowledge and convert it into competencies. From the information gathered here it is shown that a teaching regime that in part gives students a minimum level of understanding of the competencies outlined in PMBOK would help them toward becoming more efficient and successful project managers in industry. Having put these competencies in context for the Auckland commercial construction market it would be interesting to go on and find out how the industry perceives the basic understanding of these skills are being met by training institutes. If these are not met then what are the options to go and pick up the specific matrix of skills in a way where a company is able to see a direct return on investment should they choose to put staff into such training. This goes back to the research by Alum, Gale, Brown & Kidd (2007) who state that project management training is a multimillion dollar business and despite this, it is difficult to be sure that the knowledge gained is linked to the context of professional practice that will benefit the employing organisation.

It is shown clearly here however that a person who is able to build strong relationships with their clients will have a major contributing factor to project success on their side. The approach of this research to gather the technical competencies has not managed to look closely at the details of how these behavioral competencies vary. The area of investigating behavioral competencies would be a relevant research topic of its own and an interesting expansion on this topic. It was also briefly touched upon the importance of holding a project management qualification. This was brought about by Quarterman Frame & Coffey (2010) being concerned with training started by education but not carried on into industry in a structured way. There is a concern that there is not enough happening in industry to ensure that project managers are well rounded in all areas. The concern around a need to be competent in all these areas by way of a formal industry qualification be it membership of a local industry body or other is seen by senior professionals as of only average importance. Further research could be done on how the industry believes the best way to ensure project managers of the future are skilled in all of the competency areas. Furthermore research into at the best way to go about ensuring

new project managers get the industry experience they need to succeed, which industry body accreditations are recognised and whether they test the competency areas identified herein as part of this accreditation would be of interest. This links back to Davidson Frame (1996) statement that outstanding performers add far more value than average or sub average performers. From this it can be drawn that having a comprehensive understanding of the industry best practices through accreditation, could be a minimum benchmark when working towards becoming an outstanding performer. This would partially depend on the accreditation being rigorous otherwise it will quickly lose value. It would also be of contrast to this research to interview project managers on their opinions of what the important competencies of project managers are, without giving them prompts and a framework on which to rate. It may be that some of the rankings given herein were based on competencies sounding important in theory but are not actually undertaken in practice and would therefore not be brought up without such prompts being given i.e. in an interview only situation.

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7 APPENDICES

7.1 Copy of survey questions

As this is not in a format able to be electronically copied into this document, it has been printed and attached at the back of the document.

7.2 IPMA Baseline – Technical Competencies Summary

This section describes the technical competence elements. In the 'Technical' range the competence elements described are needed to initiate and start, to manage the execution of, and to close a project.

This order can differ depending on the kind, size and complexity of a project and other influencing factors. The importance or weight of a competence is completely dependent upon the specific project situation.

1.01 Project management success

'Project management success' is the appreciation of the project management results by the relevant interested parties.

1.02 Interested parties

Interested parties ('interested parties' is the ISO approved term adopted in ICB; 'stakeholders' is a synonym used for interested parties; 'client' and 'customer' are

also used in the text to identify a subset of interested parties) are people or groups, who are interested in the performance and/or success of the project, or who are constrained by the project.

The project manager should identify all the interested parties, what their interests are, and sequence both in order of importance to the project.

1.03 Project requirements & objectives

Requirements management consists of the identification, definition and agreement of the project to meet the needs and expectations of interested parties, especially those of the customers and users.

1.04 Risk & opportunity

Risk and opportunity management is an ongoing process taking place during all phases of the project life cycle, from initial idea to project close-out. At project close-out the lessons learnt in risk and opportunity management throughout the project are an important contribution to the success of future projects.

1.05 Quality

Quality of the project is the degree to which a set of inherent characteristics fulfils the project requirements. Project quality management embraces all phases and parts of the project from the initial project definition, via the project processes, the management of the project team, the project deliverables and the closure of the project. Project quality management is the responsibility of the project, programme and portfolio management as a part of the management of total quality.

1.06 Project organisation

The project organisation is a group of people and associated infrastructure with an arrangement of, authority, relationships and responsibilities aligned to the business or

function's processes. This competence element covers the design and the maintenance of appropriate roles, organizational structures, responsibilities and capabilities for the project.

1.07 Teamwork

Projects are performed by teams of people, who are usually brought together specifically for the purpose of the project. **Teamwork** covers the management and leadership of team building, operating in teams and group dynamics. Teams are groups of people who work together to realise specific objectives.

