THE PROJECT SUCCESS RATE AND STANDARD PROJECT MANAGEMENT METHODOLOGY IN MALAYSIA

LOW CHEN SYEN

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Faculty of Engineering and Science
Universiti Tunku Abdul Rahman

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DECLARATION

I hereby declare that this project report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree or award at UTAR or other institutions.

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Name : _____

ID No. : _____

Date : _____

APPROVAL FOR SUBMISSION

I certify that this project report entitled **"THE PROJECT SUCCESS RATE AND STANDARD PROJECT MANAGEMENT METHODOLOGY IN MALAYSIA "** was prepared by **LOW CHEN SYEN** has met the required standard for submission in partial fulfilment of the requirements for the award of Master of Science Project Management at Universiti Tunku Abdul Rahman.

Approved by,

Signature : _____

Supervisor : Dr. Chia Fah Choy

Date : _____

Specially dedicated to
my beloved mother and father

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ABSTRACT

Over the years, Project Management Institute (PMI) USA has been developing a defined body of knowledge, and processes to improve the management of timed events or projects. The Project Management Body of Knowlege (PMBOK) guide is applicable for any industry to help project managers to ensure project success. In Malaysia, project management is very well known especially in IT industry. However, there is not much research evidence that indicated that these project standards are linked to project performance. The aim of this research is to determine the difference between the actual project management practice in the Malaysian industries and the formal project management methods advocated in the PMBOK of PMI. The objective is to find out what are the common project management practices in Malaysian industry activities that contribute to project success. Findings from literature review indicated that the measure of success for a project may not be limited to time, cost and quality; but client satisfaction, business objective and technical specification as well. An online questionnaire survey was conducted and responded by 51 employees from various industries. The analysis based on Spearsman Correlation and Kruskal-Wallis revealed that 'Monitoring and Controlling Process group' is the main contributor for overall project success. Activity 'verify scope' on the other hand affect the quality requirement of project success and there are no significant differences between project management

processes performed by different type of industry with exception of activity ‘define scope’ and ‘create work breakdown structure (WBS)’. The result of the research indicated that the standard project management processes are practiced most extensively by petroleum mining and electricity industries. This research enhanced the existing theories, and the chance of project success with efficient utilization of project management processes.

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LIST OF ABBREVIATIONS

PMI	Project Management Institute
PMBOK	Project Management Body of Knowledge
PRiSM	Project Integrating Sustainable Method
PRINCE2	PRoject IN Controlled Environment

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CHAPTER 1

INTRODUCTION

1.1 Background

Project is a temporary, limited in resources, separated various milestones into deliverables with the aim of producing or providing unique product or services (Lundin & So¨derholm, 1995). Project management is the mean of applying tools, technique, skills and knowledge to project activities in order to be able to meet the expectation of the stakeholders (PMBOK, 2008).

The Project Management Institute (PMI), USA was founded in the year 1969 with the goal of deriving a common practices or standards among all the different management practice (Duncan, 1995). Over the last 25 years, project management has seen the development of a defined body of knowledge, formalized management processes, and institutionalized professionalism designed to improve the management of timed events or projects (Thomas & Adams, 2005). The PMBOK guide was then developed to assist project managers to apply the appropriate knowledge, processes, skills, tools, and technique that have significant impact over the project success (PMBOK, 2008). The guide identifies the subset of project management body of knowledge which is generally defined as good practice. The

application of the skills, tools, and techniques identified are generally applicable for any industry (PMBOK, 2008)

Over the years, many organizations have implemented team-based project in their daily work to improve productivity and to achieve company goal (Irja, 2006), by doing so, the complexity and the cost of projects have increased (Papke-Shields et al, 2010). Despite the improvement seen in project success, many project failures have been reported as well. With the problem of growth in the scale, complexity and financial risks of capital projects, problems of delivery, quality and cost, and greater competition and regulation, a more defined procedure for managing project is required (R. Hussain and S. Wearne, 2005). Research and studies have been done to determine the various factors that lead to success. Standards have been developed and codified to overcome the problem (Cicmil and Hodgson, 2006).

Many organization claimed to have adopted a project management system, but most of them does not adhere to what PMBOK's had been advocating. Further integration is needed to achieve success. In this case the complete range of project management tools and technique is required (Eager, 1997).

1.2 Problem Statement

Despite the availability of these project management standards, the extents of these project management standards actually used are not known (Papke-Shields et al, 2010). There are project management standards like PMBOK and PRINCE2 in Malaysia. However, there is no information regarding what project management practices that are most widely being practiced in Malaysian industries.

The research for PMBOK is continuing to grow, but there is still very little research evidence that links these project management standards to project performance (Thomas & Mullaly, 2007). Project Management may be able to increase project success, but it does not guarantee success for every project.

1.3 Aim

The aim of this research is to determine the difference between the actual project management practice in the Malaysian industries and the formal project management methods advocated in the PMBOK of PMI.

1.4 Objectives

The objectives of this research are:

1) To identify the project management processes involved in project management based on theoretical studies.

2) To identify what are the common project management practices that were implemented by the companies in Malaysia and how extensively these activities are conducted.

3) To find out how the project management practices affect the project success.

1.5 Research Scope

Questionnaire survey was conducted for all Malaysian companies disregarding the type of industry to identify the project management practice that was used commonly in the industry in Malaysia.

In this research, a list of possible project management activities was gathered through previous literature studies in order to produce a questionnaire and allow the

employees from the firm to determine the weight of each statement. The organizing and analysis of the data was done quantitatively for easier understanding.

1.6 Significance of study

The result of the research created awareness among the top management of what kind of activities are able to contribute to project success and how the top management is able to handle their project more effectively to increases the rate of project success. Besides that, the research also enlightens the internal employees of the benefits of project management practices and standards hence allow them to learn how to cope with these activities in the future. In term of academic, the research also further enhances the pre-existing theories and materials collected that was pre-defined by recent studies by adding in new possible theories and explanation that is beneficial to future researcher and project management student alike.

1.7 Research Methodology

The research will begin with literature review, where the common practices of a project will be listed out from previous studies based on the context of PMBOK. The nature of this research will be in quantitative manner.

Since the research is in quantitative, a questionnaire will be produced for data collection. The targeted audience will be those who are currently working in Malaysia regardless of their industries and position. The questionnaire will have rating scale questions, as well as some objective multiple choice questions. Online survey tool will be used to ease up the data collection process, and a total of 100 questionnaire survey invitation will be sent out through e-mail.

Descriptive analysis will be performed on the data collected to describe the basic features of the data. Since the data collected is non-parametric, Correlation coefficient analysis and Kruskal-Wallis test will be used to further analyze the data. Correlation coefficient analysis will be used to find the relationship of two variables, while Kruskal-Wallis test will be used to compare the difference among the independent group. An additional reliability test will be used to check the reliability of the questionnaire survey prior to the two tests above.

1.8 Chapter of Dissertation

The first chapter of the dissertation discussed some background information of project management and the problem statements within the context of the research. The aim and objectives of the study is also defined for the study to identify the works to be done in order to complete the research. The scope of the study is defined. The significance of study shows how this research may be able to contribute to all the firms that practices project management in Malaysia. The research method implemented in this study is also briefly discussed in the first chapter.

The second chapter mainly touches on the literature review. Previously made studies from books and journals are discussed in this chapter. This chapter will provide a more in depth understanding of the current trend of project management as well as the project management activities that was commonly being practiced in the PMBOK guide. Other information like success factors and enterprise environmental factors are also studied.

Chapter three is about research methodology. It mainly describe about the method to be implemented in the research in detail. The method discussed here provides a clearer understanding of how the research reaches a conclusion and provide a guideline during the implementation phase.

The fourth chapter is basically about the result of the research. This chapter talks about the result of the analysis. Results from the analysis will be organized to allow the reader to easily interpret the outcome of the research.

The fifth chapter is discussion. In this chapter, the result will be discussed. The findings from literature review will be re-assessed in relation with the results from this research.

The last chapter is about conclusion and recommendation. This chapter discussed about the final finding of the research. Limitation of the research was also pointed out and recommendation on what can be done in the future to further improve this research was also provided.

1.9 Summary

This chapter described some general information regarding Project Management and the history of project management body of knowledge. This aim of this research is to determine the difference between the actual project management practice in the Malaysian industries and the formal project management methods advocating in the PMBOK of PMI. The findings from the study will contribute to current firms practicing Project Management.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter involves the study of the previous research. By studying the older cases, it will allow further understanding of the current issue and problems encountered in the context of this research. In this chapter, the difference between project and operation will be discussed. The nine knowledge area and the project management process group will be studied in order to further understand the activities of project management. The success factor will also be studied to determine the factors to be considered for a project's success. The enterprise environmental factors will also be studied to determine the internal and external factors that may affect the project. The studying of previous researches is important because it may help to prevent future researcher from doing repetitive work.

2.2 Project Versus Operation

In order for the research to be carried out more robustly, the difference between operation and project should be made clear. A project by nature is a temporary work, whereby the work have a designated start and end time, on the other

hand, operation is an ongoing process with no start and end time (Huemann et al, 2007). Besides that, a project can also be differentiated from an operation through the observation of the output. A project always produces unique results, while an operation has repetitive and similar output (Huemann et al, 2007). The last criteria that can help to determine is through observing the employees. Usually in a project, the project team will disperse upon project completion, while in an operation, the employees will remain (Huemann et al, 2007). Aside from the dissimilarity, project and operation also have a number of characteristics that are similar to each other. Firstly, both of them are performed by individuals. They are also limited by constraints such as scope and resources. Similarly, both of them also shared the same processes of planning, executing, monitoring and controlling. Both of these methods are also performed in order to achieve organizational objectives or business plan (PMBOK,2008).

2.3 Types of Project Management Standards

There are a lot of project management standards that was developed and used to govern projects throughout the world. Some examples of these standards are :

1) Project management body of knowledge by PMI (PMBOK, 2008).
2) PRINCE2 (PRoject IN Controlled Environments) (Crawford, 2004).
3) APM BoK (Association of Project Management Body of Knowledge) (Dixon, 2000)
4) BS6079 Guide to Project Management (British Standard Board, 1996)

5) P2M: A Guidebook of Project and Program Management for Enterprise Innovation (ENAA, 2002).

This research will focus primarily on PMI's standard because they are the more commonly practiced and well known standard where they have over half a million members in over 185 countries.

2.4 PMBOK Nine Knowledge Area

PMI has organized the project management knowledge and practice in term of its component processes into nine knowledge areas. They are: project integration management, project scope management, project time management, project cost management, project quality management, project human resource management, project communications management, project risk management and project procurement management (Duncan, 1996).

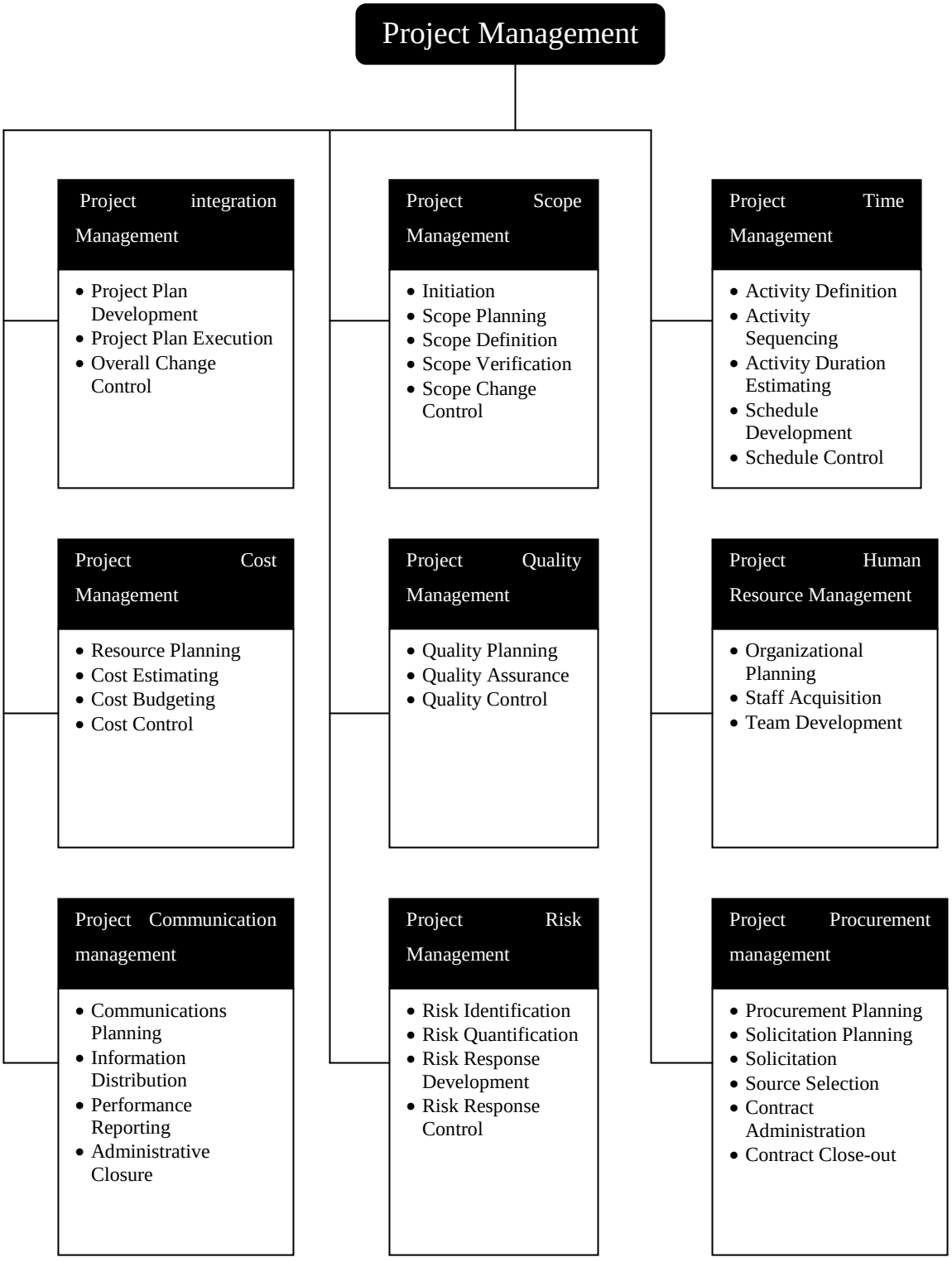

Figure 2.1**: Overview of Project Management Area and Project Management Process (PMBOK, 2008).**

General management process includes planning, organizing, staffing, executing, and controlling the operations of an ongoing enterprise.

2.4.1 Project Integration Management

Project integration management, describes the process of identifying, defining, combining and coordinate various elements involved in the project in an organized manner to ensure the management of the stakeholder expectations, and meeting of requirement are successfully carried out (Duncan, 1996; PMBOK, 2008) .There are six sub-processes that are entailed in project integration, they are develop project charter, develop project management plan, direct and manage project execution, monitor and control project work, perform integrated change control and close project or phase. Develop project charter is the process of developing a document that formally authorizes the project and documenting the expectations and needs of the stakeholders. Develop project management plan is where the necessary actions to define, prepare, integrate and coordinate are documented. Direct and manage project execution is the process of performing the defined task in the project management plan. Monitor and control project work is the process of overseeing the project and to review the work progress to ensure it is on the right track. Perform integrated change control is the process of reviewing all the change requests and approving the changes to the project work. A change of scope in project is very common. It is up to the project manager to analyze on the impact of the change prior to adopting the changes (Gupta, 2010). Change control is important because it can prevent wastage of time and money due to rework (Gupta, 2010). Close project or phase is the process of finalizing all the activities in order to formally complete the project (PMBOK, 2008). In project closure, the project manager will review all the information to ensure that the project work is complete and has met the project objectives before considering the project closed (PMBOK, 2008). In term of client,

project closure usually involves activities like providing training for client on how to use the product properly (Frost, 2007), handover of project to the team responsible for warranty and further support (Stoemmer, 2009) and also capture feedback on the client for future project (Frost, 2007). In term of internal employees, activities like call for feedback of project members, and carry out post project review (Stoemmer, 2009) will be performed. Post project review is performed to see whether the project meets the business objective.

2.4.2 Project Scope Management

Project scope management on the other hand describes the procedure where all the elements or work required to ensure the success of the project is included in the project. In other words, it is basically to define and control what is and is not included in the project (Duncan, 1996; PMBOK, 2008). There are five sub-processes that are included in this process. They are collect requirement, define scope, create WBS, verify scope and control scope (PMBOK, 2008). Collect requirement is where the stakeholders' needs are defined and documented. Define Scope is the process where a detailed description of both the project and the product are identified. Create WBS is where the project deliverables are being broken down into smaller components (PMBOK, 2008). Verify Scope is the process of accepting the completed project deliverables. The main focus of verify scope is to ensure the work defined in the define scope is done and accepted by the customers (Gupta, 2010). Verify scope can be performed on every phases of the project to ensure the project is in the right track and to prevent any customer acceptance issue in the latter part.

Quality control and scope verification is a similar kind of work, except verify scope is more focused towards customer acceptance (Gupta, 2010). Control Scope is the process of monitoring the project and product based on the predetermined scope baseline (PMBOK, 2008). Creating, updating, and formalizing changes to the scope will ensure meeting target time, and cost while at the same time satisfies customers (Papke-Shields et al, 2010). Proper manage of scope will prevent scope creep and keep team members inform of any changes (Papke-Shields et al, 2010). Scope creep is caused by uncontrolled changes of the scope without addressing the effect of time, cost, resources and without customer's approval (PMBOK, 2008).

2.4.3 Project Time Management

Project time management is to ensure that the project is completed in a timely manner (PMBOK, 2008). Processes that is involved are activity definition, activity sequencing, activity resources estimating, activity duration estimating, schedule development, and schedule control (Duncan, 1996; PMBOK,2008). Activity definition is the process of identifying actions to be taken to produce the right deliverables. Activity sequencing is the process of identifying the relationship among all the project activities. Activity resources estimating is the process of estimating they required resources such as material, manpower, machinery required to perform the project activity. Activity duration estimating is the process of finding the number of work periods required to complete an activity. Schedule development is the process of producing a project schedule based on the activity sequences, durations, resources requirements and schedule constraints. Schedule control is the process of

monitoring the progress of the project and manages the changes to the schedule (PMBOK, 2008).

2.4.4 Project Cost Management

Project cost management is to ensure that the project is completed within the budget. It involves the processes of cost estimating, cost budgeting, and cost controlling (Duncan, 1996; PMBOK,2008). Cost Estimating is the process of approximating the resources required in order to complete the project activities. Cost budgeting is the process of establishing a cost baseline by combining the estimated costs of individual work packages. Cost Controlling is to monitor the status of the project in term of the resources used and to manage changes of the cost baseline (PMBOK, 2008).

2.4.5 Project Quality Management

Project quality management describes the process whereby the requirement or expectation of the project is satisfied (Duncan, 1996; PMBOK, 2008). It involves quality planning, quality assurance, and quality control (PMBOK, 2008). Quality planning is the process of identifying the quality requirements and standards for the project and product. Quality assurance is the process of reviewing the quality requirements and the result from the quality control measurements to ensure the product or project meets the right quality standard. Quality control is the process of

monitoring and recording result of the quality activities for constant improvement (PMBOK, 2008).

2.4.6 Project Human Resource Management

Project human resource management describes the effective use of manpower involved in the project (Duncan, 1996; PMBOK, 2008). The type and number of project team members may change frequently throughout the course of the project. It involves develop human resource plan, acquire project team, develop project team and manage project team. Develop human resource plan is the process of identifying the roles, responsibility, required skills, and reporting relationship and document them into a staff management plan (PMBOK, 2008). Acquire project team is the process of obtaining the necessary human resource to complete the project works. Develop project team is the process of enhancing project performance through constant improvement of team interaction and environment. Manage project team is the process of tracking the performance of all the team members, resolving issues provided by the members in order to optimize project performance (PMBOK, 2008). Communication is harder to quantify and measure because it was human-related (Cooke-Davies, 2002)

2.4.7 Project Communication Management

Project Communication management describes the process required to ensure generation, collection, dissemination, storage, and ultimate disposition of project information is completed in a timely and appropriate manner (PMBOK, 2008). Effective communications among stakeholders both internal and external is crucial in a project (Duncan, 1996). It includes activities like identify stakeholders, plan communications, distribute information, manage stakeholder expectations, and report performance (PMBOK, 2008). Identify stakeholder is the process of identifying all the people that have impact on the success of the project. Plan communications is the process of determining the communication of the stakeholders based on the information available. Distribute information is the process of making sure all the relevant information is available to all the project stakeholders. Manage Stakeholder expectations are the process of communicating and working closely with stakeholders to ensure their needs are met. Report Performance is the process of collecting and distributing performance information like status reports, progress reports and forecasts (PMBOK, 2008). Through proper management of communication, internal stakeholders will have a clearly defined responsibilities; Which in turn will ensure project is within budget, schedule and technical specification as well, because it will ensure that everything needs to be done are actually done. By understanding who are the more important stakeholders and their expectation, it will allow the project to achieve better quality and satisfy client's requirement (Papke-Shields et al, 2010). Communication can also affect the satisfaction level of a client, without communication, it will be really hard to meet

time, cost target as well as business objectives due to lack of understanding of the stakeholder's expectation (Papke-Shields et al, 2010).