1.08 Problem resolution

Most of the work in the project life-cycle deals with the definition of work tasks and **problem resolution**. Most of the problems that arise are likely to involve the time-frame, cost, risks or deliverables of the project or an interaction between all four factors. Options to resolve problems may involve reducing the scope of project deliverables, increasing its time-frame, or providing more resources.

1.09 Project structures

The portfolio, programme and project managers coordinate the different structures in their respective areas. The **project structures** are a key mechanism for creating order within the project. Hierarchical structures serve to ensure nothing is omitted from the project.

1.10 Scope & deliverables

The project **scope** defines the boundaries of a project. If the boundaries of the project, programme, or portfolio are not properly defined and if additions to and deletions from the project, programme or portfolio are not properly documented, then the situation tends to get out of control. From the point of view of the interested

parties the scope embraces the totality of all the deliverables, which are included in a project. The **deliverables** of a successful project, programme or portfolio are tangible or intangible assets created by the project, programme or portfolio for the customer. They are represented by drawings, schematics, descriptions, models, prototypes, systems and products of various kinds.

1.11 Time & project phases

Time covers the structuring, sequencing, duration, estimating and scheduling of activities and/or work packages, including the assignment of resources to activities, establishing project deadlines and monitoring and controlling their timely execution. These aspects should be displayed on a criticalpath diagram.

A **project phase** is a discrete time period of the project sequence, which is clearly separate from other periods. A project phase includes both major project deliverables and decisions which are the basis for the next phase. Phases have defined objectives and may have specified time limits. Different phase models may be used for different kinds of (sub) projects which increases the complexity of their coordination. Milestones can be used to work towards specific targets or phase limits or intervals in between.

1.12 Resources

Resource management consists of resource planning, with the identification and allocation of resources with the appropriate capability. It also includes optimising the way resources are utilised in the time schedule as well as the continuous monitoring and control of these resources. Resources embraces people, materials and the infrastructure (such as materials, equipment, facilities, services, information technology, information and documents, knowledge, funds) required to carry out project activities. Project management should make sure that individuals have the necessary technical, behavioral and contextual competences and are provided

1.13 Cost & finance

Project **cost and finance** management is the sum of all the actions required for planning, monitoring and controlling costs during the project life-cycle, including project assessment and cost estimates in the early phases of the project.

Project **cost management** estimates the cost of each work package, the sub-systems and the whole project and establishes the budget for the overall project. It also involves comparing planned versus actual costs incurred at various points in the project and estimating the remaining cost, as well as updating the final cost estimate. The cost of the deliverables should be measurable and calculable. The cost of any change should be calculated, agreed and documented.

Project **financial management** ensures that in all project phases project management knows how much financial resource is required for each time interval. The resources required depend on the project cost, the time schedule and the payment conditions. Project management also analyses the available financial resources and manages any under-spending or over-spending.

1.14 Procurement & contract

Procurement involves obtaining the best value for money from suppliers of goods or services to the project. There is a need to formalise the work performed by the suppliers and organisations involved, clearly defining what is expected from them, the control to be exerted by the receiving organisation and the obligations of each party.

1.15 Changes

Changes are often necessary in a project due to unanticipated occurrences. It may be necessary to change the project specification or the contract terms with suppliers or customers. Changes must be monitored against the original project goals and objectives as set out in the business case. At the start of a project, the change management process to be adopted should be agreed with all relevant interested parties.

1.16 Control & reports

This element covers the integrated control and reporting of the project. **Control** is based on project objectives, plans and contracts. It measures actual project progress and performance, compares it against the baseline, and takes any necessary remedial action.

Reporting provides information and communication about the status of work on the project and forecasts developments up until the end of the project or programme. Reporting also includes financial audits and reviews of the project.

1.16 Information & documentation

Information management includes modelling, gathering, selecting, storing and retrieving project data (formatted, unformatted, graphical, hard copy, electronic copy). Care must also be taken in deciding who gets what information. There can be a tendency to overwhelm people with too much information. Interested parties should receive only the information that they need, in a suitable form, to allow them to take whatever action is required of them.

1.17 Communication

Communication covers the effective exchange and understanding of information between parties. Effective communication is vital to the success of projects, programmes and portfolios; the right information has to be transmitted to relevant parties, accurately and consistently to meet their expectations. Communication should be useful, clear and timely.