2.4.8 Project Risk Management

Project risk management describes the process of identifying, analyzing, and responding to project risk (Duncan, 1996; PMBOK, 2008). It consisted of activities like plan risk management, identify risks, perform qualitative risk analysis, perform quantitative risk analysis, plan risk responses, monitor and control risks (PMBOK, 2008). Plan Risk management is the process of determining how the risk management should be conducted in the project. Identify risks is the process of defining all the risks that may affect the project and document them in a systematic manner. Perform qualitative risk analysis is the process of sorting the risks by assessing the probability of occurrence and impact. Perform quantitative risk analysis is the process of analyzing the impact of the risk on the overall project objectives. Plan risk response is the process of defining action plan to reduce the probability of occurrence and to mitigate the risks. Monitor and control risks is the process of implementing a risk response plan that involves constant tracking of risks, monitoring, identifying and evaluating of risk throughout the course of the project (PMBOK, 2008). Risk is one of the areas that are often overlooked in the project (Schwalbe, 2009).

2.4.9 Project Procurement Management

Project procurement management describes the process of acquiring goods or services from eternal facilitators (Duncan, 1996; PMBOK, 2008). The processes included are plan procurements, conduct procurements, administer procurements, and close procurements (PMBOK, 2008). Plan procurements are the process of identifying purchasing decision, purchasing approach and to identify the potential sellers. Conduct procurements is the process of getting responses from seller, picking the most suitable seller and to award a contract. Administer procurements is the process of managing the relationship with the seller and to monitor the contract performance while at the same time making changes as needed. Close procurements is the process of completing each project's procurement (PMBOK, 2008).

2.5 Project Management Process Groups

A process is a set of interrelated actions and activities performed to achieve a pre-specified product, result, or service. Each process is characterized by its inputs, tools and technique, and the resulting output (PMBOK, 2008). In order to ensure the project is a success, the project team must select the appropriate processes required to meet the project objectives, use a defined approach that can be adapted to meet requirements, comply with requirements to meet stakeholder needs and expectations, and balance the competing demands of scope, time, cost, quality, resources and risk to produce specified product, service or result (PMBOK, 2008).

Project management processes can be applied globally and across all the industry. It has been shown to enhance the chances of success over a wide range of projects; however, the knowledge, skills, and processes described should not be applied uniformly on all projects, because some of the processes might not be appropriate for the project. It is up to the project team to determine the suitable processes (PMBOK, 2008).

Project management processes are grouped into five categories known as project management process groups (PMBOK, 2008). Initiating process group is the processes performed to define a new project or a new phase of an existing project by obtaining authorization to start the project or phase. Planning process group is the process of establishing the scope, the objectives as well as the defined course of action required to ensure the objectives are met. Executing process group is the process of completing the work defined in the planning process, the work done must satisfy the project specifications defined in the project management plan. Monitoring and controlling process group is the tracking, reviewing and regulating of the progress and the performance of the project (PMBOK, 2008). Effective monitoring and controlling will enable the project manager to identify the problems encountered during the course of the project. Suitable corrective action will be taken to ensure the project is back on track and eventually lead to project success (Sheryl, 2009). Changes will also take place in this process. Closing process group is the mean of finalizing all the activities and to formally close the project or phase (PMBOK, 2008).

The 42 project management activities can be mapped into the 5 project management process group (PMBOK, 2008).

Table 2.1 Project Management Process and Body of Knowledge (PMBOK, 2008)

Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	**Planning Process Group**	**Executing Process Group**	**Monitoring & Controlling Process Group**	**Closing Process Group**
Project Integration Management	• Develop Project Charter	• Develop Project Management Plan	• Direct and Manage Project Execution	• Monitor and Control Project Work • Perform integrated change control	• Close Project or Phase
Project Scope Management		• Collect Requirements • Define Scope • Create WBS		• Verify Scope • Control Scope	
Project Time Management		• Define Activities • Sequence Activities • Estimate Activity Resources • Estimate Activity Durations • Develop Schedule		• Control Schedule	
Project Cost Management		• Estimate Costs • Determine Budget		• Control Costs	
Project Quality Management		• Plan Quality	• Perform Quality Assurance	• Perform Quality Control	
Project Human Resource Management		• Develop Human Resource Plan	• Acquire Project Team • Develop Project Team • Manage Project Team		
Project Communic	• Identify Stakeholders	• Plan Communicati ons	• Distribute Information • Manage	• Report Performance	

ations Management			Stakeholder Expectations		
Project Risk Management		• Plan Risk Management • Identify Risks • Perform Qualitative Risk Analysis • Perform Quantitative Risk Analysis • Plan Risk Responses		• Monitor and Control Risks	
Project Procurement Management		• Plan Procurements	• Conduct Procurements	• Administer Procurements	• Close Procurements

2.6 Project Success Factor

Traditionally, a success of a project can be evaluated through time, cost, and quality (Chan et al., 2002). The traditional perspectives of project success are very easy to evaluate and measure (Willard, 2005) but there have been many criticisms from others (Shenhar et al., 1997; Alarcon et al., 1998). The traditional method were not really one homogeneous dimension, because in order to meet the constrain of time and cost, the quality maybe affected (Shenhar et al., 1997). Besides that, these basic factors are not able to identify the cause of poor productivity and quality, they are not able to provide suitable corrective actions to be taken (Alarcon et al., 1998). Strategic management concept whereby the goals of the company in term of short term and long term must be aligned with the project efforts to ensure project success (Rodrigues and Bowers, 1996).

For short term goal, the criteria of cost, time and quality maybe effective in measuring success where the delivery stage is or when the time to market is critical (Shenhar et al., 1997; Dweiri, 2006; Atkinson, 1999). Many researchers have started to introduce a new success measure whereby the participants' satisfaction (Pocock et al., 1996), interpersonal satisfaction among project members (Pinto & Pinto, 1991), stakeholders' satisfaction (Belout, 1998; De wit, 1988; Lim & Mohammad, 1999), and client satisfaction (Lim & Mohammad, 1999) are taken into consideration.

2.7 Enterprise Environmental Factors

Within a project-based organization, there are several organizational influences that we need to take into consideration. Organizational influence is the factors from the organization that will eventually influence the outcome of a project (Duncan, 1996).

An ideal project-orientated company is usually in a flat organizational structure and has a strong project management culture (Huemann et al, 2007). Project management orientated organization may be found in many different industries including the public sector. Depending on the size, number and the type of projects they carry out (Huemann et al, 2007). Usually in a project orientated company, they usually have strategy like management by project, and usually manage a project portfolio of different internal and external project types. These organizations usually

have a project portfolio group or a project management office to provide integration among all the functional departments (Gareis, 2005).

Organizational cultures and style are one of the main aspects to consider in organizational influence. Most organizations have developed different and unique cultures. The norms, values and belief of the employees are reflected to the culture of the organization itself. These cultures often will have direct relationship over their project. For examples: a project team that condone creativity and high risk approach are more likely to secure approval from a more aggressive and entrepreneurial organization (Duncan, 1996).The organizational structure may also have a high influence over the project. Functional or traditional structured organization is more bureaucratic, hence the scope of the project is always limited to the boundary of the function. On the other hand, in a projectized organization, the project managers have a greater deal of responsibilities and authority. This in turn will promote creativity among the team members (Duncan, 1996).

Besides that, technical competency could also be one of the factors to determine the effectiveness of project management. It literally means the competency to apply the project management tools and methods to carry out the project (Hyvari,2006; Fox TI & Spence WJ, 1998; Pollack-Johnson B & Liberatore MJ, 1998). A survey carried out by project management institute members shows that many project managers uses the project management software (Pollack-Johnson B & Liberatore MJ, 1998). Despite the fact that there are many types of project management tools available, most of the project managers only uses a small part of the tools only (Fox TI & Spence WJ, 1998).

Leadership is also another crucial factor that may contribute to a success project outcome (Zimmerer TW & Yasin MM, 1998). Leadership is where an individual have the ability to influence others to get the job done effectively, it can also be defined as a process of facilitating individual and collective efforts to accomplish the desired objectives (Yukl, 2002). It was found that positive leadership contributed almost 76% to the success of a projects, while negative or poor leadership contributed 67% to the failure of the project (Zimmerer TW & Yasin MM, 1998). Research also concluded that a successful project are usually lead by a leader who have high competency in both technical and management knowledge along with leadership skills that is useful in motivating the project team (Herzberg et al, 1959; Turner et al,1998; Slevin DP & Pinto JK, 1988).

The type of industry can also affect the use of formal project management practices (Crawford and Pollack, 2007). Despite that project management processes can be applied globally to any industry group; it does not mean that all the knowledge, skills, and processes describe must always be applied similarly on every project (PMBOK, 2008). Oil and gas industry practices project management by emphasizing on the common triple constraint of time, cost and scope. Time has to be managed properly to prevent unnecessary spending. Scope on the other hand has to be managed properly to prevent scope creep. Too much changes on the scope will lead to delay of the project, increases of cost, and also lower the quality of the outcome (Slyvester and Rani, 2010).

The size of the organization can also be a contributing factor affecting the practices of formal project management. In term of quality management, it seems

that most of the smaller firm did not have the resources to sustain the operation of total quality management to improve their product (Taylor and Wright, 2003). Besides that, larger organizations tend to appreciate quality management more compared to smaller organization (Taylor and Wright, 2003; Fisher, 1993).

Scale of the project is also an important factor to consider, the bigger a project is, the more control in term of time, cost and integration is required to manage it (Papke-Shields et al, 2010; Gowan and Mathieu, 2005). Besides that, the quality and risk of the project will also increase, and not to mention procurement management practices when the project requires external resources (Papke-Shields et al, 2010).

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter defined the methodology that was undertaken to fulfil the aim and the objectives of the research. The data collection method as well as how the data was analyzed was explained in detail in this chapter.

Research is basically the process of finding a solution to a problem through study and analysis (Sekaran, 2006). There are basically two types of research: Applied research and basic research. Applied research is where a research is performed with the intention of solving a problem that was currently existed, while basic research is performed to further enhance the understanding of a certain problem that existed. This research is a basic research, because it seeks to further understanding the behaviour of Malaysian industries in managing projects.

3.2 Theoretical Framework

The research is begin by studying the nine knowledge area of PMBOK thoroughly and determines the common practices, extensive studying of the available journals, as well as reference books is required. All the nine knowledge area will be

studied thoroughly and the activities or practices associated with it will be extracted. The information obtained from these study materials will contribute to the questions implemented in the questionnaire in the later part of the research.

3.3 Research Design

In order to identify what are the common project management practices that were implemented by the companies in Malaysia. Implementation of questionnaires to the management teams has been decided. The creation of the questionnaire will be based on the information obtained from previous studies of researches from the first objective. All the activities and practices from previous studies will be listed down and stated inside the questionnaire.