1.18 Start-up

Start-up provides the basis for a successful programme or project. It is frequently characterized by uncertainty, with information that is sketchy or not yet available. Interested party requirements may be ill-defined, their expectations unrealistic and

time-frame undeliverable, whilst early optimism and enthusiasm needs to be tempered with reality. A well-prepared and effectively managed start-up workshop and the recruitment of the right programme/project team personnel can improve the chances of a successful programme/project. The start-up workshop should focus on developing the programme/project charter and preparing the programme/project management plan, setting out the team roles and critical path for the programme/project.

1.19 Close-out

Close-out refers to the completion of the project or programme or of a phase of the project, after the results of the programme, project or phase have been delivered. Each phase of a project or sub-project should be formally closed with an evaluation and documentation of the phase carried out, checking that objectives have been achieved and customer expectations met. The proposals for the next phase(s) of the project should be reviewed and any issues requiring a decision submitted to the appropriate body for authorisation.

7.3   Project Management Areas – PMBOK Guide

Concerning the Knowledge areas detailed below: These processes interact with each other and with the processes in the other Knowledge Areas as well. Each process can involve effort from one or more persons or groups of persons based on the needs of the project. Each process occurs at least once in every project and occurs in one or more project phases, if the project is divided into phases. Although the processes are presented here as discrete elements with well-defined interfaces, in practice they may overlap and interact in ways not detailed here.

Project Integration Management (Ch 4 – PMBOK)

The Project Integration Management Knowledge Area includes the processes and activities needed to identify, define, combine, unify, and coordinate the various processes and project management activities within the Project Management Process Groups. In the project management context, integration includes characteristics of unification, consolidation, articulation, and integrative actions that are crucial to

project completion, successfully meeting customer and other stakeholder requirements, and managing expectations. Integration, in the context of managing a project, is making choices about where to concentrate resources and effort on any given day, anticipating potential issues, dealing with these issues before they become critical, and coordinating work for the overall project good. The integration effort also involves making trade-offs among competing objectives and alternatives.

The project integration management processes include the following:
4.1 Develop Project Charter – developing the project charter that formally authorizes a project or a project phase.
4.2 Develop Preliminary Project Scope Statement – developing the preliminary project scope statement that provides a high-level scope narrative.
4.3 Develop Project Management Plan – documenting the actions necessary to define, prepare, integrate, and coordinate all subsidiary plans into a project management plan.
4.4 Direct and Manage Project Execution – executing the work defined in the project management plan to achieve the project's requirements defined in the project scope statement.
4.5 Monitor and Control Project Work – monitoring and controlling the processes used to initiate, plan, execute, and close a project to meet the performance objectives defined in the project management plan.
4.6 Integrated Change Control – reviewing all change requests, approving changes, and controlling changes to the deliverables and organizational process assets.
4.7 Close Project – finalizing all activities across all of the Project Management Process Groups to formally close the project or a project phase.

Project Scope Management (Ch 5 – PMBOK)

Project Scope Management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. Project scope management is primarily concerned with defining and controlling what is and is not included in the project.
In the project context, the term scope can refer to:
Product scope. The features and functions that characterize a product, service, or result
Project scope. The work that needs to be accomplished to deliver a product, service, or result with the specified features and functions.
The project scope management processes include the following:
5.1 Scope Planning – creating a project scope management plan that documents how the project scope will be defined, verified, controlled, and how the work breakdown structure (WBS) will be created and defined.
5.2 Scope Definition – developing a detailed project scope statement as the basis for future project decisions.
5.3 Create WBS (work breakdown structure) – subdividing the major project deliverables and project work into smaller, more manageable components.
5.4 Scope Verification – formalizing acceptance of the completed project deliverables.

5.5 Scope Control – controlling changes to the project scope.

Project Time Management (Ch 6 – PMBOK)

Project Time Management includes the processes required to accomplish timely completion of the project. On some projects, especially ones of smaller scope, activity sequencing, activity resource estimating, activity duration estimating, and schedule development are so tightly linked that they are viewed as a single process that can be performed by a person over a relatively short period of time. These processes are presented here as distinct processes because the tools and techniques for each are different.

The Project Time Management processes include the following:

6.1 Activity Definition – identifying the specific schedule activities that need to be performed to produce the various project deliverables.

6.2 Activity Sequencing – identifying and documenting dependencies among schedule activities.

6.3 Activity Resource Estimating – estimating the type and quantities of resources required to perform each schedule activity.