3.3.1 Questionnaire

This research is conducted primarily using questionnaires. Questionnaire is the mean of sending and receiving of questionnaire through mail. The reason questionnaires are chosen is because they do not have the potential for interviewer bias (Dohoo et al., 2003). In this research, the questionnaires are developed by using previously collected description from literature review. Before we proceed to the preparation of the questionnaire, research has proven that the responses of questionnaires are low in most cases (Dohoo et al, 2003). In order to solve this problem, we can use an online survey collection services. This method will ease the

process of returning the questionnaire results as well as to increase the response counts due to the simplicity.

Over the year, technology has changed the way survey are performed (Evans & Mathur, 2005). In the year 2002, nearly $500 million was spent on online survey in the USA (Hogg, 2003) and the figure is still growing throughout the year. One of the major benefits of online survey is flexibility. The survey can be done in a few formats. It can be embedded in an e-mail, or in a form of a URL; where the user will be redirected to a specific web site that cater for these online survey. Besides that, these special online survey providing sites will also allow the researcher to customize their survey based on the requirement (Evans & Mathur, 2005). Online survey is also very convenience, because it allow the respondent to answer at the convenient time for themselves. This will allow the respondent to take as much time as they need to complete the survey (Evans & Mathur, 2005).

The questionnaire will be aimed towards the all the industry within the country Malaysia. There will be a total of 9 questions in the questionnaire, and the language used in the questionnaire will be in English language.

The first question is about how frequent the project management activities identified in the earlier literature review are performed on their project-orientated work. There are a total of 42 project management practices that were identified in the earlier chapter. A scale of 0-5; where 0 stands for unsure, 1 stands for never, 2 stands for rarely, 3 stands for sometimes, 4 stands for often while 5 stands for always are

provided allowing the respondent to rate every single project management practices based on how frequent they practices them.

The second question is about how the goal of the project is met. Similarly, a rating of 0-5 are provided as well, but this time around 0 stands for unsure, 1 stands for strongly disagree, 2 stands for disagree, 3 stands for neutral, 4 stands for agree, while 5 stands for strongly agree. As stated on the previous literature review chapter, the success measure of the project is basically based on time, cost, quality, scope, client satisfaction and business objectives.

There are various multiple choice questions that allow the respondent to fill in the type of industry they are currently working at. Of course an extra choice “other” is also included in case the respondent is from industries that are outside of the designated choices. There are a total of 12 types of industry that was identified. They are Plantation, Petroleum Mining and Electricity, Manufacturing, Construction, Wholesale Trade, Retail Trade, Banks and other Financial Institute, Insurance, real Estate and Business service, and Telecommunication.

Besides that, question regarding the scale of the project and the annual turnover of the project-orientated organization are also included. The answer for these questions are in a multiple choice manner, where it ranges from less than RM100,000 up to more than RM100,000,001.

The number of participants in the project and the number of employees in the organization are also included in the questionnaire. Similarly, multiple choices are also provided.

A personal detail column is also included to allow the respondent to fill in their name, email and contact number. The personal detail column will be left as an optional question.

3.3.2 Descriptive Analysis

Descriptive analysis will be used to summarize the collected data and to find out the activities that are most extensively being practiced in Malaysian industries. The mean for every activity will be calculated by finding the average of the data for that particular activity. A table will be produced using the calculated data. From there, we can see which activity is the most extensively performed.

3.4 Data Analysis

The data analysis is primarily to find out what are the activities that affect the success of the project in term of time, cost, scope, quality, business objective and client satisfaction.

The analysis will begin with a reliability test using Cronbach's Alpha test. Since the data is non-parametric or non-normally distributed, in order to find the relationship between project management processes and success factor, correlation coefficient will be used to analyze the collected data.

3.4.1 Questionnaire Reliability Test

Cronbach's Alpha test is used to check the reliability or the consistency of the questionnaire. This test will produce a Cronbach's Alpha value, any value above 0.7 will be considered as a reliable questionnaire; while anything below that will indicate that the questionnaire is unreliable (Field, 2005).

3.4.2 Correlation Coefficient Analysis

Correlation coefficient analysis is used to identify the relationship between two variables. There are basically two types of correlation coefficients that can be used. Spearsman's Correlation is favoured over Pearson's Correlation because the data collected is non-parametric (Field, 2005). By non-parametric, it basically means that the data is ordinal, where it is of ranking manner. By using Spearsman's Correlation, we will be able to find out the relationship of the project success factor and project management processes.

In this correlation test, the researcher is able to select between one-tailed or two-tailed test. One-tailed test is only useful when there is a directional hypothesis, while a two-tailed test is chosen when the nature of the relationship is unpredictable (Field, 2005). In this research, the relationship of the success factor and the project management processes is unpredictable; therefore a two-tailed test is favoured over one-tailed test.

There will be a significance value produced from the output of the test. This value will determine whether there is any relationship between the two variables (Field, 2005). When the significance value is lesser or equal to 0.05, it means that there is a significant relationship between the success factor and project management processes with 95% confidence. If the significance value is lesser or equal to 0.01, it means that the relationship is of 99% confidence. There will also be another correlation coefficient value to be taken into consideration. When the correlation coefficient value is positive, it means that when there is an improvement in project management processes, the success of the project will improve too.

3.4.3 Sample Comparison Test

Kruskal-Wallis is test used to find the differences between several independent groups (Field, 2005). Since the data is non-parametric, Kruskal-Wallis is favoured over ANOVA. This test will be used to find the differences between types of industry, size of project, duration of project, number of participants, annual turnover, as well as number of employees with project management processes.

Similar with Spearsman's correlation, the interpretation of this test begins with the significance value (Field, 2005). Any value lower than or equal to 0.05 will be considered as having a significance difference between the groups. The mean rank value can be used to determine how frequently the project management processes are performed.

CHAPTER 4

RESULTS

4.1 Introduction

This chapter assess the current project management processes and success factors among the different types of industries in Malaysia. This chapter presented the result of the collected data. All the result of the analysis is presented to provide a better understanding of the relationship between project management processes and project success factors. Further analysis of the difference between types of industry, project size, duration, number of participants, annual turnover and number of employees was performed in detail.

4.2 Respondent of various industries

100 survey invitations were sent out to various working individuals of various industries through email. Out of the 100 survey invitations, 51 recipients responded.

Table 4.1 below summarizes the different types of industries where the respondent are currently working in, along with project size, duration, number of participants, annual turnover and number of employees

Table 4.1 Respondents Profile

Descriptions	Number of Respondents	Percentage
Types of Industry		
Manufacturing	14	27.5%
Others	10	19.6%
Retail Trade	7	13.7%
Construction	5	9.8%
Wholesale Trade	4	7.8%
Insurance, Real Estate and Business Service	4	7.8%
Telecommunication	3	5.9%
Banks and Other Financial Institute	2	3.9%
Plantation	1	2.0%
Petroleum Mining and Electricity	1	2.0%
Total	51	100.0%

Project Size		
Less than RM100,000	17	33.3%
RM100,000 – RM500,000	11	21.6%
RM500,001 – RM1,000,000	4	7.8%
RM1,000,001 – RM5,000,000	6	11.8%
RM5,000,001 – RM10,000,000	4	7.8%
RM10,000,001 – RM50,000,000	3	5.9%
RM50,000,001 – RM100,000,000	3	5.9%
More than RM100,000,001	3	5.9%
Project Duration		
Less than 6 months	25	49.0%
6 – 12 months	16	31.4%
13 – 24 months	5	9.8%
More than 24 months	5	9.8%
Number of participants		
1 - 10	26	51.0%
11 - 25	13	25.5%
26 - 50	8	15.7%
51 - 100	2	3.9%
Greater than 100	2	3.9%
Annual Turnover		
Less than RM100,000	11	21.6%
RM100,000 – RM500,000	6	11.8%
RM500,001 – RM1,000,000	6	11.8%

RM1,000,001 – RM5,000,000	7	13.7%
RM5,000,001 – RM10,000,000	4	7.8%
RM10,000,001 – RM50,000,000	7	13.7%
RM50,000,001 – RM100,000,000	3	5.9%
More than RM100,000,001	7	13.7%
Number of Employees		
Less than 10	11	21.6%
11 - 50	17	33.3%
51 - 100	5	9.8%
101 - 500	7	13.7%
501 – 1,000	4	7.8%
1,001 – 5,000	1	2.0%
5,001 – 10,000	1	2.0%
More than 10,000	5	9.8%

Table 4.1 indicated that majority of the respondents came from manufacturing industry (27.5%). The project participated by the respondents are mostly smaller in scale at the budget of less than RM100,000 (33.3%). Most of the respondents' projects only last for less than 6 months in duration (49.0%). More than half of the respondents are from small project team of 10 peoples or lesser (51%). Majority of the respondents is from small organization that have less than RM100,000 annual turnover (21.6%). Most of the respondents is from small organization with 11 – 50 employees (33.3%).

4.3 Most Extensively Performed Activities and Success Factor

The averages of ratings for all the 42 activities are calculated to see which of the activities are the most extensively performed in Malaysian industry environment which is presented in table 4.2.

Table 4.2 Average of Ratings for Activities Performed

Activities	Average of Ratings	Std. Deviation
Determine Budget	3.71	1.27
Estimate costs	3.71	1.240
Develop Schedule	3.63	1.22
Distribute Information	3.63	1.39
Collect Requirements	3.59	1.37
Monitor and Control Project Work	3.57	1.36
Report Performance	3.53	1.36
Control Costs	3.49	1.30
Estimate Activity Resources	3.49	1.17
Control Schedule	3.47	1.49
Estimate Activity Durations	3.47	1.54
Direct and Manage Project Execution	3.43	1.22
Define Scope	3.39	1.36
Manage Project Team	3.39	1.31
Define Activities	3.35	1.32
Perform Quality Assurance	3.33	1.26
Sequence Activities	3.33	1.31

Perform Quality Control	3.31	1.38
Develop Project Management Plan	3.22	1.43
Verify Scope	3.22	1.54
Acquire Project Team	3.18	1.31
Develop Project Team	3.16	1.40
Plan Quality	3.16	1.36
Plan Communications	3.12	1.28
Control Scope	3.08	1.50
Monitor and Control Risks	3.02	1.28
Plan Procurements	3.02	1.36
Close Project Phase	3.00	1.44
Develop Human Resource Plan	3.00	1.33
Perform Integrated Change Control	2.98	1.42
Close Procurement	2.94	1.43
Manage Stakeholder Expectations	2.94	1.41
Identify Risk	2.86	1.52
Plan Risk Management	2.86	1.39
Administer Procurements	2.78	1.25
Conduct Procurements	2.71	1.42
Identify Stakeholders	2.69	1.44
Plan Risk Responses	2.63	1.60
Perform Qualitative Risk Analysis	2.49	1.54
Create WBS	2.45	1.49
Develop Project Charter	2.45	1.64
Perform Quantitative Risk Analysis	2.43	1.45

Activities ‘estimate costs’ and ‘determine budget’ is the most extensively practiced activity (average rating = 3.71), followed by activities ‘develop schedule’ and ‘distribute information’ (average rating = 3.63). The least most practiced activity is ‘perform quantitative risk analysis’ (average rating = 2.43), followed by activities ‘develop project charter’, and ‘create WBS’ (average rating = 3.45).