6.4 Activity Duration Estimating – estimating the number of work periods that will be needed to complete individual schedule activities.

6.5 Schedule Development – analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule.

6.6 Schedule Control – controlling changes to the project schedule. These processes interact with each other and with processes in the other Knowledge Areas as well. Each process can involve effort from one or more persons or groups of persons, based on the needs of the project. Each process occurs at least once in every project and occurs in one or more project phases, if the project is divided into phases. Although the processes are presented here as discrete components with well-defined interfaces, in practice they can overlap and interact in ways not detailed here.

Project Cost Management (Ch 7 – PMBOK)

Project Cost Management includes the processes involved in planning, estimating, budgeting, and controlling costs so that the project can be completed within the approved budget. Project Cost Management is primarily concerned with the cost of the resources needed to complete schedule activities. However, Project Cost Management should also consider the effect of project decisions on the cost of using, maintaining, and supporting the product, service, or result of the project. For example, limiting the number of design reviews can reduce the cost of the project at the expense of an increase in the customer's operating costs. This broader view of Project Cost Management is often called life-cycle costing. Life-cycle costing, together with value engineering techniques, can improve decision-making and is used to reduce cost and execution time and to improve the quality and performance of the project deliverable.

The project cost management processes include the following:

7.1 Cost Estimating – developing an approximation of the costs of the resources needed to complete project activities.

7.2 Cost Budgeting – aggregating the estimated costs of individual activities or work packages to establish a cost baseline.

7.3 Cost Control – influencing the factors that create cost variances and controlling

changes to the project budget, using earned value management techniques

Project Quality Management (Ch 8 – PMBOK)

Project Quality Management processes include all the activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken. It implements the quality management system through the policy, procedures, and processes of quality planning, quality assurance, and quality control, with continuous process improvement activities conducted throughout, as appropriate.

The Project Quality Management processes include the following:

8.1 Quality Planning – identifying which quality standards are relevant to the project and determining how to satisfy them.

8.2 Perform Quality Assurance – applying the planned, systematic quality activities to ensure that the project employs all processes needed to meet requirements.

8.3 Perform Quality Control – monitoring specific project results to determine whether they comply with relevant quality standards and identifying ways to eliminate causes of unsatisfactory performance.

Project Human Resource Management (Ch 9 – PMBOK)

Project Human Resource Management includes the processes that organize and manage the project team. The project team is comprised of the people who have assigned roles and responsibilities for completing the project. While it is common to speak of roles and responsibilities being assigned, team members should be involved in much of the project's planning and decision-making. Early involvement of team members adds expertise during the planning process and strengthens commitment to the project. The type and number of project team members can often change as the project progresses. Project team members can be referred to as the project's staff. The project management team is a subset of the project team and is responsible for project management activities such as planning, controlling, and closing. This group can be called the core, executive, or leadership team. For smaller projects, the project management responsibilities can be shared by the entire team or administered solely by the project manager. The project sponsor works with the project management team, typically assisting with matters such as project funding, clarifying scope questions, and influencing others in order to benefit the project.

The Project Human Resource Management processes include the following:

9.1 Human Resource Planning – Identifying and documenting project roles, responsibilities, and reporting relationships, as well as creating the staffing management plan.

9.2 Acquire Project Team – Obtaining the human resources needed to complete the project.

9.3 Develop Project Team – Improving the competencies and interaction of team members to enhance project performance.

9.4 Manage Project Team – Tracking team member performance, providing feedback, resolving issues, and coordinating changes to enhance project performance.

Project Communications Management (Ch 10 – PMBOK)

Project Communications Management is the Knowledge Area that employs the

processes required to ensure timely and appropriate generation, collection, distribution, storage, retrieval, and ultimate disposition of project information. The Project Communications Management processes provide the critical links among people and information that are necessary for successful communications. Project managers can spend an inordinate amount of time communicating with the project team, stakeholders, customer, and sponsor. Everyone involved in the project should understand how communications affect the project as a whole.

The Project Communications Management processes include the following:

10.1 Communications Planning – determining the information and communications needs of the project stakeholders.

10.2 Information Distribution – making needed information available to project stakeholders in a timely manner.

10.3 Performance Reporting – collecting and distributing performance information. This includes status reporting, progress measurement, and forecasting.

10.4 Manage Stakeholders – managing communications to satisfy the requirements of and resolve issues with project stakeholders.

Project Risk Management (Ch 11 – PMBOK)

Project Risk Management includes the processes concerned with conducting risk management planning, identification, analysis, responses, and monitoring and control on a project; most of these processes are updated throughout the project. The objectives of Project Risk Management are to increase the probability and impact of positive events, and decrease the probability and impact of events adverse to the project.

The Project Risk Management processes include the following:

11.1 Risk Management Planning – deciding how to approach, plan, and execute the risk management activities for a project.

11.2 Risk Identification – determining which risks might affect the project and documenting their characteristics.

11.3 Qualitative Risk Analysis – prioritizing risks for subsequent further analysis or action by assessing and combining their probability of occurrence and impact.

11.4 Quantitative Risk Analysis – numerically analyzing the effect on overall project objectives of identified risks.

11.5 Risk Response Planning – developing options and actions to enhance opportunities, and to reduce threats to project objectives.

11.6 Risk Monitoring and Control – tracking identified risks, monitoring residual risks, identifying new risks, executing risk response plans, and evaluating their effectiveness throughout the project life cycle.

Project Procurement Management (Ch 12 – PMBOK)

Project Procurement Management includes the processes to purchase or acquire the products, services, or results needed from outside the project team to perform the work. This chapter presents two perspectives of procurement. The organization can be either the buyer or seller of the product, service, or results under a contract. Project Procurement Management includes the contract management and change control processes required to administer contracts or purchase orders issued by authorized project team members.

Project Procurement Management also includes administering any contract issued by an outside organization (the buyer) that is acquiring the project from the performing organization (the seller), and administering contractual obligations placed on the project team by the contract.

The Project Procurement Management processes include the following:

12.1 Plan Purchases and Acquisitions – determining what to purchase or acquire and determining when and how.

12.2 Plan Contracting – documenting products, services, and results requirements and identifying potential sellers.

12.3 Request Seller Responses – obtaining information, quotations, bids, offers, or proposals, as appropriate.

12.4 Select Sellers – reviewing offers, choosing among potential sellers, and negotiating a written contract with each seller.

12.5 Contract Administration – managing the contract and relationship between the buyer and seller, reviewing and documenting how a seller is performing or has performed to establish required corrective actions and provide a basis for future relationships with the seller, managing contract-related changes and, when appropriate, managing the contractual relationship with the outside buyer of the project.

12.6 Contract Closure – completing and settling each contract, including the resolution of any open items, and closing each contract applicable to the project or a project phase.

Adapted from: Institute, Project Management. (© 2004). A guide to the project management body of knowledge (pmbok® guide), third edition. [Books24x7 version] Available from http://common.books24x7.com.libproxy.unitec.ac.nz/toc.aspx?bookid=9342.

What are the perceived benefits of increasing competency in project management?
What are the perceived benefits of a project management framework?
The following is in line with the works from (Suikkia, Tromstedta and happasolob).
Which competencies do you think are the most important when trying to achieve the following and what can a PM do to improve these outcomes:
Better financial management
Better time management
Better client satisfaction
An easier and more enjoyable project for all participants to be involved with
Improved future possibilities for the PM
Efficient use of resources
Better communication
More forward progress in projects
Research methodology
The Role of project management maturity and organisational l culture:
Pg 18: 46 Questions of project management maturity from eight knowledge areas
with a 1-5 likert scale, each representing a maturity level.

Lit Review

Structural Equation model for assessing impacts of contractor performance on project success. This talks about the importance of contractor selection to project success; this can be linked to project success vs project manager competence in the lit review. Topics that are not mentioned should not be considered unimportant. There are several reasons why a topic may not be included in a standard: it may be included within some other related standard; it may be so general that there is nothing uniquely applicable to project management; or there is insufficient consensus on a topic. The lack of consensus means there are variations in the profession regarding how, when or where within the organization, as well as who within the organization, should perform that specific project management activity. The organization or the project management team must decide how those activities are going to be addressed in the context and the circumstances of the project for which the *PMBOK® Guide* is being used. Chapter 1 - Introduction

A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Third Edition

by Project Management Institute

Project Management Institute © 2004 Citation

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The question "Is project management necessary?" is rarely asked today. The relevant questions are:

What are the deliverables, methods and tools of professional project management? What constitutes quality in project management?

How competent should the project personnel be for a given project, phase, and area of responsibility?

How good is the project management of a particular project?