Table 4.3 Type of Industry and Most Frequent Practiced Activities

Type of Industry	Project Management Process
Petroleum Mining and Electricity (N=1)	Create WBS
Plantation (N=1)	Manage stakeholder expectations
Telecommunication (N=3)	Estimate activity duration
Construction (N= 5)	Plan communication
Insurance, Real Estate and Business Service (N= 4)	Control cost
Others (N= 10)	Monitor and control project work
Manufacturing (N= 14)	Plan procurement
Retail Trade (N= 7)	Administer procurement
Wholesale Trade (N= 4)	Verify scope
Banks and Other Financial Institute (N=2)	Report performance

Table 4.3 shows the most frequently practices project management process with respect to the various types of industries.

Table 4.4 Average of Ratings for PMBOK Nine Knowledge Area

PMBOK 9 knowledge area	Average of ratings	Std. Deviation
Project Cost Management	3.64	1.13
Project Time Management	3.46	1.20
Project Quality Management	3.27	1.05
Project Human Resource Management	3.18	1.21
Project Communication Management	3.18	0.97
Project Scope Management	3.15	1.15
Project Integration Management	3.11	1.09
Project Procurement Management	2.86	1.15
Project Risk Management	2.72	1.32

When the result above is being categorized into nine knowledge area of PMBOK, project cost, time and quality seems to be the highest.

Next, we look at the average of ratings for the project success factor.

Table 4.5 Average of Ratings for Project Success Factor

Project Success Factor	Average of Ratings	Std. Deviation
Client Satisfaction	3.75	1.30
Quality Requirements	3.63	1.08
Time Target	3.61	0.99
Business Objective	3.61	1.02
Technical Specification	3.57	1.21
Cost Target	3.51	1.22
Overall Success Factor	3.61	0.87

Table 4.5 indicated that ‘client satisfaction’ is the success factor that is most frequently achieved, followed by ‘quality requirement’, ‘time target’, ‘business objective’, ‘technical specification’, and ‘cost target’. The overall success factor is at 3.61.

4.4 Reliability Test

In order to measure the consistency of the questionnaire, Cronbach’s alpha test is used. The Cronbach’s alpha value that was obtained from the analysis is at 0.956, this indicate that the internal consistency or the reliability of the test score is at a high level.

4.5 Project Management Practices and Success Factor

In order to check the relationship between the project management processes group and the success factor, Spearsman Correlation is used. Before the analysis, the project management processes 42 activities are grouped into 5 main project management process groups consisted of initiating, planning, executing, monitoring and controlling, and closing.

Table 4.6 Correlation Coefficient (r_s) of Project Management Process Group and Success Factors

	Process group				
Success Factors	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Cost	.280*	.244	.345*	.449**	.256
Time	.292*	.316*	.328*	.543**	.199
Technical Specification	.452**	.407**	.509**	.509**	.339*
Quality Requirement	.256	.343*	.491**	.616**	.585**
Client Satisfaction	.371**	.324*	.457**	.427**	.504**
Business Objective	.395**	.359**	.417**	.474**	.477**
Overall Success Factor	.443**	.428**	.548**	.649**	.510**

*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level.

The result of the analysis indicated that in term of overall success factor and the five project management processes group, all of them appear to have positive correlation at 99% confidence. According to the coefficient value r_s, it appears that process group 'monitoring and controlling' happened to be the most highly correlated (r_s = 0.649) while planning process is the lowest correlated (r_s = 0.428) with overall success factor.

The analysis between process group ‘monitoring and controlling’ and the split up success factor which consisted of cost, time, technical specification, quality requirement, client satisfaction, business objective has shown that all the success factors are also having positive correlation at 99% confidence. The coefficient has shown that success factor ‘quality requirement’ is the most highly correlated (r_s = 0.616) with process group ‘monitoring and controlling’.

Besides that, in term of achieving success in the context of cost, time, and technical specification, the result indicated that, process group ‘monitoring and controlling’ is also the main contributor. For ‘technical specification’, it seems that besides ‘monitoring and controlling’, process group ‘executing’ is also having the same coefficient value. As for success factor ‘client satisfaction’ and ‘business objective’, the main contributor in order to achieve success is process group ‘closing’.

4.6 Monitoring and Controlling Process and Quality Requirements

Another Spearman Correlation analysis was done to determine the relationship of all the activities in the monitoring and controlling process group with success factor ‘quality requirements’.

Table 4.7 Correlation Coefficients of Activities in Monitoring and Controlling Process Group and Success factor in Quality Requirements.

Monitoring and Controlling Processes	Quality Requirements
Monitor and Control Project Work	0.293*
Perform Integrated Change Control	0.250
Verify Scope	0.503**
Control Scope	0.502**
Control Schedule	0.366**
Control Costs	0.329*

*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level.

The result above indicated that activity ‘verify scope’ ($r_s = 0.503$) is the most highly correlated activity with success factor ‘quality requirement’ which is at 99% confidence positive correlation. Followed by activity ‘control scope’ ($r_s = 0.502$) and

‘control schedule’ (r_s = 0.366). As for activities ‘control costs’ (r_s = 0.329) and ‘monitor and control project work’ (r_s = 0.293), they are also of positive correlation but only at 95% confidence. Activity ‘perform integrated change control’ (r_s = 0.293) on the other hand has the least significance relationship with success factor ‘quality requirements’.

4.7 Monitoring and Controlling Process and Cost

The relationship of monitoring and controlling and cost was determined using Spearsman correlation.

Table 4.8 Correlation Coefficients of Activities in Monitoring and Controlling Process Group and Success factor in Cost.

Monitoring and Controlling Processes	Cost
Monitor and Control Project Work	.306*
Perform Integrated Change Control	.353*
Verify Scope	.269
Control Scope	.141
Control Schedule	.095
Control Costs	.350*

*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level.

The result of the analysis indicated that the most highly correlated activity is 'perform integrated change control' (r_s = 0.353) activity. Followed by activities 'control cost' (r_s = 0.350) and 'monitor and control project work' (r_s = 0.306). All the activities with significance relationship with success factor 'cost' have a positive correlation at 95% confidence with success factor 'cost'. While activities 'verify

scope', 'control scope', and 'control schedule' has no significance relationship with success factor 'cost'.

4.8 Monitoring and Controlling Process and Time

Similarly, Spearsman Correlation is used to determine the relationship of process group 'monitoring and controlling' with success factor 'time'.

Table 4.9 Correlation Coefficients of Activities in Monitoring and Controlling Process Group and Success factor in Time.

Monitoring and Controlling Processes	Time
Monitor and Control Project Work	.361**
Perform Integrated Change Control	.407**
Verify Scope	.369**
Control Scope	.301*
Control Schedule	.284*
Control Costs	.222

*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level.

The result above indicated that only activity 'control costs' is not related with success factor 'time'. The most correlated activity is 'perform integrated change

control' (r_s=0.407), it is also of a positive correlation at 99% confidence with success factor 'time'.

4.9 Executing Process, Monitoring and Controlling Process and Technical Specification

Since there are two process groups having the same correlation coefficient with success factor ‘technical specification’, two correlation analysis was performed.

Table 4.10 Correlation Coefficients of Activities in Executing Process Group and Success factor in Technical Specification.

Executing Processes	Technical Specification
Direct and Manage Project Execution	.340*
Perform Quality Assurance	.439**
Acquire Project Team	.237
Develop Project Team	.305*
Manage Project Team	.258
Distribute Information	.354*
Manage Stakeholder Expectations	.506**
Conduct Procurements	.358**

*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level.

In term of ‘executing’ process group, activity ‘manage stakeholder expectations’ is the most highly correlated (r_s= 0.506).

Table 4.11 Correlation Coefficients of Activities in Monitoring and Controlling Process Group and Success factor in Technical Specification.

Monitoring and Controlling Processes	Technical Specification
Monitor and Control Project Work	.405**
Perform Integrated Change Control	.279*
Verify Scope	.368**
Control Scope	.328*
Control Schedule	.208
Control Costs	.311*

*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level.

While in term of ‘monitoring and controlling’, activity ‘monitoring and controlling project work’ is the most highly correlated (r_s= 0.405). The result of the analysis indicated that activity ‘manage stakeholder expectation’ is more correlated compared with activity ‘monitoring and controlling project work’

4.10 Closing Process and Client Satisfaction

Another Spearsman Correlation analysis is performed to determine the relationship of process group ‘closing’ and success factor ‘client satisfaction’.

Table 4.12 Correlation Coefficients of Activities in Closing Process Group and Success factor in Client Satisfaction.

Closing Processes	Client Satisfaction
Close Project Phase	.471**
Close Procurement	.385**

*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level.

The result above indicated that activity ‘close project phase’ is having a positive correlation at 99% confidence. It is also the most highly correlated activity ($r_s = 0.471$).

4.11 Closing Process and Business Objective

In order to find the correlation between process group ‘closing’ and success factor ‘business objective’, Spearsman correlation is used.

Table 4.13 Correlation Coefficients of Activities in Closing Process Group and Success factor in Business Objective.

Closing Processes	Business Objective
Close Project Phase	.434**
Close Procurement	.408**

*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level.

The result above indicated that activity ‘close project phase’ have the highest correlation with success factor ‘business objective’ ($r_s = 0.434$).

4.12 Types of Industry and Project Management Processes

In order to find out the difference between the type of industry with the project management practices, Kruskal-Wallis test is used.

Table 4.14 Difference Between Project Management Processes With Respect to Types of Industry

Project Management Processes	Chi Square	p value
Define Scope	17.771	0.038
Create WBS	17.755	0.038

The result of the Kruskal-wallis test indicated that most of the project management processes does not have significant difference between type of industry except for two activities; Namely activities ‘define scope’ and ‘create WBS’ (both $p = 0.038$). For complete result, please refer to appendix A.

Table 4.15 Mean Rank Between Type of Industry

Type of industry	Define Scope	Create WBS
Petroleum Mining and Electricity	45.5	49
Telecommunications	41.17	39.83
Manufacturing	29.04	33.57
Construction	32.3	32.4
Plantation	18.5	30
Insurance, Real Estate and Business Service	32.25	22
Retail Trade	13.64	19.36
Wholesale trade	18.5	17.25
Banks and other Financial Institute	6	17
Others	26	16.9

Table 4.15 shows the two activities that have significance different with type of industry. From the mean rank, we can see that the industry that practices this two processes the most frequently is from Petroleum Mining and Electricity (mean rank = 45.50 for Define Scope, mean rank = 49.00 for Create WBS).

4.13 Project Size and Project Management Processes

Another Kruskal-Wallis test is done to find the difference between size of the project with project management process.

The result of the test indicated that all the project management process does not have any significant difference between project size (p>0.05), therefore the result is not presented in this chapter. The result is shown in appendix B.

4.14 Project Duration and Project Management Processes

In order to find the difference between project duration with project management processes, another Kruskal-Wallis test was performed.

Table 4.16 Difference Between Project Management Processes with respect to Project Duration

Project Management Processes	Chi Square	p value
Manage Stakeholder Expectations	6.036	0.049
Conduct Procurements	6.169	0.046
Develop Project Charter	6.657	0.036
Close Procurement	6.689	0.035
Sequence Activities	10.227	0.006
Define Activities	10.965	0.004

The analysis result above indicated that there are six project management processes that have significance difference between project duration. The most highly significance activity is ‘define activities’ (*p*=0.004), followed by ‘sequence activities’ (*p*=0.006), ‘close procurement’ (*p*=0.035), ‘develop project charter’ (*p*=0.036), ‘conduct procurement’ (*p*=0.046), and ‘manage stakeholder expectations’ (*p*=0.049). For complete result, please refer to appendix C

Table 4.17 Mean Rank Between Project Duration

Project Duration	N	Develop project charter	Define activities	Sequence activities	Manage stakeholders expectations	Conduct procurements	Close procurements
13-24 months	16	30.00	30.53	30.94	29.72	30.00	30.31
More than 24 months	5	24.30	30.10	27.40	23.80	19.30	19.80
Less than 6 months	25	19.18	17.68	17.96	19.46	20.18	19.88
Total	51						

Table 4.17 indicated that the six activities will be more likely to be practiced when the project span from 13 to 24 months.

4.15 Number of Participants and Project Management Processes

Kruskal-Wallis is used to find the difference between numbers of participants with project management processes.

The result of the analysis indicated that there are no significance differences between numbers of participants for all project management processes. For the result, please refer to appendix D

4.16 Annual Turnover and Project Management Processes

Kruskal-Wallis test is done to find the difference between annual turnover of the organization with project management processes.

Table 4.18 Difference Between Project Management Processes With Respect to Annual Turnover

Project Management Processes	Chi Square	p value
Perform Quality Control	19.215	0.008

The result above indicated that only activity ‘perform quality control’ have significance difference between annual turnover(p=0.008). For complete result, please refer to appendix E

Table 4.19 Mean Rank Between Annual Turnover

Annual Turnover	N	Perform Quality Control
RM50,000,001 – RM100,000,000	3	47.50
RM5,000,001 – RM10,000,000	4	37.38
More than RM100,000,001	7	35.93
RM500,001 – RM1,000,000	6	26.58
RM100,001 – RM500,000	6	24.58
Less than RM100,000	11	20.64
RM1,000,001 – RM5,000,000	7	19.86
RM10,000,001 – RM50,000,000	7	15.64
Total	51	

Table 4.19 indicated that activity ‘perform quality control’ is most frequently performed when the organization is having annual turnover within the range of RM50,000,001 to RM100,000,000.

4.17 Number of Employees and Project Management Processes

Another Kruskal-Wallis test is performed to find out the difference between number of employees with project management processes.

The result of the test indicated that there are no significant differences between numbers of employees in the organization with project management processes. Refer to appendix F for complete result.

CHAPTER 5

Discussion

5.1 Introduction

This chapter discusses the result obtained from the research. It begins with discussion of the most extensively practiced project management practices in Malaysian industries, followed by an in-depth discussion of project management processes and all the success factors involved. The discussion for the relationship of project management process with project duration, type of industry and annual turnover will also be discussed in the latter part.

5.2 Project Management Processes Practiced

From the result of the analysis, it has shown that Malaysian industries are practicing formal project management processes that are associated with time (μ= 3.46), cost (μ= 3.64), quality (μ= 3.27) and not all the practices are being emphasize evenly (refer to table 4.3).

Time, cost, and quality is actually the most well established and traditional knowledge area in PMBOK, it is very normal that most of the industries practices

project management based on the three knowledge area because they are easy to evaluate and measure (refer to section 2.5 first paragraph).

Activities from human resource (μ= 3.18), communication (μ= 3.18), and scope (μ= 3.15) management are moderately practiced. Human resource and communication is the mean of managing stakeholders both internally and externally (refer to section 2.3 paragraph 8). Unlike the traditional triple constrain of time, cost and quality, people-related matters are harder to quantify and measure (refer to section 2.3 paragraph 9). Communication barrier and misinterpretation is one of the common problems occurred in human resource management and communication.

Practices that are associated with risk (μ= 2.72), integration (μ= 3.11) and procurement (μ= 2.86) on the other hand are practiced less frequently. Risk is the least practiced, because risk related issue are always overlooked by the project manager (section 2.3 paragraph 10). Risk is often neglected because the management of the risk may consume time. Many organizations will only perform risk management procedure only once they encounter problems on their project. In most cases, this will lead to failure to meet the time constrain.

5.3 Relationship of Project Management Processes and Project Success Factor

The average of rating for success factor has shown that through the practice formal project management processes, it really does increase the chance of project

success (μ= 3.61). This also shows that the use of more traditional project management approach based on the triple constrain of time, cost and quality can be quite effective in ensuring project success (refer section 2.5 second paragraph). For short term or smaller scale project, it is more effective if the project success is measured based on the triple constraints (refer section 2.5 second paragraph).

The research also suggested that process group 'monitoring and controlling' is the major contributor to overall project success (r_s= 0.649). Monitoring and controlling is where the progress and the performance of the project are tracked, reviewed and regulated (refer section 2.4 paragraph 3). Through proper monitoring and controlling of project work, problems encountered during the project will be identified and proper corrective or even prevention steps will be taken to ensure the project is running smoothly. This will eventually lead to project success (refer section 2.4 paragraph 3).

5.3.1 Quality Requirement

The result of the analysis indicated that activity 'verify scope' is the major contributor to achieving better quality (r_s = 0.503). Scope is the work or elements required for ensuring project success (refer to section 2.3 paragraph 4). While verify scope is the mean of accepting the project deliverables based on the defined scope in the earlier phase (refer to section 2.3 paragraph 4). Scope verification is important because it ensures that the project is at the right track, and to ensure the customer is satisfied with the work performed (refer to section 2.3 paragraph 4). Scope verification will ensure the output of the project meets the quality requirement

because it is a similar kind of work with quality control. Only difference is that scope verification focuses more towards customer satisfaction (refer to section 2.3 paragraph 4).

5.3.2 Time

In term of achieving project success within the allocated time, the result of the analysis has indicated that activity ‘perform integrated change control’ is the major contributor (r_s = 0.407). Perform integrated change control is the process of reviewing all the change requests and approving the changes to the project work (refer to section 2.3 paragraph 3). It seems that in order to achieve project success in term of time, the activity ‘perform integrated change control’ is really important, because changes in a project are very common. It is important that changes should be minimized in the course of the project, because too much changes will lead to scope creep (refer to section 2.3 paragraph 3). It is up to the project manager to analyze and determine whether the changes are suitable or not prior to applying it. Proper management of changes will prevent redundancy in term of rework at a later phase of the project that might have an impact on the completion time (refer to section 2.3 paragraph 3).

5.3.3 Cost

In order to achieve project success in term of cost, the analysis indicated that activity ‘perform integrated change control’ is the major contributor (r_s = 0.353). Without a good control of changes in the project, scope creep will happen, causing the project to overrun the designated budget due to rework (refer to section 2.3 paragraph 3). It is up to project manager to analyze the changes prior to updating the baseline (refer to section 2.3 paragraph 3). Uncontrolled change of scope will not only affect the final cost of the project, but time and client satisfaction as well (refer to section 2.3 paragraph 4).

5.3.4 Technical Specification

The result of the analysis indicated that activity ‘manage stakeholder expectations’ is the major contributor for project success in term of meeting technical specification (r_s = 0.506). Communication is the mean of managing stakeholder expectations is by working closely with them to ensure their needs are met (refer to section 2.3 paragraph 9). Communication is very important in a project, because it will ensure that everyone knows their responsibility in the project. Clearly defining responsibilities will ensure the project finishes within time, cost and technical specifications (refer to section 2.3 paragraph 9). Technical specification of a certain product or services is based on the requirement of the client. Therefore it is really important that the project team to collect feedback from various stakeholders to ensure the final product is what the stakeholder expected.

5.3.5 Client Satisfaction

The result of the analysis suggests that activity ‘close project phase’ is the major contributor for client satisfaction (r_s = 0.471). Close phase is the process of finalizing all the activities in order to formally complete the project (refer to section 2.3 paragraph 3). In project closure, the end product will be handover to the aftersales team to provide warranty and support to further satisfy the needs of the clients. Besides that, capturing feedback from the client will be able to further improve client satisfaction in future projects (refer to section 2.3 paragraph 3). Depending on the type of product, training may also be provided to the client on how to operate the product properly (refer to section 2.3 paragraph 3). Client satisfaction is crucial because it is one of the main factors that affect the reputation of the company.

5.3.6 Business Objective

The result of the analysis indicated that activity ‘close project phase’ is the major contributor in term of achieving business objective (r_s = 0.434). During project closure, a post project review will be performed to determine whether the business objective is met (refer to section 2.3 paragraph 3). It is important for project manager to not lost sight of the organization’s business objective.

5.4 Relationship of Project Management Processes and Different Project Duration

The result of the research indicated that there are differences between project duration with project management process. It appears that a project actually required greater control in term of time, cost and integration when the project is larger and costlier (refer to section 2.6 paragraph 6). When the scale of the project is big, it will affect the lead time. When a project requires a longer time to complete, the chances of problem occurring will increase as well. Therefore it is important that the project manager pay more attention to all the processes.

5.5 Relationship of Project Management Process and Type of industry

Table 5.1 Type of Industry and Most Frequent Practiced Activities

Type of Industry	Project Management Process
Manufacturing (N=14)	Plan procurement
	Create WBS
	Develop project charter
	Close procurement
	Collect requirement
Construction (N=7)	Plan communication
	Administer procurement
	Plan quality
	Close procurement
	Develop project charter
Retail Trade (N=5)	Administer procurement
	Control scope
	Verify scope
	Conduct procurement
	Plan quality

Table 5.1 shows the 3 industries that has the most number of respondents along with the 5 activities that they practices most extensively in their industry. Manufacturing industries seems to emphasizing a lot in the planning phase where they practices a lot of activities like ‘plan procurement’, ‘create WBS’, and ‘collect requirement’. Construction industries on the other hand are more balanced. They seem to be practicing activities from all the process groups except ‘executing’. Retail

trade seems to be focusing a lot in ‘monitoring and controlling’ process group with the practice of ‘administer procurement’, ‘control scope’, and ‘verify scope’.

The result of the research suggests that there are differences between project management processes for petroleum mining and electricity with the other type of industry. Petroleum mining and electricity appears to be practicing activity ‘define scope’ and ‘create WBS’ more frequently compared to other industries. The result of the analysis is consistent with previous findings; where type of industry may affect the use of project management processes (refer to chapter 2.6 paragraph 6). Since oil and gas company manage their project based on triple constraint of time, cost, and quality, the management of scope has to be done right to prevent any scope creep that may potentially leads to time and cost overrun and reduce in quality (refer to chapter 2.6 paragraph 6).