The culture of companies, organisations, disciplines, sectors of the economy and countries are taken into account in the interviews and assessment reports, as well as by choosing one assessor from the relevant sector (the second assessor is from another sector). The cultural aspects of a country can be included in a National Competence Baseline (NCB).

A competence is a collection of knowledge, personal attitudes, skills and relevant experience needed to be successful in a certain function. To help candidates measure and develop themselves and to help assessors to judge a candidate's competence, the competence is broken down into competence ranges. The ranges are mainly dimensions that together describe the function and are more or less independent. Each range contains competence elements that cover the most important competence aspects in the particular range.

Possible questions that could be asked about individual competence elements are:

Q. Isn't there overlap between competence elements?

A. Yes, there certainly will be. If the competence elements are considered to cover a range, then there will inevitably be overlap.

Q. Are all competence elements of equal weight?

A. This is intended to be the case, but a project situation or specific type of project can raise some competence elements to the crucial category. Apart from this, for some competence elements there is more literature or knowledge than for others.
Q. Can a competence element provide guidance to me on how to carry out a project?
A. No, the ICB is not a cookbook on how to do projects. However, the description of the *Possible*
process steps can help the candidate to apply and implement a competence. The Topics addressed help the candidate to find the relevant literature to learn more about the competence element.

7.4   Average Rankings Calculation

Project Management Areas - PMBOK Guide (2004) - Responses Calculated								
Calculation: Likert Scale rating x number of persons who chose this rating. i.e. 3 persons chose a rating of 5 = total score of 15						Sum of rankings/no of responses (6 Participants)	Total No of responses = No of process x no of participants (6 Participants)	Average rating = Total / Total B
1*	2*	3*	4*	5*	Total A	Total A/ Response Count (6)	Total B	Total A / Total B
0	0	3	8	15	**26**	**4.33**		
0	0	0	12	15	**27**	**4.50**		
0	0	3	8	15	**26**	**4.33**		
0	0	3	0	25	**28**	**4.67**		
0	0	0	8	20	**28**	**4.67**		
0	0	3	4	20	**27**	**4.50**		
0	0	6	8	10	**24**	**4.00**		
					186		**42**	**4.43**
0	0	3	8	15	**26**	**4.33**		
0	0	0	4	25	**29**	**4.83**		
0	2	0	12	10	**24**	**4.00**		
0	0	6	4	15	**25**	**4.17**		

0	0	3	4	20	**27**	**4.50**		
					131		**30**	**4.37**
0	0	3	12	10	**25**	**4.17**		
0	0	3	12	10	**25**	**4.17**		
0	0	3	8	15	**26**	**4.33**		
0	0	0	16	10	**26**	**4.33**		
0	0	3	12	10	**25**	**4.17**		
0	2	0	8	15	**25**	**4.17**		
					152		**36**	**4.22**
0	0	0	4	25	**29**	**4.83**		
0	0	0	16	10	**26**	**4.33**		
0	0	0	8	20	**28**	**4.67**		
					83		**18**	**4.61**
0	0	9	4	10	**23**	**3.83**		
0	0	6	12	5	**23**	**3.83**		
0	0	6	16	0	**22**	**3.67**		
					68		**18**	**3.78**
0	0	6	4	15	**25**	**4.17**		
0	0	0	0	30	**30**	**5.00**		
0	0	0	0	30	**30**	**5.00**		
0	2	3	0	20	**25**	**4.17**		
					110		**24**	**4.58**
0	0	0	8	20	**28**	**4.67**		
0	0	0	8	20	**28**	**4.67**		
0	2	0	4	20	**26**	**4.33**		
0	0	3	4	20	**27**	**4.50**		
					109		**24**	**4.54**
0	0	3	8	15	**26**	**4.33**		
0	0	3	4	20	**27**	**4.50**		
0	0	3	16	5	**24**	**4.00**		
0	0	3	16	5	**24**	**4.00**		
0	0	3	12	10	**25**	**4.17**		
0	0	6	0	20	**26**	**4.33**		
					152		**36**	**4.22**

0	0	3	12	10	**25**		**4.17**		
0	0	6	12	5	**23**		**3.83**		
0	0	3	8	15	**26**		**4.33**		
0	0	3	4	20	**27**		**4.50**		
0	0	0	12	15	**27**		**4.50**		
0	0	6	0	20	**26**		**4.33**		
					154			**36**	**4.28**