5.6 Relationship of Project Management Processes and Annual Turnover

The result of the analysis indicated that there are differences between organizations with different annual turnover. Organizations with an annual turnover of RM50 million to RM100 million practices quality control more extensively. An organization with an annual turnover of RM50 million to RM100 million is considered as a large organization. Quality control is the process of monitoring and recording result of the quality activities for constant improvement (refer to chapter 2.3 paragraph 7). The result of the analysis is consistent with the previous studies, where larger organization tends to appreciate quality management more and have

more resources to implement total quality management (refer to chapter 2.6 paragraph 7).

CHAPTER 6

Conclusions

6.1 Introduction

This chapter drew a conclusion for the research. All the findings of the research are summarized and concluded. The implication of the research was discussed. While the limitation of the research as well as recommendation on how to improve this research were also assessed in the latter part.

6.2 What are the management processes involved in project management?

Through literature review, the nine knowledge area of PMBOK are studied. The nine knowledge area consisted of project time, cost, quality, scope, integration, risk, communication, procurement, and human resource management. There are a total of 42 project management practices available in this nine knowledge area of PMBOK. The 42 practices can also be mapped into the five project management process groups which consisted of initiating, planning, executing, monitoring and controlling, and closing.

6.3 What are the common project management practices that were implemented by the companies in Malaysia and how extensively these activities are conducted?

This research has shown that the most commonly practiced project management processes that were implemented by companies in overall Malaysian industries is ‘determine budget’ and ‘estimate cost’.

The activity practiced most commonly by the petroleum mining and electricity is ‘create WBS’. As for plantation, activity ‘manage stakeholder expectation’ is identified as the most extensively used. For telecommunication industry, activity ‘estimate activity duration’ is the most commonly practiced. Construction industry on the other hand practices activity ‘plan communication’ the most. While for manufacturing industry, activity ‘plan procurement’ is practiced most frequently. Besides that, retail trade practices activity ‘administer procurement’ most frequently. Wholesale trade practices activity ‘verify scope’ most extensively. Lastly, banks and other financial institute practices activity ‘report performance’ most frequently.

In term of the nine knowledge area of PMBOK, project time, cost and quality is the most commonly implemented knowledge area. This also indicated that most Malaysian companies’ practices project management based on a more traditional approach with respect to the triple constrain of time, cost and quality.

6.4 How the project management practices affect the project success?

In term of achieving overall project success, the research has suggested that by improving quality, the chances of project success will also increases. In order to meet the quality requirement, activity ‘verify scope’ is being identified as the major contributor.

As for ensuring project is completed in a timely manner, process group ‘monitoring and controlling’ is the key contributor. The activity that has the most impact on this success factor is ‘perform integrated change control’.

In order for the project to complete within the designated budget, process group ‘monitoring and controlling’ is also the contributor. The result of the research suggested that activity ‘perform integrated change control’ is the main contributor.

In term of achieving client’s satisfaction, process group ‘closing’ was identified as the major contributor to success. The activity that is most highly correlated with client’s satisfaction is ‘close project phase’.

As for achieving technical specification, process group ‘executing’ was identified as the major contributor. Activity ‘manage stakeholder expectation’ was the most highly correlated with this success factor.

In order to achieve business objective, the research suggested that process group ‘closing’ is the main contributor. The activity ‘close project phase’ is the major contributor to this success factor.

Below is a table to show the activities that contributed to all the project success factors.

Table 6.1 Project Success Factors and Activities

Project Success Factors	Process Group	Activity
Time	Monitoring and Controlling	Perform Integrated Change Control
Cost	Monitoring and Controlling	Perform Integrated Change Control
Quality Requirement	Monitoring and Controlling	Verify Scope
Client Satisfaction	Closing	Close Project Phase
Technical Specification	Executing	Manage Stakeholder Expectation
Business Objective	Closing	Close Project Phase

Table 6.1 indicated that process group 'monitoring and controlling' is determined as the most important process group to practice in order to achieve overall project success.

6.5 Research Implication

In term of academic, this research further enhanced the existing theories and materials based on project management that were predefined by previous researcher. This result of this research helped future researchers who are currently studying project management especially in Malaysian environment and allow future researcher to focuses on issues regarding the consequences of project managers neglected the least practiced knowledge areas.

In term of working industries, through effective implementation of formal project management, the productivity and chances of project success in Malaysian industries increased. The research allows the project manager to see the major activities that contributed to project success and focuses on the key activities. From the result of the research, the approaches taken by project managers in Malaysian industries are too traditional where they emphasize mostly on time, cost and quality only. All the nine knowledge area should not be neglected to further increase the chance of project success. Besides that, non-managerial employees also benefit from this research, where they learn how to cope with the activities identified.

6.6 Limitation of the research

The major limitation of this research is the sample size which is mainly from manufacturing (N= 14) industries, followed by retail trade (N= 7) and construction (N= 5). With such a small sample size, the result obtained from the research may not be able to really represent the industries.

The research only focuses on the three projects management knowledge areas that are practiced more extensively and there are no further research on why the other six knowledge areas are least practiced.

The research focuses on PMBOK only. This in turn will limit the methodology that is only available in PMBOK. There are many types of standards available for project management. E.g. PRINCE2, P2M. PMBOK is only one of the standards that have been developed to govern project management.

6.7 Further Research

In future research, the sample size should be increased to ensure that the result of the research is able to represent their industries. A larger sample size will also increase the precision of the result. Besides that, the research can also be improved by focusing on one industry only.

The research has found that Malaysian industries tend to focuses on the triple constraint of time cost and quality only when it comes to managing a project. Further research on the reason of why the Malaysian project managers should not neglect all the least practiced knowledge area

Further research on other standard like PRINCE2 may help to produce a more comprehensive research questionnaire, because there are different views and theories in PRINCE2 that can be implemented in this research. A comparison can be made to see the difference between these two standards as well. PRINCE2 (PRoject IN Controlled Environments) is another project management standard used extensively by UK government and is widely recognized and used in the private sector internationally as well.

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APPENDICES

APPENDIX A: Difference Between Project Management Processes With Respect to Type of Industry

	Type of industry	
Project Management Processes	Chi Square	p value
Develop Project Charter	16.078	0.065
Identify Stakeholders	13.771	0.131
Develop Project Management Plan	15.554	0.077
Collect Requirements	13.77	0.131
Define Scope	17.771	**0.038**
Create WBS	17.755	**0.038**
Define Activities	14.248	0.114
Sequence Activities	14.599	0.103
Estimate Activity Resources	10.125	0.34
Estimate Activity Durations	13.576	0.138
Develop Schedule	11.563	0.239
Estimate costs	13.748	0.132
Determine Budget	11.428	0.248
Plan Quality	9.369	0.404
Develop Human Resource Plan	10.747	0.293
Plan Communications	10.477	0.313
Plan Risk Management	5.197	0.817
Identify Risk	6.791	0.659
Perform Qualitative Risk Analysis	7.204	0.616
Perform Quantitative Risk Analysis	7.995	0.535
Plan Risk Responses	5.471	0.791
Plan Procurements	11.803	0.225
Direct and Manage Project Execution	13.297	0.15
Perform Quality Assurance	8.777	0.458
Acquire Project Team	7.583	0.577
Develop Project Team	6.534	0.685
Manage Project Team	6.553	0.684
Distribute Information	6.349	0.705
Manage Stakeholder Expectations	12.035	0.211

Conduct Procurements	7.826	0.552
Monitor and Control Project Work	15.411	0.08
Perform Integrated Change Control	8.698	0.466
Verify Scope	11.231	0.26
Control Scope	9.604	0.384
Control Schedule	9.125	0.426
Control Costs	13.591	0.138
Perform Quality Control	9.988	0.351
Report Performance	11.225	0.261
Monitor and Control Risks	8.531	0.482
Administer Procurements	11.466	0.245
Close Project Phase	7.24	0.612
Close Procurement	8.25	0.509

APPENDIX B: Difference Between Project Management Processes with respect to project size

	Project size	
Project Management Processes	Chi Square	p value
Develop Project Charter	6.668	0.464
Identify Stakeholders	5.562	0.592
Develop Project Management Plan	8.668	0.277
Collect Requirements	9.716	0.205
Define Scope	8.599	0.283
Create WBS	3.309	0.855
Define Activities	10.386	0.168
Sequence Activities	5.773	0.566
Estimate Activity Resources	8.766	0.270
Estimate Activity Durations	11.442	0.120
Develop Schedule	11.891	0.104
Estimate costs	4.691	0.698
Determine Budget	10.179	0.179
Plan Quality	7.034	0.425
Develop Human Resource Plan	6.225	0.514
Plan Communications	4.823	0.682
Plan Risk Management	7.403	0.388
Identify Risk	8.850	0.264
Perform Qualitative Risk Analysis	7.613	0.368
Perform Quantitative Risk Analysis	12.439	0.087
Plan Risk Responses	8.347	0.303
Plan Procurements	5.593	0.588
Direct and Manage Project Execution	8.130	0.321
Perform Quality Assurance	4.648	0.703
Acquire Project Team	7.494	0.379
Develop Project Team	11.553	0.116
Manage Project Team	9.577	0.214
Distribute Information	7.352	0.393
Manage Stakeholder Expectations	6.594	0.472
Conduct Procurements	8.596	0.283
Monitor and Control Project Work	7.874	0.344
Perform Integrated Change Control	5.347	0.618
Verify Scope	4.088	0.770
Control Scope	6.742	0.456
Control Schedule	6.515	0.481
Control Costs	10.564	0.159

Perform Quality Control	8.049	0.328
Report Performance	6.684	0.463
Monitor and Control Risks	4.839	0.680
Administer Procurements	4.928	0.669
Close Project Phase	9.332	0.230
Close Procurement	5.188	0.637

APPENDIX C: Difference Between Project Management Processes with respect to Project Duration

	Project duration	
Project Management Processes	Chi Square	p value
Develop Project Charter	6.657	**0.036**
Identify Stakeholders	5.139	0.077
Develop Project Management Plan	4.544	0.103
Collect Requirements	3.085	0.214
Define Scope	4.776	0.092
Create WBS	4.768	0.092
Define Activities	10.965	**0.004**
Sequence Activities	10.227	**0.006**
Estimate Activity Resources	4.154	0.125
Estimate Activity Durations	4.038	0.133
Develop Schedule	5.028	0.081
Estimate costs	0.610	0.737
Determine Budget	1.505	0.471
Plan Quality	0.429	0.807
Develop Human Resource Plan	2.666	0.264
Plan Communications	5.775	0.056
Plan Risk Management	2.013	0.366
Identify Risk	1.964	0.375
Perform Qualitative Risk Analysis	2.352	0.309
Perform Quantitative Risk Analysis	2.529	0.282
Plan Risk Responses	2.671	0.263
Plan Procurements	1.229	0.541
Direct and Manage Project Execution	0.878	0.645
Perform Quality Assurance	3.423	0.181
Acquire Project Team	0.974	0.614
Develop Project Team	0.894	0.639
Manage Project Team	0.479	0.787
Distribute Information	0.983	0.612
Manage Stakeholder Expectations	6.036	**0.049**
Conduct Procurements	6.169	**0.046**
Monitor and Control Project Work	5.101	0.078
Perform Integrated Change Control	4.709	0.095
Verify Scope	1.601	0.449
Control Scope	4.440	0.109
Control Schedule	2.956	0.228
Control Costs	3.723	0.155

Perform Quality Control	1.310	0.519
Report Performance	3.115	0.211
Monitor and Control Risks	1.331	0.514
Administer Procurements	2.848	0.241
Close Project Phase	3.632	0.163
Close Procurement	6.689	**0.035**

APPENDIX D: Difference Between Project Management Processes with respect to Number of Participants

	Number of participants	
Project Management Processes	Chi Square	p value
Develop Project Charter	5.083	0.279
Identify Stakeholders	7.355	0.118
Develop Project Management Plan	4.281	0.369
Collect Requirements	5.064	0.281
Define Scope	6.356	0.174
Create WBS	1.999	0.736
Define Activities	6.737	0.150
Sequence Activities	4.614	0.329
Estimate Activity Resources	2.240	0.659
Estimate Activity Durations	3.299	0.509
Develop Schedule	6.136	0.189
Estimate costs	4.698	0.320
Determine Budget	1.181	0.881
Plan Quality	3.294	0.510
Develop Human Resource Plan	1.976	0.740
Plan Communications	2.077	0.722
Plan Risk Management	0.454	0.978
Identify Risk	2.304	0.680
Perform Qualitative Risk Analysis	0.970	0.914
Perform Quantitative Risk Analysis	1.447	0.836
Plan Risk Responses	2.362	0.669
Plan Procurements	1.182	0.881
Direct and Manage Project Execution	0.825	0.935
Perform Quality Assurance	2.817	0.589
Acquire Project Team	1.505	0.826
Develop Project Team	1.855	0.762
Manage Project Team	0.539	0.970
Distribute Information	1.438	0.838
Manage Stakeholder Expectations	5.536	0.237
Conduct Procurements	2.087	0.720
Monitor and Control Project Work	1.420	0.841
Perform Integrated Change Control	0.433	0.980
Verify Scope	0.929	0.920
Control Scope	2.248	0.690
Control Schedule	1.093	0.895
Control Costs	0.555	0.968

Perform Quality Control	4.613	0.329
Report Performance	6.030	0.197
Monitor and Control Risks	1.927	0.749
Administer Procurements	1.884	0.757
Close Project Phase	3.106	0.540
Close Procurement	0.799	0.939

APPENDIX E: Difference Between Project Management Processes With Respect to Annual Turnover

	Annual Turnover	
Project Management Processes	Chi Square	p value
Develop Project Charter	9.540	0.216
Identify Stakeholders	12.260	0.092
Develop Project Management Plan	11.417	0.121
Collect Requirements	7.417	0.387
Define Scope	11.950	0.102
Create WBS	7.990	0.333
Define Activities	12.542	0.084
Sequence Activities	7.346	0.394
Estimate Activity Resources	4.822	0.682
Estimate Activity Durations	8.619	0.281
Develop Schedule	8.683	0.276
Estimate costs	5.238	0.631
Determine Budget	5.620	0.585
Plan Quality	7.574	0.372
Develop Human Resource Plan	11.659	0.112
Plan Communications	5.067	0.652
Plan Risk Management	5.776	0.566
Identify Risk	7.468	0.382
Perform Qualitative Risk Analysis	6.580	0.474
Perform Quantitative Risk Analysis	2.844	0.899
Plan Risk Responses	3.515	0.834
Plan Procurements	10.059	0.185
Direct and Manage Project Execution	12.769	0.078
Perform Quality Assurance	13.903	0.053
Acquire Project Team	8.415	0.297
Develop Project Team	9.928	0.193
Manage Project Team	8.911	0.259
Distribute Information	10.974	0.14
Manage Stakeholder Expectations	7.954	0.337
Conduct Procurements	7.875	0.344
Monitor and Control Project Work	13.599	0.059
Perform Integrated Change Control	4.771	0.688
Verify Scope	3.509	0.834
Control Scope	3.379	0.848
Control Schedule	14.021	0.051
Control Costs	7.756	0.355

Perform Quality Control	19.215	**0.008**
Report Performance	10.702	0.152
Monitor and Control Risks	9.810	0.2
Administer Procurements	9.899	0.194
Close Project Phase	11.056	0.136
Close Procurement	6.025	0.537

APPENDIX F: Difference Between Project Management Processes With Respect to Number of Employees

	Number of employees	
Project Management Processes	Chi Square	p value
Develop Project Charter	8.369	0.212
Identify Stakeholders	3.746	0.711
Develop Project Management Plan	2.455	0.873
Collect Requirements	8.795	0.185
Define Scope	8.925	0.178
Create WBS	11.315	0.079
Define Activities	10.487	0.106
Sequence Activities	6.224	0.399
Estimate Activity Resources	5.468	0.485
Estimate Activity Durations	4.939	0.552
Develop Schedule	6.233	0.398
Estimate costs	3.166	0.788
Determine Budget	4.326	0.633
Plan Quality	5.835	0.442
Develop Human Resource Plan	7.998	0.238
Plan Communications	4.227	0.646
Plan Risk Management	2.494	0.869
Identify Risk	3.135	0.792
Perform Qualitative Risk Analysis	5.484	0.483
Perform Quantitative Risk Analysis	7.835	0.25
Plan Risk Responses	6.107	0.411
Plan Procurements	8.041	0.235
Direct and Manage Project Execution	3.603	0.73
Perform Quality Assurance	2.144	0.906
Acquire Project Team	4.575	0.599
Develop Project Team	5.354	0.499
Manage Project Team	3.954	0.683
Distribute Information	5.734	0.454
Manage Stakeholder Expectations	3.074	0.8
Conduct Procurements	5.199	0.519
Monitor and Control Project Work	4.338	0.631
Perform Integrated Change Control	5.145	0.525
Verify Scope	3.407	0.756
Control Scope	3.724	0.714
Control Schedule	6.231	0.398
Control Costs	5.088	0.533

Perform Quality Control	6.988	0.322
Report Performance	11.281	0.08
Monitor and Control Risks	9.392	0.153
Administer Procurements	7.059	0.315
Close Project Phase	7.819	0.252
Close Procurement	6.650	0.354

APPENDIX G: Questionnaire Survey

Section A

Please indicate (✓) how often the following items were obtained or used in the project that you were involved in the last two years.

Item	Project Management Practice	Always	Often	Sometimes	Rarely	Never	Unsure
1.	Develop Project Charter						
2.	Identify Stakeholders						
3.	Develop Project Management Plan						
4.	Collect Requirements						
5.	Define Scope						
6.	Create WBS						
7.	Define Activities						
8.	Sequence Activities						
9.	Estimate Activity Resources						
10.	Estimate Activity Durations						
11.	Develop Schedule						
12.	Estimate Costs						
13.	Determine Budget						
14.	Plan Quality						
15.	Develop Human Resource Plan						
16.	Plan Communications						
17.	Plan Risk Management						
18.	Identify Risk						
19.	Perform Qualitative Risk Analysis						
20.	Perform Quantitative Risk Analysis						
21.	Plan Risk Responses						
22.	Plan Procurements						
23.	Direct and Manage Project Execution						
24.	Perform Quality Assurance						

Item	Project Management Practice	Always	Often	Someti	Rarely	Never	Unsure
25.	Acquire Project Team						
26.	Develop Project Team						
27.	Manage Project Team						
28.	Distribute Information						
29.	Manage Stakeholder Expectations						
30.	Conduct Procurements						
31.	Monitor and Control Project Work						
32.	Perform Integrated Change Control						
33.	Verify Scope						
34.	Control Scope						
35.	Control Schedule						
36.	Control Costs						
37.	Perform Quality Control						
38.	Report Performance						
39.	Monitor and Control Risks						
40.	Administer Procurements						
41.	Close Project Phase						
42.	Close Procurement						

Section B

By reference to the project in Section A, please indicate (✓) how do you rate the following goals were met.

Item	Success measures	Strongly agree	Agree	Neutral	Disagree	Strongly	Unsure
1.	Cost target						
2.	Time Target						
3.	Technical Specifications						
4.	Quality requirements						
5.	Client Satisfaction						
6.	Business objectives						

Section C

Please answer the following questions by reference to the project in Section A.

1. **The project size:**
   - ☐ Less than RM100,000
   - ☐ RM100,000 - RM500,000
   - ☐ RM500,001 – RM1,000,000
   - ☐ RM1,000,001 – RM5,000,000
   - ☐ RM5,000,001 – RM10,000,000
   - ☐ RM10,000,001 – RM50,000,000
   - ☐ RM50,000,001 –RM100,000,000
   - ☐ More than RM100,000,001
2. **The project duration:**
   - ☐ Less than 6 months
   - ☐ 6-12 months
   - ☐ 13-24 months
   - ☐ More than 24 months
3. **The number of participants in the project**
   - ☐ 1-10
   - ☐ 11-25
   - ☐ 26-50
   - ☐ 51-100
   - ☐ Greater than 100

4. The type of industry you are currently in:

- ☐ Plantation
- ☐ Logging
- ☐ Petroleum Mining and Electricity
- ☐ Manufacturing
- ☐ Construction
- ☐ Wholesale Trade
- ☐ Retail Trade
- ☐ Hotels
- ☐ Banks and Other Financial Institutions
- ☐ Insurance, Real Estate and Business Services
- ☐ Transport
- ☐ Telecommunications
- ☐ Others, please indicate

  _____

Please answer the following questions by reference to your present organization.

5. The annual turnover

- ☐ Less than RM100,000
- ☐ RM100,000 - RM500,000
- ☐ RM500,001 – RM1,000,000
- ☐ RM1,000,001 – RM5,000,000
- ☐ RM5,000,001 – RM10,000,000
- ☐ RM10,000,001 – RM50,000,000
- ☐ RM50,000,001 –RM100,000,000
- ☐ More than RM100,000,001

6. The number of employees

- ☐ Less than 10
- ☐ 11-50
- ☐ 51-100
- ☐ 101- 500
- ☐ 501-1,000
- ☐ 1,001-5,000
- ☐ 5,001-10,000
- ☐ More than 10,000

Thank you for participating in this survey. You are being ensured that all information provided will be strictly used for the analysis of this study only. We would be appreciated if you could provide your contact so that we can reach you if it is necessary.

Name:

Email: Telephone No.: