Project Portfolio Management for Successful Major IT Projects in Global Telecommunication Organization

إدارة محافظ المشاريع لإنجاح مشاريع تقنية المعلومات في المؤسسات العالمية للاتصالات ومزودي الخدمات

By

Shamim Rubaiya Salem

No table of contents entries found.**Dissertation submitted in partial fulfillment of MSc IT Management Faculty of Informatics**

Dissertation Supervisor

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Abstract

Many researchers have discussed and analyzed the failures for Information Technology Projects and the importance of implementing project management methodology through Project Management Office or Enterprise Project Management. However, there are not enough studies covering telecommunication and IT service provider organizations published for forming and implementing Project Portfolio Management process especially in the Gulf Countries.

The aim of this research paper is to investigate how PPM can be utilized by organizations to decrease the failures of the major IT Projects in. The research is considering "***Company A***" as a case study to analyze it throughout different reviews. This organization went through a strategic change which shifted their IT projects direction and its management decided to implement PPM to maintain their competitive advantage in the market.

The research methodology covers qualitative, quantitative and empirical and observation data gathering and analysis.

The research findings indicate that although the reasons for IT project failures are apparent to most researchers and business owners, the rate of success is still disappointing. The research indicated that these factors like scope, time and cost of a project are not enough to control IT projects and obtain the expected result. However, PPM looks at vast areas like synchronization of projects' strategies, goals, values, revenue and benefits to fit the organizational long term objectives. The research considers the IT Projects and Technology complexity which are another reason for the failures.

The current study concludes that organization should always recognize its capabilities and external environmental factors to identify its sensitivity to different market variables. Also, the surveyed sample shows the importance of associating the PPM tasks to individual so it is aligned with the strategic objectives. Human resource function is vital to develop the required skills according to the new requirements of the organization projects.

Mainly, it is suggested by this paper that the association of these factors should be investigated in future studies using a larger sample of questionnaire respondents and to different telecommunication organizations.

ملخص البحث

ناقش العديد من الباحثين والمحللين في دراسات مختلفة اسباب فشل مشاريع تكنولوجيا المعلومات وأهمية تنفيذ المشروع من خلال منهجية مكتب إدارة المشاريع في المؤسسات .ومع ذلك ، لا توجد دراسات علمية كافية تغطي مجال الاتصالات وتكنولوجيا المعلومات لمنظمات مزودي الخدمة باستخدام إدارة المشاريع خاصة على مستوى دول الخليج والمنطقة.

الهدف من هذه الورقة البحثية هو التوصل لمعرفة كيفية استخدام الشركات لادارة المحافظ لتقليل الفشل في مشاريع تكنولوجيا المعلومات الرئيسية. هذه الورقة البحثية تتناول ***مؤسسة أ*** كدراسة حالة. قامت هذه المؤسسة بتغيير استراتيجيتها عن طريق تأسيس مكتب ادراة المساريع في مجال التكنولوجيا والمعلومات للحفاظ على ميزتها التنافسية في السوق. علما أن هذه الشركة لم تكن تتبع هذه المنهجية في السابق كما هو معتمد في الشركات العالمية.

منهجية البحث يشمل النوعية ، الكمية والتجريبية والملاحظة وجمع البيانات وتحليلها. نتائج البحوث تشير إلى أنه بالرغم من أن أسباب فشل المشاريع واضحة لمعظم الباحثين وأصحاب الأعمال ، فإن معدل النجاح لا يزال مخيبا للآمال .وأشار البحث إلى أن هذه العوامل مثل الوقت والنطاق وتكلفة المشروع ليست كافية للسيطرة على مشاريع تكنولوجيا المعلومات والحصول على النتيجة المتوقعة .ولذلك ، فإن ادارة محافظ المشاريع يهتم بالعوامل مثل التداخل والترابط بين المشاريع المختلفة للشركة، والأهداف والقيم والعائدات والفوائد التنظيمية لتتناسب مع الأهداف الاستراتيجية على المدى الطويل. وقد تبين من البحث ان التكنولوجيا ونظم المعلومات هي اسباب اخرى للفشل بسبب صعوبة السيطرة على تغيراتها كعوامل مؤثرة.

تشير هذه الدراسة إلى أهمية ادراك المنظمة لقدراتها الداخلية والعوامل البيئية الخارجية لتحديد حساسيتها لمتغيرات السوق المختلفة . اضافة الى ذلك، يتبين من هذه الورقة أهمية ربط المهام بالاداء الوظيفي للموظفين العاملين على المشاريع على النطاق الفردي حتى تتفق مع الأهداف الاستراتيجية . وتأتي أهمية دور قسم الموارد البشرية في تنمية المهارات الملحة وفقا للمتطلبات للمشاريع الجديدة في المؤسسة.

ويقترح البحث في نهاية هذه الورقة الى اهمية القيام ببحوث مستقبلية للنظر في العوامل المسببة لفشل المؤسسات وذلك عن طريق البحث باستخدام عينة أكبر من المشاركين في الاستبيان والتنسيق مع منظمات أخرى في المجال المعني في دول مختلفة من المنطقة الجغرافية للخليج العربي.

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List of Abbreviations

Abbreviation	Full Terminology
PMO	Program Management Office
PPM	Project Portfolio Management
EPMO	Enterprise Project Management Office/Enterprise Program Management Office
PM	Project Management
IT	Information Technology
IS	Information System
FL	Functional Leader
SC	Steering Committee
CS	Case Study
SWOT	Strength, Weakness, Opportunity and Threat
RQ	Research Question
LR	Literature Review
KPI	Key Performance Indicators
HR	Human Resources
Ops	Operational
CTIO	Chief Technology Information Officer

10. Chapter One: Introduction:

This chapter is an introduction to the dissertation project and it gives general information about the research paper. It intends to provide the reader a background of the organization used in the case study.. In addition, the problem statement and the research questions to address the problem will be included in detail. By answering the research questions, the research aim and objectives are hoped to be achieved. Finally, the introduction briefly explains the research conceptual framework which is used to link all the research components together.

1.7.Background Information:

1.7.1. Project and Program:

There might be some organizations which still do not see the importance of the implementations of Project Portfolio Management for Major Projects for better alignment with the business strategy. In my research, the focus will be on a company in one of the Gulf Countries which is running major IT Projects. The paper will look at the importance of having Project Portfolio Management established and implemented in organizations. However, the name of the company and its competitor will remain anonymous for confidentiality reason.

As the terms 'Project' and 'Program' will be used extensively in this paper, the following definitions will apply. Project is a set of activities run by resources and has start and end date and have specific scope, deliverables, objective and budget. Program is a dynamic system that has group of projects that can be controlled by Project Portfolio Management which includes all the approved projects with their dependencies and strategic objectives in a control manner. This Program is flexible to allow new projects to be added to the portfolio or current projects to exit the portfolio based on certain criteria and judgment methods. The duration of the program can either be fixed or flexible based on the projects and business requirements as stated by Gardiner (2005).

1.7.2. Telecommunication Background:

Telecommunication is a Greek term that refers to communication at distance using any type of means. Initially, people used to use the drum and lights for their distance communications which was evolved with the invention of electricity by Alessandro Volta (1800). This shows that

different means of communication have been developed since ancient time to what we have in today's advanced communications types. Ex

periments started in 1809 by Sommering to invent telegraph system using basic items such as golden sensors, battery, wires for letters and numbers and water tank. This is to examine the effect of the signals when they passed through these wires. However, the test failed. (Brian n . d)

In 1843, further experiments done by Samuel Morse by developing Sommering's idea and allocating each letter and number a specific space, line, and point which worked and is still used today. Since this is an evolving area of research, other scientists looked at the possibility of having a device that transmits voice and audio and not only signals. This was enhanced by Graham Bell and he introduced the telephone machine sever years later.

The data packet switching idea was introduced by Paul Baran which is based on node connectivity and packet routing concept. Later in 70's, the TCP/IP Protocol was developed to unify the internet protocol and communication method and was selected by ARPANET to be common worldwide for research and improvements highlighted by Brian (n . d)

1.7.3. Case Study Brief:

Company A was one of the first telecommunication companies in its country and was well established in the market since long time with complete new infrastructure and network. It has been in the market as the strongest Telecom and Internet Service Provider for more than 15 years and with the time passing, it became a global organization serving overseas users and businesses. ***Company A*** is also considered one of the largest contributors to its society and community in terms of development program as well as nationalization. It contributed to the country position among other countries to be one of the best in terms of telecom services to its business and consumer. This means consumers enjoy the services like mobile packages, data usage packages, iPhone, Blackberry and other advanced internet services as high speed internet all over the country. Furthermore, business customers are provided with internet services, virtual private network, MPLS and frame relay network and more. These were some of the main reasons to have and retain loyal customers in the region unlike other small service providers.

After about 25 years, a new strong operator entered the market as a competitor for ***Company A*** and after only 4 years of establishment, the competitor company managed to have around 3 million customers. This organization is using the advantage of attracting the new subscribers by their flexible offers and packages which can't be found with Company A. It ensures their commitment to nationalization as about 50% of their management board members are local which in fact contributes to the country's development.

1.8.Problem Statement:

The problem was found in ***Company A*** where all the projects are managed through the traditional project management approach. These projects are implemented by the Engineering Units independent of other units or sections and might not be aligned to the long term objectives. As a strategic change, the management decided to introduce a new department called the Program Management Office to run PPM.. The reaction to market changes including the economic crisis is considered as a key change for all organizations where management should review their internal processes and approaches. As discussed by Cleland and Ireland (2010), projects are one of the means for the enterprise to be stable and positioned well in the competitive market so it important to add controls to project management. The main challenge faced by the organization and PMO was the complexity of the new projects in the enterprise which is supposed to differentiate the organization from new competitors. Additionally, people acceptance of change since some believe PPM adds complexity in the system.

Most of the research paper shows that Systematic project portfolio management enables major stakeholders to have feasibility and control on the ongoing projects under different departments and units as a set of programs. This will be explored at depth later. The main objective of PPM is to make sure only right projects are selected and invested by the management within the enterprise as reported by Rad and Levin (2008). Therefore, the paper will look at PPM as one of the options to increase the success of the projects in the organizations.

As will be demonstrated in the case study for ***Company A***, one of the main problems and challenges for the enterprise is to manage and control the interdependencies between these major IT projects, departments and Infrastructure's resources. This can be monitored through PPM by defining and managing all Level 0 (L0: direct interdependent with other projects) and Level 1

(L1: indirect dependency with other projects) milestones of each project. In the case study, Project portfolio management is the main process and function under program management office. Lack of utilization of PPM is the focal focus of this research paper and how to help organizations to understand and implement the PPM for successful major IT Projects. This is because PPM can be used to control strategic projects at all phases starting from proposed, initiated, planned and approved projects. (Cleland and Ireland 2010)

1.9.Research Questions:

Based on the initial review of previous writings and literatures by other research papers, it was found that most researchers looked at the importance of project portfolio management in today's business environment. However, none of them have focused on Telelcom organizations as this paper seeks to do. Therefore, this research is mainly to answer the research questions and relate the answers to the case study company in order to understand why PPM is important to have successful Major IT projects in competitive environment with better business alignment.

The first research question will look at different literature review papers and their view of having PPM implemented in the organizations. It will also analyze the reasons behind these views and evaluate them. In the second research question, the paper will seek to address the gap between Operations and managing IT Projects. It has always been the issue that business strategy, operations and individual's tasks are disconnected. As shown by Levine (2005), to increase the profitability for project oriented enterprises, it is recommended to adopt PPM to bridge the gap between operations and project management. Third research question proposes to discuss how Information System Strategy and resources can complement decisions made at the Business Strategy level when a company has PPM implemented. Finally, a case study for Telecommunication Network Enhancement Program will be analyzed to relate the literature review to a practical scenario. It will cover Projects alignment with Business Strategy, projects dependencies, value of communications and knowledge in PPM, and finally risk management. The following are the four research questions:

- What are the difficulties in today's major IT projects and what role can PPM play in their resolution?
- How can PPM bridge the gap between daily Operations and major IT Projects?

- How can PPM achieve the Business Strategy objectives by aligning the Information Systems Strategy and Business Strategy?
- Case Study for Telecommunication Network Enhancement Program reflecting above questions.

1.10. Aims of the Research:

The aim of the research is to investigate the importance of project portfolio management process in major IT projects executed in a dynamic industry such as Telecommunication and IT Service Provider.

1.11. Objectives of the Research:

The research objectives have been motivated by the researcher's experience which indicated that some people in IT and Operations still underestimating the importance and the need for PMO and PPM in the organization. The research will mention examples from the case study on managing programs under PMO and what difference it makes when using PPM processes.

Below are the research objectives:

- To assess previous research done in the field of Project Portfolio Management for Successful Major IT Projects in Global Telecommunication Organization.
- To explore the importance of PPM to help telecommunication organizations achieve better strategic alignment.
- To explore the linkage between IS and Business Strategy in different PPM applications models and to make recommendations for the main case study.
- To investigate an integrated processes approach for both Projects and Operations Management.

1.12. Conceptual Framework in Brief:

The conceptual framework briefly explains the relationships between the main components and variables of the research paper and thesis. These components are related to each other in a way. Firstly, the business strategy selects the IT Projects to support its strategic goals and inject these projects into the Project Portfolio Management Process to be implemented and run through Operations. On the other hand, Operations needs the Information System resources resulted from IS Strategy as a tool to enable and support business strategy as a return (Having PPM linking the three points of the IS Strategy Triangle Model) as explained by Pearlson and Saunders (2006). In today's business, most management representatives consider the group of projects that will give more profits and business. They were concerned about putting these projects in one process and managing the benefits of them as mentioned by Levine (2005). The last element of the research is the case study which will be analyzed and compared to the results of the literature review as a demonstration for the subject. The framework in the following Figure 1 will be further expanded in later section such as literature review, case study and conclusion chapter. The colors are kept to differentiate the programs.

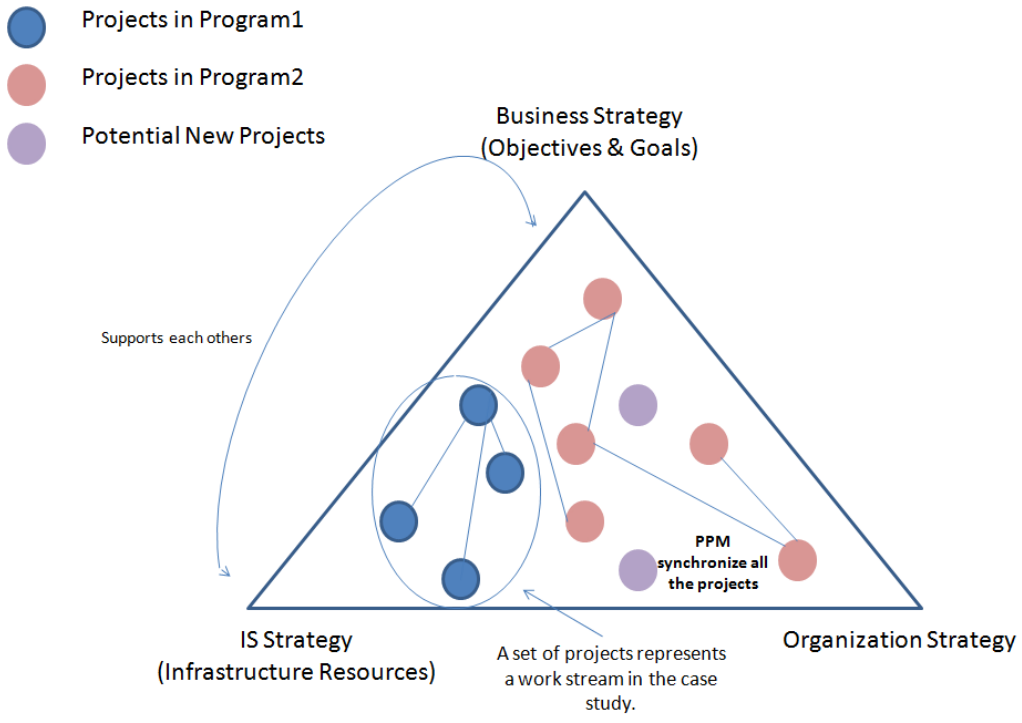

Figure 1: **Information Strategy Triangle Model** (Adapted from Pearlson and Saunders (2006))

11. Chapter Two: Literature Review

2.1. Introduction to Literature Review:

This chapter will discuss different researchers' analysis on various topics. It is divided into three sections; respectively significant project failures factors and PPM role in overcome the failures factors, differences between PPM, traditional PM and EPMO, and finally, the characteristics of PPM models that contribute to reduce projects' failures.

First section will talk about the significant project failures factors that will be covered in this paper like the uncertainties and risk management, IT project as a change, project pillars, and project stakeholders. The LR will look into each aspect and how it is related to project success or failure. Secondly, considering the significant failure factor in projects, the LR will investigate how PPM can be used to reduce the failures and increase the projects' success rate within an organization in different context than traditional project management and enterprise project management office.

Thirdly, it will cover different models and focus on their main features to analyze how they can be used for better PPM implementation. It will also discuss PPM in relation to the IS and Business strategy. From this assessment, the paper will derive an integrated system which will be explored and investigated for Operations and Projects Management using the principals of PPM. This will be addressed by looking at different possible ways of bridging the gap between operations and projects and how this can empower the project success and business strategy.

2.2. Uncertainties and Risk Management:

As per Wortmann, Boonstra, and Karel (2010), the failure of IT projects can be decreased if managers control and manage the risks and uncertainties within the project cycle that can interrupt the project progress. The research indicated that it is necessary to define the mitigation plans for the identified project risks within the risk register. The research focus considers two approaches, the first one for evaluating project risks and the second one is for managing these risks for the projects. The evaluation risk approach basically looks at different reasons for risks that might cause project failures and quantify them to avoid getting the same causes in future projects. Figure 2 shows that as an input to this approach, the known information is collected and

entered in the project risk management process and then reused for evaluating other projects. This is useful for implementing the second management approach for better project outcomes. IT organizations have the option to use these models to avoid uncertain events and even control them using the historical data from previous identified project risks that will be used to predict the future project risks and will help the project manager to avoid same mistakes. However, the project manager should be careful in analyzing the previous risks and whether they are valid for the current project or not to avoid taking incorrect actions influencing the project.

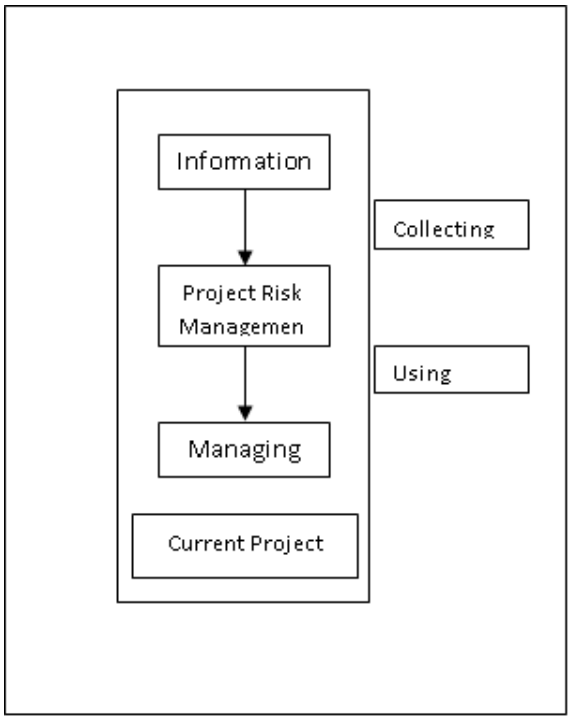

Figure 2: **The evaluation approach to risk management** (Adapted from Wortmann, Boonstra, and Karel (2010))

The management approach in Figure 3 can be used to identify ways to deal with risk and define the resolution or mitigation plan. Therefore, risk management is one way to ensure project success since it will help to achieve the project results with less and managed unexpected events during the project implementation by organizations. This indicates that the better the evaluation process is, the more manageable the risks are and can be used for the decision making process by the management. Figure 12 shows the management approach and Figure 4 shows the combined approaches which can be used by advanced companies.

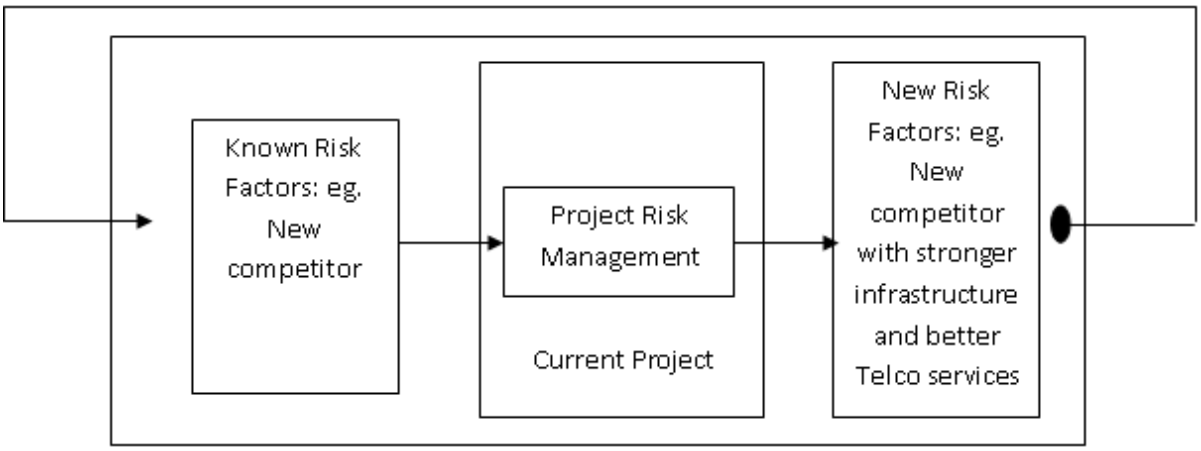

Figure 3: **The management approach to project risk management** (Adapted from Wortmann, Boonstra, and Karel (2010))

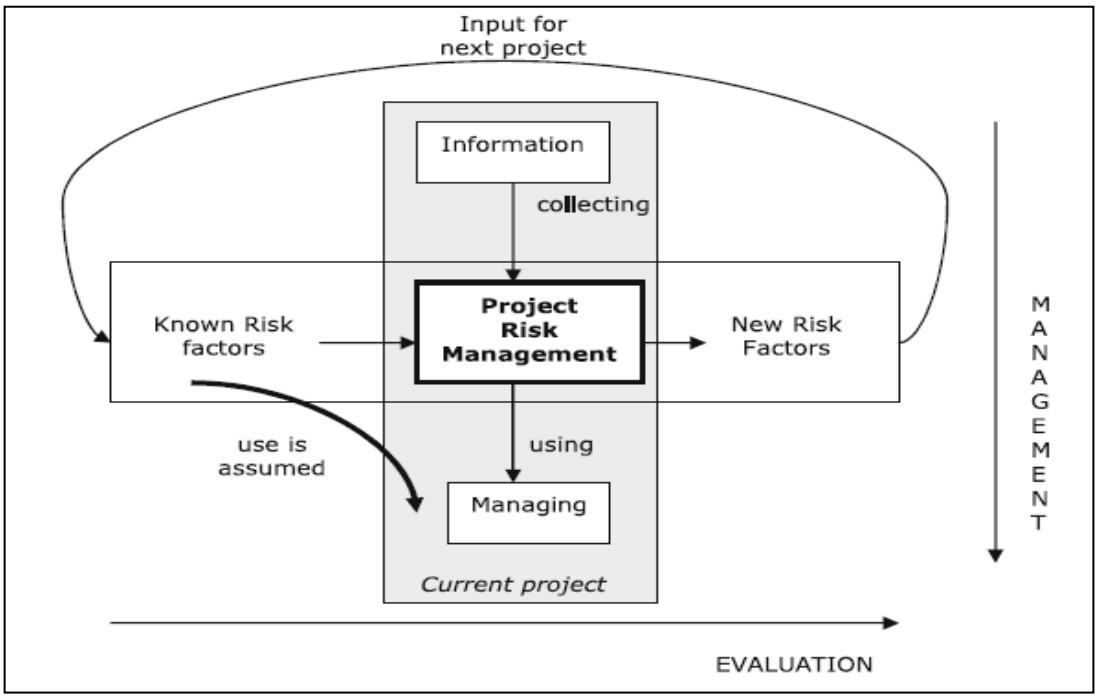

Figure 4: **The two approaches to project risk management combined** (Adapted from Wortmann, Boonstra, and Karel (2010))

Another review by Glass (2006) pointed out the importance of understanding project risk management in IT field. It was found by KPMG longitudinal study that almost all projects which are facing the issues of failures went through poor project risk management. In fact, Bupa (2005) also agreed and suggested that risk assessment should take place in studying different scenarios such as what is the impact if the organization proceeds with the project, what if it decided not to

proceed with the project and the possible risk of not meeting the expectations of users and shareholders out of the project.

Jeffery and Leliveld (2004) suggest another method to investigate and evaluate the risk for a project based on the maturity model which is divided into four stages; ad hoc, defined, managed and synchronized. The model focuses on the project value to the business and project risks as showing in Figure 5. As an example, the synchronized organizations are those who identified their projects as high value and the associated risks are very low. So, these projects are selected and prioritized for execution. Companies are using this method to evaluate their position according to this model and select the project methodology which ensures risk management.

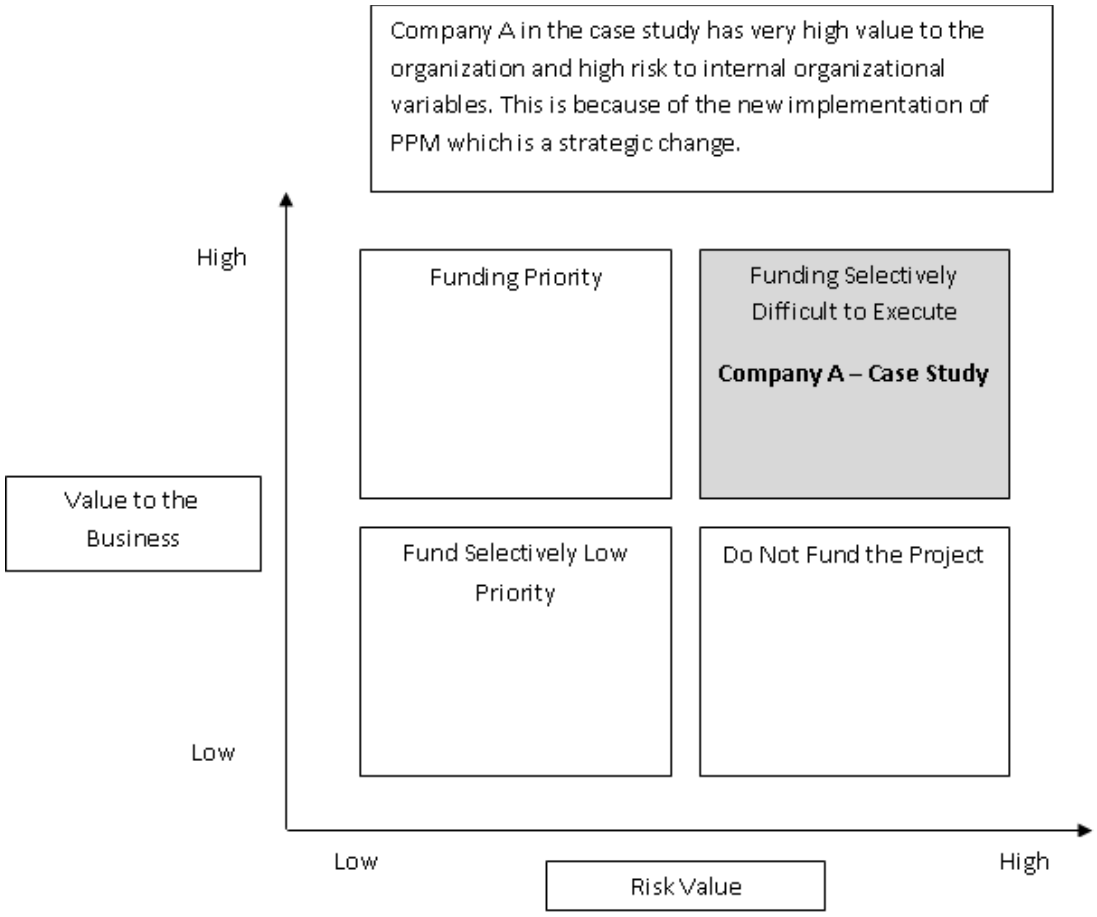

Figure 5: **Dimensions of the IT Portfolio** (Adapted from Jeffery and Leliveld (2004))

Generally, Jeffery and Leliveld (2004) summarized the challenges for IT projects from the survey results as 1) it is difficult to identify a tangible benefits from all IT project specifically at the planning phase of the project. 2) skills and resources are main challenge due to the fact of employees' turnover, lack of knowledge, trainings and expertise. To minimize the impact of first challenge, the risk prediction and evaluation discussed by Wortmann, Boonstra, and Karel (2010) can be utilized to predict the project outcomes. This is also considered as a risk to the project and should be managed by the project managers with the support of top management. Later in the LR for investigating PPM, it will be highlighted how it can help in resolving the first challenge stated in this paragraph.

Finally, Glass (2006) believes that an organization should be careful in selecting the framework to adopt in project management to ensure proper results. The framework should be tested and workable in the industry and not based on someone's opinion which might lead to serious issues in the project phases. The successful model and framework should be built on studies and research and it should consider different aspects of the project including risk management. A careful studying for "Challenges of Complex IT Projects" is a must and needed in today's industry and work environment.

2.3.IT Projects as a Change:

Looking at the risks and uncertainties in the market, a project might occur to address the need and demand in the organization and thus the IT project. Therefore, it is important to deal with any new project as a change. As per McKenna (2000), companies have to deal with project as changes if they are a reaction for a new market demand and customer requirements. Therefore, it should go through proper change process to ensure successful project. Kotter and Schlesinger (2008) mentioned that the process should study the project or change requirements, impact and main people who are involved in this change. It will help the project owner to understand the reasons why people may resist the project as a change so he or she can deal with the resistance properly. For example, the project value should be clearly communicated to all stakeholders to attract their interest to start the project and participate otherwise the project might be delayed or even failed.

McKenna (2000) explains a model that involved continuous change process indicating the importance of having a change agent as a focal point linking between different aspects of change and managing the interactions between them. This model for management to ensure the change management process is part of the strategic processes which helps them to make decision based on the continuous changes in the businesses which require changes in the project level. As shown in Figure 6, the aspects include problem and objective definition, problem solving process, measurement's evaluate and control, and implementing the change. In summary, the similarity between projects and changes is very close. As it will be explained in the three pillars section, it is noticeable that both project and changes has to be studied at depth, scoped, scheduled, communicated and implemented through defined process.

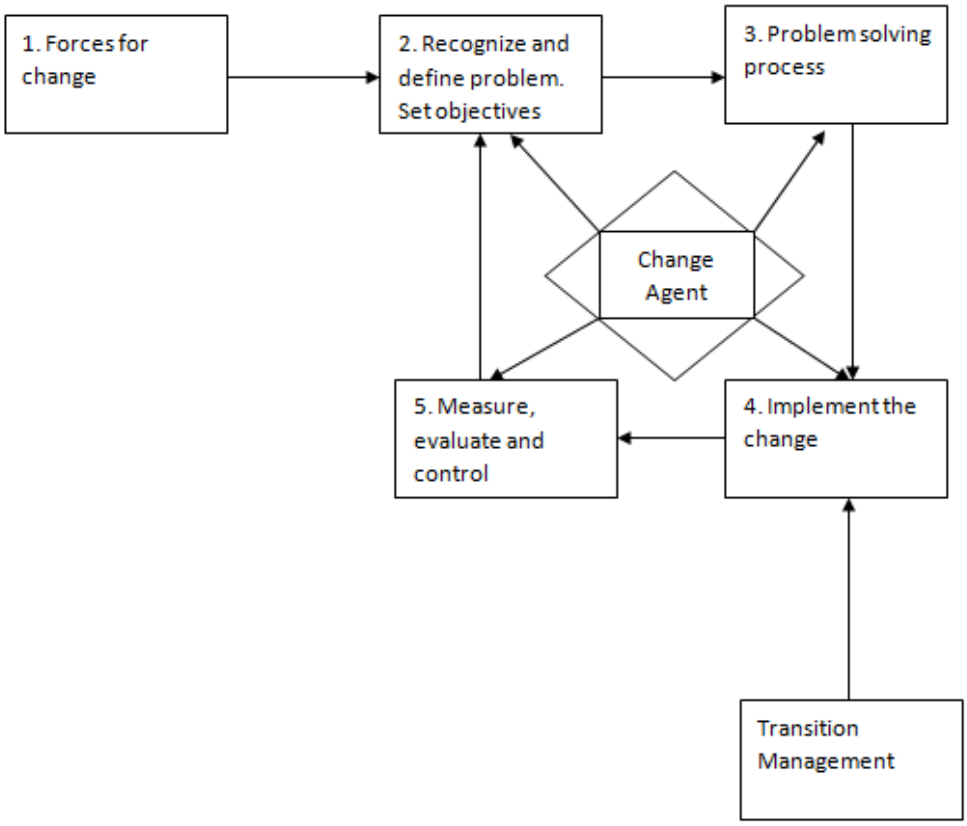

Figure 6: **Continuous change process model** (p 543, adapted from McKenna (2000))

2.4.Project Pillars (Time, Scope, and Cost):

One of the arguments that are researched by different reviews is the impact of the project pillars in ensuring successful or failed projects as part of the project management office and PPM. Bupa (2005) mentioned that any project depends on three main pillars for measuring its progress through the project execution. The three pillars of the projects which are cost, time, and scope shall be managed and monitored consistently. US IT projects' reports show that approximately 4333 out of 13000 projects delivered on time, and within budget and scope which means meeting the three baseline elements and this only reflects 33.3% rate. This rate is low compared to achievements in individual factor respectively, 50% scope met, 43% failed to meet the estimated budget and 80% met the planned scheduled. In view of the three pillars rates, it is obvious that time was the most successful estimated component while project managers mostly fail to estimate the cost and scope. As agreed by Wortmann, Boonstra, and Karel (2010), project success is measured by achieving the three factors baseline which is defined at the initial planning phase of the project. This indicates that the plan is known to the project team and the path is agreed through certain framework and mechanisms. So, if the project fails, it means that the standard processes and procedures need to be reviewed and amended according to the failure analysis.

2.4.1. Project Scope:

in light of the above, Mark Jefery (2004) emphasizes to have the scope defined and finalized at the first stage of project planning and designing and it should be tracked well so the organization and projects have focused plan. This will allow better controlling on the scope of the project and will minimize the changes that can shift the project plan and accordingly it may increase the 50% scope success rate which was mentioned by Bupa (2005). Likewise, Khan (2006) agrees that all type of projects in any industry require a proper scope management as one of the main roles of project managers. Figure 7 shows the main components of the scope which should be planned and considered for any project based on the work breakdown structure (WBS). The WBS will include specific tasks defined to achieve the project objective and these tasks and activities will have scope assigned for each. The project managers should decide the level of details in the plan, the reporting mechanism and resources and this is the scope planning factor as in Figure 7. For example, highly-detailed project will require more resources to manage and maintain report

documentation. However, a detailed plan can result in better scope management since all the tasks are related, monitored and reported regularly. Some other important outcomes from planning phase are the resources, technology and infrastructure details.

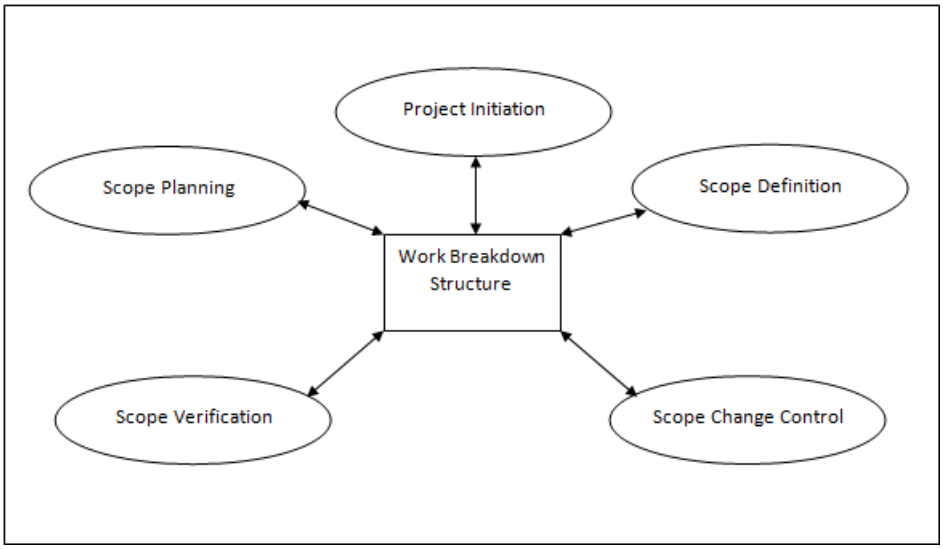

Figure 7: **Scope Management Components' Interaction with Work Breakdown Structure** (Adapted from Khan (2006))

Figure 8 shows the project initiation triggers which are market demand, regulatory requirements, customer requirements, service improvement, reliability improvement and new product and technology. The main outcome from this phase is the feasibility analysis for management to approve the project. This outcome is useful since the project requirements are captured to ensure qualified results and satisfied customer. The figure also shows the factors that applied to Company A.

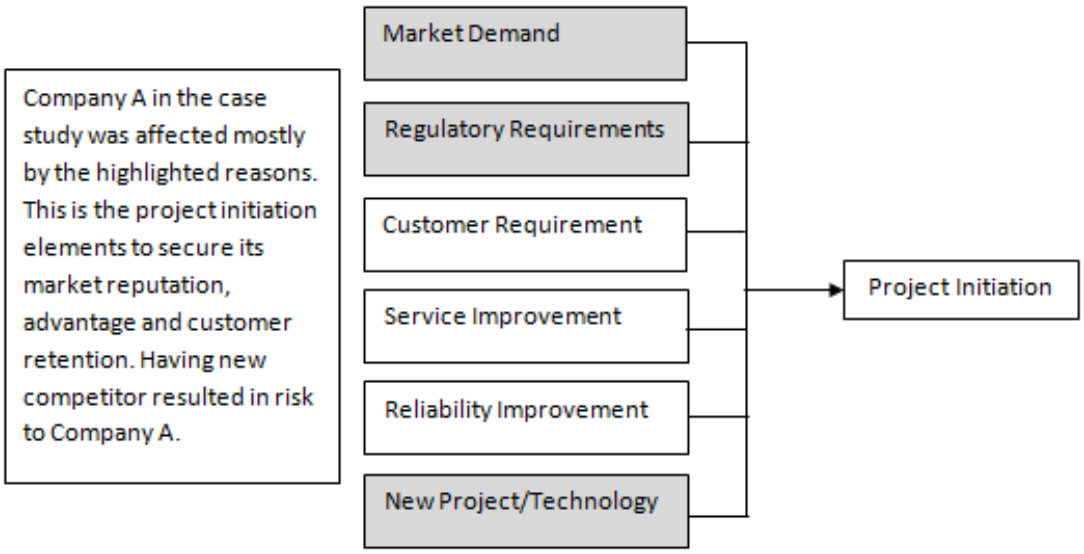

Figure 8: **Project Initiation – Triggers** (Adapted from Khan (2006))

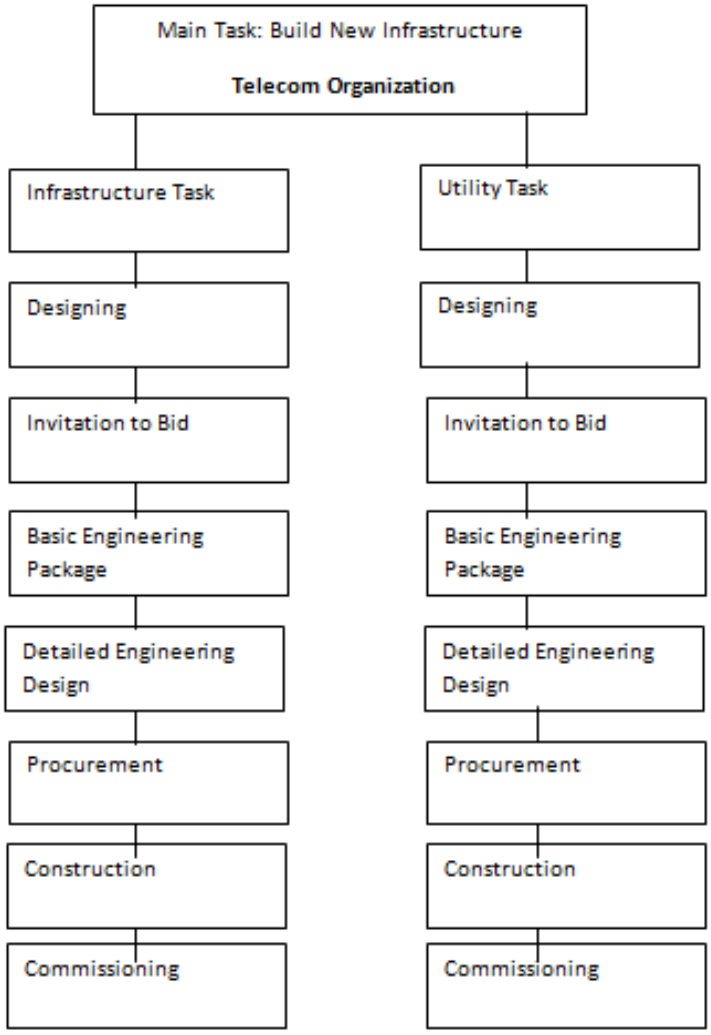

Figure 9: **WBS Sample at the Project Planning Phase** (Adapted from Khan (2006))

he third component is the project definition phase which will finalize the project framework including the project plan, project manager, project team, and invitation to bid which means the project is ready to be initiated. The project definition WBS includes the planning at the commissioning, procurement, invitation to bid and constructions level which are different from planning WBS. The WBS contributes to the project success or failure because it is the translation from requirements to results. If it is well scoped, it allows more quality.

Finally, the scope verification and change control are also ensuring to control the overall project scope. Scope verification is linked to planning and definition but it ensures that a project review is in place and feedback is captured. Figure 10 shows the feedback process which is ensuring procurements and constructions are in place. However, this review might result in modifications

in the project and it is controlled by the change process as Figure 11 and will be detailed in next part. The change control should ensure test and commissioning as an outcome.

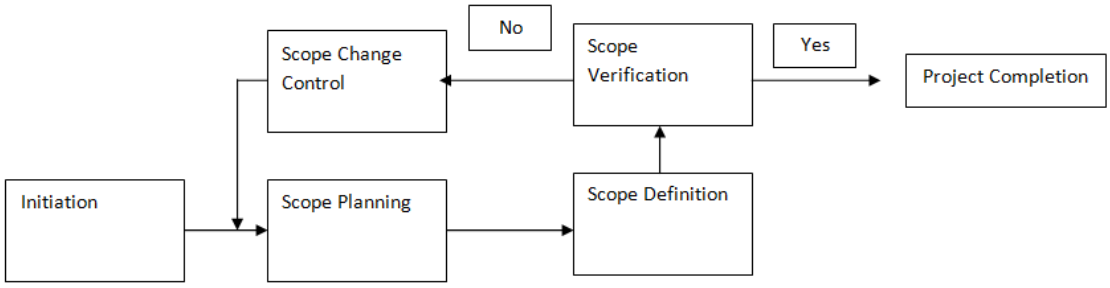

Figure 10: **Scope Verification Feedback Loop** (Adapted from Khan (2006))

Type of Change	Reason for change	Nature of Change
Design specification change	Correct deficiency to meet safety, health or environmental regulations.	
Process design development		
Project execution change	Correct deficiency to meet operational requirements	Discretionary and
External budget transfer		Non-discretionary
Estimate adjustment	Correct deficiency in cost estimate; and budget adjustments	
Filed change		
Commissioning change		

Figure 11: **General Listing of the type, reasons, and nature of changes in a project (**Adapted from Khan (2006))

PPM can play an important role in managing and controlling the scope for any project including major IT projects to reduce the failures if employed successfully. PPM deals with all projects as one portfolio which prioritizes the projects and studies the resources required according to the organization capacity and project nature. Rad and Levin (2008, p. 1) define PPM as following,"PPM involves a logical and formalized selection of projects and methodical execution of these projects to their logical and successful conclusion". All interdependencies and milestones are defined in portfolio and revisited by management to decide which project should continuo and which one is to be terminated. This is based on factors like the alignment between the projects and business vision, this process called as Midstream Evaluation as defined by Rad and Levin (2008). Regardless of the PPM tool used to implement portfolio management, the

main objective is to be able to monitor and report the projects and prioritization to the executives in the company and steering committee. It was also highlighted that the organization has the choice to either include all projects in one portfolio or multiple portfolios based on the project function areas, and company's strategy.

2.4.2. Project Time and Budget:

Additionally, time and budget management and estimation are other elements that involved in project success or failures. The time factor was discussed by Eskerod and Bilchfeldt (2008) and found that based on their research that most projects are not finished at the baseline schedule which results in failed project even if the scope is achieved at the required budget. The reason is that most products and services are a quick reaction to market need. If there is a competitor who is faster in delivering the service, it means the organization lost the value share in the market. In another study by Bupa (2005), he also highlighted that one of the risks for random changes in the schedule might impact the organization reputation in terms of delivery and its competitive advantage becomes a major concern. This has impact especially if technology and IT as dynamic factors are considered as part of its business strategy. Therefore, it should be developed realistically based on different stakeholders' agreements at the starting stage of the project. They should consider the tasks defined in the scope and what are the interdependencies between these tasks.

This issue might occur if the time and cost are underestimated by management and project teams in these scenarios which resulted in timeline overdue. Another issue can be resulted is the impact on other dependencies such as time allocated for the project testing phase. There will not be enough time slots for proper phased and integrated testing after implementation if no time buffer has been considered and this might affect the user satisfaction if the product is not meeting the technology security standards. Khan (2006) agrees with Bupa (2005) to have the time planning at the feasibility study phase as explained and illustrated in the WBS in Figure 9. To summarize, the WBS will not only show the detailed tasks for the scope, however, it will also detailed time, resources, cost and dependencies of the captured tasks. Simultaneously, the cost of the project will be estimated in the feasibility study as a financial feasibility. It will cover the fund, assigned budget, management reserves, and contingency funds. Figure 12 is a sample of project feasibility planning.

Technical Feasibility	Economic Feasibility	Financial Feasibility
Availability of technology	Benefit-cost ratios	Availability of necessary funds
Previous experience of similar projects	Economic models; linear and non-linear programming techniques	Cost of borrowing money; and credit rating of owner organization
Competency of management team		
Competency of operations team	Decision trees, and	
Availability of raw material, and feedstock	Expert judgment	

Figure 12: **Project feasibility is Comprise of Technical, Economic and Financial Aspects** (Adapted from Khan (2006))

Some organizations implementing PPM are using the budget estimation as a factor for their portfolio selection. Thus, it can be concluded that a proper estimation helps the leadership team ensuring valid portfolio. Projects selection in PPM can be made based on the projects' budget requirements and there are three main ways of annual budgeting for the project portfolio in different schemas as detailed by Rad and Levin (2008). It is mainly dependant on having funding groups in other words control account which is one of the methods for cost breakdown structure and explained by Gardiner (2005). Following are the schemas which are used for project selection based on budget:

- 'Total Number of Projects': looks at how many projects can be added in one fund group or control account
- 'Funding Percentage': looks at how many cost or budget can be invested in one fund group or control account as detailed by Gardiner (2005).
- 'Pipeline Population': looks at how often the organization should release new product as a result of certain project.

The importance and criticality of budgeting IT projects is a concern for many organizations since they need billion of investments. This was resulted into IT portfolio concept which is dealing with every IT element as an asset in the portfolio to be controlled and managed to ensure tangible values are returned to the company. (Jeffery and Leliveld 2004)

2.5.Project Stakeholders:

Besides the three pillars of project success, UK National Audit Office reported a different factor related to the workforce and people skills which highlighted that lack expertise in both project and program management can be the reason to have well progressing projects but not closed yet to go wrong at some point of time before closure. The research shows only 16% of government IT projects are successful as highlighted by British Computer Society Bupa (2005).

There always can be a debate on what are the most important skills for IT Project Manager to successfully close a project in the business, IT or managerial skills. Bupa (2005) believes that many IT projects fail due to several reasons such as having senior managers who do not understand IT, lack of proper risk management before and during implementation of IT projects and other factors like progress review which can be through milestone monitoring. This in fact the case since 1970's as not much changes happen with regard to the annual reports on IT project failures and success. From this study, it can be understood that IT skills is important for the project manager, however, the managerial skills in dealing with project complexity, resources, timeframe and changes is a crucial abilities for the project manager. The project team as mentioned earlier consists of multiple layers of team members. Therefore, the technical skills are very important for the sub-teams who are managing the technical tasks and support the project manager in his role especially if the team is well established and the trust is well built. It seems that the project manager does not necessarily need to understand the detailed technical operations, but it is important to know the like between the teams, resources, IT elements and other project dependencies.

It is important to study how project stakeholders can positively or negatively impact the project result and achievements. Bahel (2009) discussed the failures from the top management and shareholders perspectives looking at the execution planning and shareholders satisfactions. His paper investigates how projects and programs can succeed. The article's conclusion resulted from a survey done for more than 200 management representatives and concluded that Steering Committee (SC) is an important team to invest on and form for the selected projects and initiatives. Besides the top management and project sponsors, this team should include project manager and members' who are nominated in the projects so they contribute in the decision making. Additionally, Jeffery and Leliveld (2004) support that management responsibility is to

reduce the communication barriers in communication to ensure all strategic goals and objectives are clear to all employees in the company. This may emphasize that SC members should have regular meetings and reviews for communications, progress updates and decision making as suggested by Bahel (2009). It is more likely that the project develops tolerance for failures if the project team works on different directions other than the management expectations.

Secondly, project team selected by the SC should be responsible to run the project, made required decisions and align the project within their area to the project master plan. These two factors will help to eliminate the failure causes that are mentioned by Bupa (2005) such as lack of projects ownership. The main reason is that whenever a project manager is involved in the SC meeting with top management, project managers will ensure their tasks are delivered since they are responsible and accountable for it. Also, involving them in the decision making process will increase their confidence and ownership level. Another advantage is that management will have better awareness and high level details about the project which will increase their technical knowledge.

Third point by Bupa (2005) is establishing sub-teams who are responsible for specialized area to run the IT Projects can reduce the chance of the problem that Top Management does not understand IT. Mainly, the Sub-Team will run technical reporting on the progress and the issues which is provided to project managers. This in turn will be developed into high level managerial reports. These business reports will be the interface for management to understand IT aspects and focused areas of the project. Besides, the defined roles and responsibilities should be clearly agreed and communicated to all members to support them during the project life cycle.

Moreover, the project master plan and timeline can help the team to generate a detailed breakdown structure for their areas which is the responsibility of the project manager. This will address the issue of having lack of planning skills as indicated by Bupa (2005). It will also allow the project teams to monitor the Milestones and project progress through the anchor dates defined in the master plan. Bahel (2009) supports that in large IT project; the Top-Down approach is more successful where high level task is defined then cascaded into specific areas. This is contrary the traditional approach of defining main tasks and combine them into one master plan irrespective of where each task fit.

In conclusion, looking at different reviews in this field and through the years, most reports show a high percentage of IT project failures. This statement might lead us to consider the importance of considering that IT Projects are dynamic and change often which might be the reason for the failures. Additionally, the reason can also be that by the time organizations adopt the recommended methodology in managing IT Projects the market, the nature of projects and project complexity have all changed.. For example, when the networking started and telephone system was invented, the dependency in terms of protocols used and software version was less. However, nowadays, the network is sophisticated and advanced systems and software is used in the market. So, when any organization is planning to invent or establish another network, it will be more challenging.

Another example is social networks, when the first social network was established; it was easier to attract people and users and get customer satisfaction. On the other hand, if new organization is planning to build and establish new social network, it should analyze and study the current social networks, customer feedback, customer needs, and market demands so it can survive in the market and have satisfied and acceptable market share.

2.6. Traditional Project Management, Enterprise Project Management and Project Portfolio Management role in IT projects:

Based on the previous discussion of the failures and success factors of the projects in an organization, this section will further consider how PPM advantages and disadvantages contribute to project management. This part will first briefly discuss traditional project management and enterprise project management office in running IT projects. Secondly, it will study the advantages and disadvantages of PPM as a suggested process over others for successful projects and business.

As per the study done by Wortmann and Boonstra (2010) on the 26 organizations, 61% company is following the traditional definition of project management which is a high percentage. So, this might be one of the main reasons why we have high rate of IT projects failures that discussed in the previous section. It is important to understand the features that allow high percent failures in traditional projects management methodology and to assess the other possibilities of EPMO and P implementations.

Both Levine (2005) and Rad and Levin (2008) agree that traditional project management (PM) is dealing with each IT Project in a separation mode. It does not carefully align and look at the risks, added value and benefits of group of projects to the organization strategy and business. As explained by Wortmann and Boonstra (2010), the traditional project management is purely defining the project success based on the scope, cost and budget having the three factors accomplished unlike the EPMO or PPM which introduce broader definition with other variables such as risks level, performance, and quality. The traditional approach is limiting the organization to the three mentioned factors and might give wrong statistics and reports on the successful projects rate. For example, if the organization achieves the projects on time, cost and scope but the team was not performing well and learning during the project, then still traditional project management will consider it as successful project. However, underestimating the performance failure will result in least value to people skills and capabilities which against the new definitions of project success. This might not help the organization in the long term objectives, the competitive environment, and even the market changes. It is interesting to find that this is considered as a weakness in the new concept of success in both PPM and EPMO while a strength and normal in the traditional way.

To add on this, the traditional project management also considers the changes on scope during the project as failures because it might affect the estimated project timeline and cost. In complex projects like technology and IT, the estimation is more difficult because of the high level of uncertainties.

In summary, as highlighted by Levin and Rad (2007), traditional projects office or project management office focuses on one project or is only support one unit in an organization respectively unlike the EPMO which will be explained in the next paragraph.

On the other hand, Levin and Rad (2007) discussed a more sophisticated approach which is enterprise project management office. It is another methodology followed by organizations for successfully implementing the projects at enterprise level. EPMO ensures that project team has all the required tools, techniques, resources and processes to implement and deliver as per the scoped requirements, time, cost, and quality as an added aspect. Not only this, it supports the PPM with the same resources as it is progressing and keeps monitoring the performance of the portfolio. This methodology consists of two categories namely function oriented or enterprise

oriented depending on the team it supports for project implementation. If the organization's EPMO is involved in the implementation of the projects, it means it is a team-focus function. However, for companies which have the project team directly executing the projects with all enablers provided from EPMO, it is considered as enterprise oriented function as stated in Levin and Rad (2007).

This can lead to a positive sign for flexibility in this approach because some organizations might have major issue with changing traditional into more effective project management. Therefore, it can be the option that these companies gradually upgrade the maturity level of their processes from functional to enterprise orientation. As an example, they can benefit from having some projects run by the EPMO as their traditional way while others are allowed through operations team under EPMO supervision. This can be considered as a positive feature of EPMO method.

Further, another advantage of EPMO is the strength of its portfolio management in the case of enterprise organizations. The reason is that the EPMO as an office and function will be focusing on the support and control of both project team and portfolio and not interfering with the daily operations and project implementation unnecessarily. It will result in the ultimate objective of the new definition and implementation for project management which is qualified project result on time, cost and budget. This indicates the benefits that EPMO add to the portfolio in the organization as understood from the previous analysis for EPMO. So, the EPMO is only to support the portfolio however, it does not replace its role.

There are different papers look into the PPM role in managing projects and Reyck and Cockayne (2005) research for selection method was one of them. It is focusing on whether PPM adds value to IT projects or not; and which elements of PPM contribute more into this value. The main conclusion was that high percentage of respondents agrees that PPM provided them with centralized view of their projects, all respondents use a methodology to measure the financial status of the organization, and finally around 80% of the respondents focus and monitor the interdependencies between the projects and departments involved in the portfolio through PPM.

In summary, the research by Reyck and Cockayne (2005) finalized that the more the level of PPM adoption was, the more it positively impact the organization. One of the main reasons found by Reyck and Cockayne (2005) was having risk management, resources and financial

management processes followed and implemented. Also, the more PPM is considering the support processes, the more the level of projects' problem decreases which most of the reviewed papers agreed on.

To further examine the PPM role in IT projects, different research papers evaluated considering the advantages and disadvantages of the process which is the focus of this section. According to Rad and Levin (2008), there are many returns and drawbacks of deploying PPM in the organization to select and execute IT projects under Program Management. This part will progressively discuss both aspects.

First disadvantage is people's mindset that PPM adds complexity in handling projects as a new process especially to people in the organizations that used to run projects within traditional project management approaches. This is a change even in the culture of the organization which results in change resistance from individuals. Nevertheless, the change initiator should focus on reducing the resistance so the project smoothly be kicked off and started as per its requirements. Moreover, people arguments and disagreements can be looked at and handled differently. It can be the case that resistance opens valuable discussions, allows more brainstorming, and finally refines the scope for better alignment and positioning during the planning phase. So the risk and threat in this case can be converted to opportunity if smartly managed by the project manager to successfully define the project and deliver the expected results and quality. Management can achieve this by following proper organizational analysis using the SWOT (Strength, Weakness, Opportunity and Threat) tool for the organization as adapted from http://www.quickmba.com/strategy/swot/. SWOT will list all the four elements and then can be studied by management to reduce the weakness and threat, and increase the area of strength and opportunity.

Rad and Levin (2008) brought another example for change which is the midstream evaluation process decision as part of PPM. This process might decide to terminate any project as part of the periodical project portfolio review and assessment; the management should deal with managing people reactions and tolerance to changes which is a challenging responsibility in large enterprises. This negative reaction is resulted from people who have interest and loyalty to the project and have been involved in it for a long time. On the other hand, if IT Portfolio Management is implemented, the organization will have the benefit of controlling and improving

decision making process as finalized from the survey from Jeffery and Leliveld (2004). This is because it ultimately reduces the communication barriers between IT and business team which results in more business alignment and feasibility. If the gap is reduced then management will have better control and employees will trust their management board. Also, other benefits from reducing communication barriers are increasing the return on investments, and increasing people skills in IT and project management. It is always the argument that reducing the communication gap between business and IT operations is a major challenge for implementing the portfolio management.

Furthermore, the portfolio is mostly budgeted on yearly basis since it is a complicated exercise specifically if there are so many projects selected to achieve a particular strategic objective. This is considered as a drawback due to the fact that any improper project budget estimation may result in either duration expansion until budget relocation takes place by withdrawing from other projects' budgets. This is to overcome the shortage according to their priority for the organization. However, the project budget can be reassessed by the project team and committee through change management process if valid reason is specified which will be discussed later.

This is a disadvantage highlighted by Rad and Levin (2008) in terms of time required for budget reallocation which may result in product and service delays. However, it can be found as an advantage from controlling perspectives and a quality health check as explained in the previous paragraph by Jeffery and Leliveld (2004) and as detailed on the EPMO and the new concept of project management success by Levin and Rad (2007). The conclusion from Jeffery and Leliveld (2004) survey was based on companies implementing IT Portfolio Management, these surveyed organizations have significant performance improvements on the return on asset compared to the investments on IT projects. This benefits the IT projects because the management will be able to evidently see the value of their investments (ROI) in the assets which are associated to the tasks during the resourcing activity for the WBS regardless of the PPM budgeting and complexity. Accordingly, management in any organization will have strong commitment and reasons to support these projects and this increases the success rate of them.

As an advantage, PPM can be useful also for organizations which are facing financial issues and want to reduce cost and expenditures through mergers and acquisitions. For example, Jeffery and Leliveld (2004) mentioned the benefits of IT Portfolio Management in saving around 75$ million

in one of the organizations in wireless industry and this was achieved by removal of the redundancy in the network and infrastructure. It is because IT Portfolio looks at all IT components as assets and evaluates the dependencies and relationships between them. Reyck and Cockayne (2005) also emphasized this point by mentioning that PPM enabled risk and priority assessment, managing interdependencies, and managing resources which are common between different projects. Moreover, PPM is to evaluate the projects and eliminate the redundancy in the portfolio by either combining similar projects or cancel duplicates; therefore, it should result in lower project costs. Archer and Ghasemzadeh (1999) supported this point and indicated that project portfolio selection is an important process to ensure that all selected projects under certain portfolio are approved by the sponsor considering the three pillars of projects which are time, cost and scope.

2.7. Comparison of PPM Models and Frameworks in Relation to Information System Strategy Model:

This section will consist of two main parts; the first one is a discussion and comparison of PPM models and frameworks, the relationship between them, and how they support or contrast with each other's according to different reviews. This discussion will enable the research to identify the models' characteristics which contribute to reduce failures in IT projects in the three main areas of project selection, portfolio evaluation and advantages and disadvantages of the models.

The second part will discuss the Information Systems Strategy Triangle Model with relation to business strategy having the PPM as a core process and function linking the three components of the model to support the IT projects. Consequently, this section will explore and investigate an integrated system for both projects and operations management based on the discussed models principles and IS triangle model for PPM.

As discussed in the previous section, the management makes a decision of list of projects that are agreed and budgeted in the organizations for specific period of time. However, the selections are difficult decisions to be made by the senior managers since there are always plenty of projects proposed in a given time by different departments for various requirements and needs. Some top management prefers to have a framework that helps them to select these projects however; they are tending to use their own techniques and methods. A research paper proposed an integrated

framework for project selections that defines separate stages as a process which is in Figure 13. This framework was developed to make the selection mechanism more effective for the organizations in the actual work environment as per Archer and Ghasemzadeh (1999).

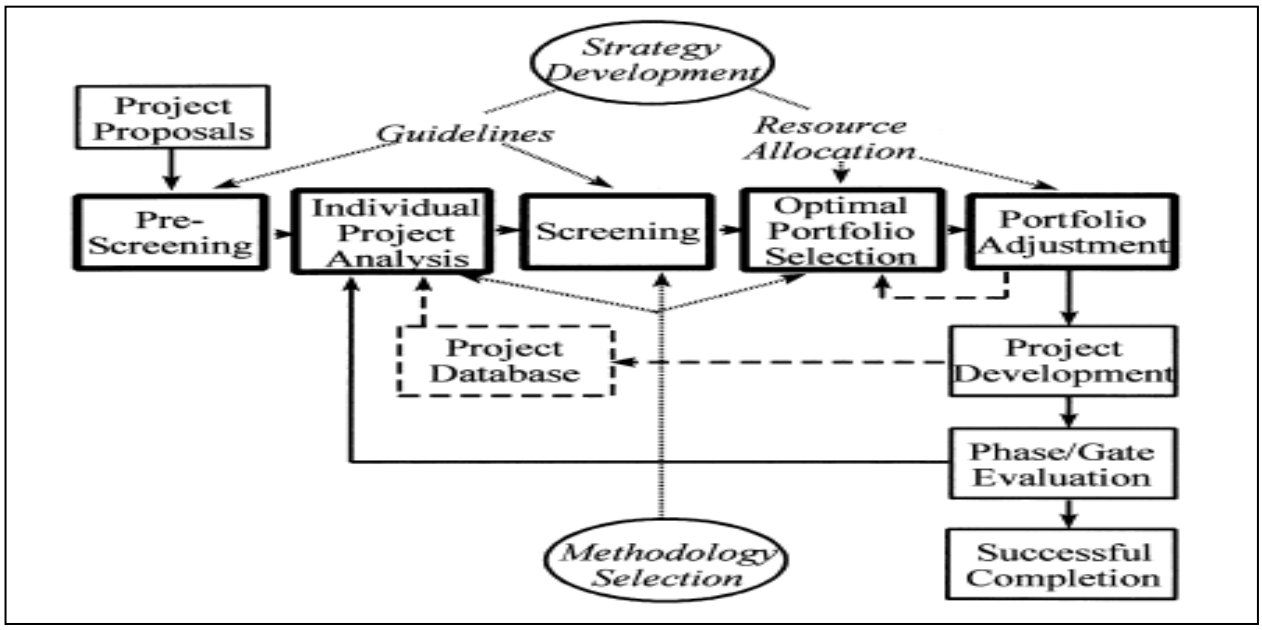

Figure 13: **Framework for Project Portfolio Selection** (Adapted from Archer and Ghasemzadeh (1999))

From the initial readings and brainstorming for this model, an outdated review was identified which is by Archer and Ghasemzadeh (1999). Therefore, further search in different databases was done to identify other studies that have been studying the same selection framework. A research paper written by Milosevic and Srivannaboon (2006) where the framework was renamed to "***A Theoretical Framework for Aligning Project Management with Business Strategy"*** is examined. Additionally, more papers of different model in the same context will be discussed and examined to verify differences and similarities in other models.

2.7.1. Project Selection Phase:

Archer and Ghasemzadeh (1999) discussed three main phases for the project portfolio selection and evaluation which are strategic considerations, individual project evaluation, and portfolio

selection. They also detailed different propositions under each phase which will not be the focus of this research.

Strategic considerations phase evaluates the internal and external (SWOT) factors of the organizations which can affect its position in the market. It also looks at the strengths and weaknesses of the company compared to its competitors. This feature of the model can be used by organizations to focus on its strengths and employ them to serve the strategic projects. For example, if the organization has a good financial status, management might encourage new projects to attract new market segment. Besides the projects, the organization should undertake initiatives to increase its competitive advantage by doing something unique from other market players. The research by Archer and Ghasemzadeh (1999) showed that the planning and mapping of the projects should be at the advance stage of the portfolio planning and not after selecting the individual projects. All propositions of this stage indicate the requirements for framework flexibility, process simplicity, budget focus, and data availability for users of this process.

On the other hand, Milosevic and Srivannaboon (2006) highlighted that organizations often select projects regardless of their contribution to the strategy which leads to project failures, project termination or resource waste. Therefore, the study is looking at the alignment of business processes including strategy management, project management and execution, portfolio management and finally resources management. Both Archer and Ghasemzadeh (1999) and Milosevic and Srivannaboon (2006) agree that project selection process should support the business strategy and organizational goals to obtain the competitive advantage in the marketplace.

As an added advantage of the research done by Milosevic and Srivannaboon (2006), they contributed to identify the project elements that are essentials for achieving the strategic alignment and goals so it can be followed by the organization to reduce the project failures. The project elements they focused on are as per Shenbar's strategic project leadership (SPL) framework (1999) which insists that any project should have its strategy, organization, culture and metrics. If all mentioned elements are clearly defined for a project, it will be easier to evaluate and align the project and finally select it to be valid for the portfolio. In this approach, the PMO will have reasonable justifications for management on why these projects should be invested and funded. Another reason for this model to be considered as useful is the clarity in

project elements will ease the mapping of this project to the strategic objectives and on the other hand to employee performance.

Additionally, another research by Fetch and Bidanda (2008) which looks into a ***Multi-Objective Mathematical Model*** to select and identify a most favorable portfolio for the organization and indicated that the project selection is a challengeable phase of the process. The suggested framework is to support the management to take decision on which projects to be selected for the portfolio to result in successful implementation. The organization should assess the project variables such as values, goals, budget, and resources. This shows that this model by Fetch and Bidanda (2008) also support the idea that for the project to be selected, it should be valuable for the organization and its strategy. Budget and resources are different elements than what suggested by Archer and Ghasemzadeh (1999), or Milosevic and Srivannaboon (2006). This might be an indication that if organizations find it difficult to define the project goals to align it with the strategy, they can use and judge the budget and resources required and then select the project.

The previous project portfolio selection framework might face the limitation of assuring management feasibility on the success of the portfolio; therefore, the suggested model by Meskendahl (2010) in Figure 14 can be used for this purpose. This model introduced another conceptual framework that discusses the relationship between strategy, PPM and the success of business in one interface known as ***Conceptual Model on the Relationship between Strategic Orientation, Project Portfolio Management and Success***. This recent paper by Meskendahl (2010) intended to take the research step forward and evaluates the PPM performance and its contribution to the organization success starting from forming the strategy till implementing it. In my research paper, the focus will be on project and business success only as above figure3 to emphasize on the interrelation between the two. The main two objectives by Meskendahl (2010) in his research which are related to my study are maximizing the projects value from financial perspectives, and having the portfolio supporting and fitting the strategic objectives.

To further explain the model in by Meskendahl (2010) in Figure 3, business success depends on economic success and preparing for future which is the long term objectives. The economic success is divided into two factors, the market and commercial. The market addresses the sales of the organization compared to its competitors. Also, it tracks the market share in the industry.

This shows how the model is considering the customer impact and market demand on what projects to be selected for the portfolio. However, the commercial consideration only addresses the financial success and ensures it meets the organizational objectives from return or revenue perspective. It may indicate that organizations might take a decision based on the commercial value of the project unlike other models. This part of the model can benefit the traditional organizations which are depending and measuring the success based on the financial outcome of the business.

Secondly, preparing for the future is a long term output of the projects such as the new skills and knowledge produced from a particular project which implicitly highlights the focus on the learning curve of the people in the organization and human resource development. People oriented management can make a benefit from this model to improve the employees' capabilities and skills.

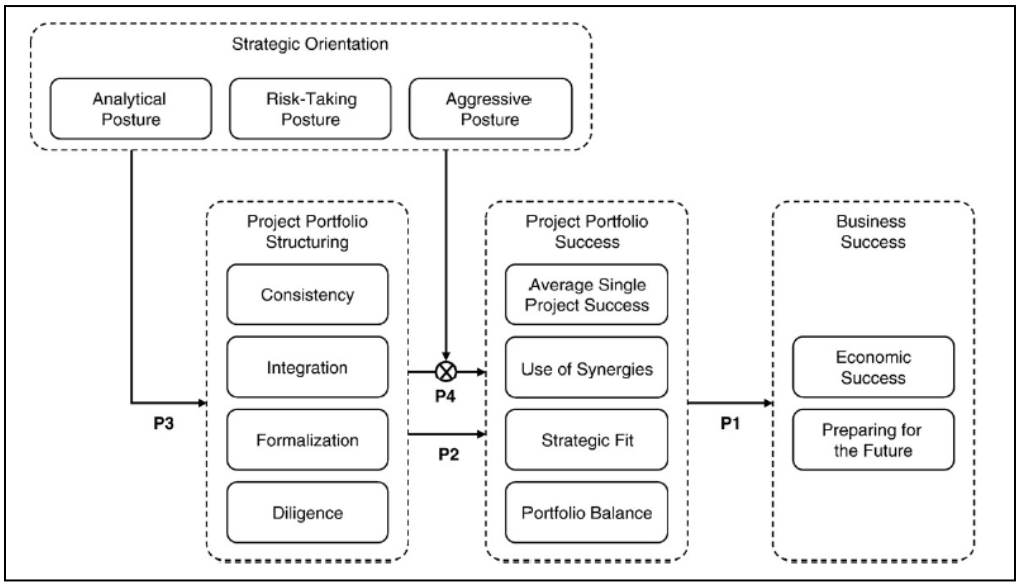

Figure 14: **Conceptual Model on the Relationship between Strategic Orientation, Project Portfolio Management and Success** (Adapted from Meskendahl (2010))

As conclusion from the model (***Conceptual Model on the Relationship between Strategic Orientation, Project Portfolio Management and Success***), the success of project portfolio is directly contributing to the business success as said by Meskendahl (2010). Selecting the right projects and undertakingthem under PPM will result into promising long term advantages as

mentioned earlier. Additionally, the business vision is to ensure short and long term success factors are met to take the company to its future position.

Another model by Carazo (2010) indicates same concept that the selected projects should make sense and value to the organization as a group of projects. Although the individual selected project might be very valuable, but it is not necessarily that they will result in an effective portfolio. However, the difference in this paper is the recommendation for programmable model for the process of Project Portfolio Selection. This is supporting the suggestion highlighted by Glass (2006) in his research to have a studied and tested model for the PPM selection process. Carazo (2010) explains the model based on formulas and calculation of different attributes and elements of the projects and it calculates the selection and scheduling of each project in the portfolio. Most of the models assume that all projects start at the same period of time unlike the approach by Carazo (2010). ***Selection and Scheduling Model*** Formula is known as SS-PPS (***Scatter Search for Project Portfolio Selection***). This model can be useful for organizations that have many projects and scope changes. For example, if the scope is changed, it may change the start time of the project which may also impact the budget and resources. Therefore, this model considers the unused money for other projects which have not yet started in the portfolio and also have the flexibility of reallocating the resources from one project to another if these resources are not utilized or overloaded. Again, the principles that impact the selection and scheduling are common and similar to previous models discussed but it differs in the attributes that are used in the formula to select the group of the projects such as the baseline start time and start budget. In this case, it can be understood that management has the option to use more than one model based on the requirements and situation of the project portfolio.

2.7.2. Portfolio Evaluation Phase:

It can be realized that evaluation phase is also common between most of the models. However, as agreed between Archer and Ghasemzadeh (1999), Fetch and Bidanda (2008), and Milosevic and Srivannaboon (2006), the evaluation of the projects can be achieved by different techniques based on different criteria, and it is the organization choice to select the applicable method as following:

- The Economic Return Technique calculates the Net Present Value (NPV), Internal Rate of Return, Payback Period and other economical factors as per Archer and Ghasemzadeh (1999).
- The ratio or different between how much the organization invested and how much it will gain from the projects and this is the Benefits/Cost Technique.
- The rate of the project risk can be identified and accordingly the project is evaluated and selected. This technique breaks down the project into smaller tasks using the Work Breakdown Structure (WBS).
- Fetch and Bidanda (2008) that explores process factors like the probability of project benefits in term of lifecycle length and cash flow.

Fetch and Bidanda (2008) suggested an evaluation method for their multi-objective model which flexibly assigns a weight to the objectives to produce the Pareto Frontier Chart to ease the decision making for top management in the organization for the selected projects and final portfolio. It also highlighted the importance of understanding the interrelation between validated projects and their link to the business which also supported by Rad and Levin (2008). Meskendhal (2010) agrees that having successful individual analysis and evaluation of all projects in the project portfolio will result in successful synergic projects. Also, he mentioned that these projects should fit the organization strategic goal which is detailed previously by Archer and Ghasemzadeh (1999).

On the other hand, the theoretical framework by Milosevic and Srivannaboon (2006) studied the minimization of the portfolio implementation through the summation of the selected interrelated projects that have their benefits to the company. The factors were indicated by this model for project evaluation are different such as are project efficiency, team leader and spirit, success dimension and impact on customer. The evaluated projects might be classified as strategic, extension or utility projects and they are either targeting internal or external customers to address specific demand. Organizations which are not willing to invest due to any reason can follow this approach and model because it will remove the redundancy of the project and resources. Another example is the utility projects where the organization forms an internal team to work on internal project or initiative to minimize the cost of having external vendor or third party.

Meskendahl (2010) in his model of ***Conceptual Model on the Relationship between Strategic Orientation, Project Portfolio Management, and Success*** pointed out that business success should not depend only on the financial measurement which was not discussed in any of the models. It should also consider the project, portfolio and business success level. This can be achieved by implementing a performance model such as the ***Balance Scorecard*** which looks at the financial aspects, customer satisfactions, internal business processes and learning and growth as demonstrated in http://www.businessballs.com/balanced_scorecard.htm. In summary, both Archer and Ghasemzadeh (1999) and Meskendahl (2010) explained and suggested the importance of the portfolio balance in terms of cost, resources, time allocations and investments. Balance scorecard is one of the ways to allow the organization to judge if the ultimate objectives are achieved.

A logical conclusion by Archer and Ghasemzadeh (1999) is that each task will have a specific risk with a given rate and probability of happening. The overall risk of the project will be finalized based on these lower level risks. Finally, the organization is evaluating the projects based on the market requirements and customer demands that are according to the Market Research done by the company. Therefore, the management should involve the marketing team in evaluating the benefits of this model for their business.

On the other hand, Milosevic and Srivannaboon (2006) came up with the evaluation of different case studies in their research and concluded that not all companies formally follow PPM process; however they still use the project selection method at the strategic level. These selections are based on strategic fit and alignment, risk balance, and capacity management. All projects are then executed through proper methodology like project management and by relevant department of project management office (PMO)

2.7.3. Advantage and Disadvantages of Some of the Models:

Looking at the compared literatures which discussed project portfolio management process, project portfolio evaluation process and selection process, some of the models have constraints and disadvantage while other models are not. . The framework in figure 1 by Archer and Ghasemzadeh (1999) is basically divided into logical stages and combining all the existing methods which are theoretically well established. The advantage of this framework as

highlighted earlier is the flexibility in deciding which techniques to be used by the organization. Each stage will have an input to the next stage which is represented by heavy outlined boxes, ovals indicate the pre-process activities and finally, post-process activities are shown as lightly outlined boxes.

Moreover, the multi-objective model is efficient because it looks at resource shortage as a constraint and included it in the model as a variable. This is to allow balancing between the validated and approved projects into the portfolio and resource availability. Also, the multi-objective model can be used to resolve other issues in the process which might be faced by the company using the project selection in the model as found by Fetch and Bidanda (2008).

Finally, Carazo (2010) explained that the approach in his model is getting complex once there are a large number of projects in the organization. It depends on multiple objectives, ability to transfer the resources to another task, project period of time and finally, the resources which are changeable during the project executions (which might increase or decrease). It was concluded from the same study that this model was found to be more stable when tested and compared with others. This can be seen as the main advantage.

2.8. The Information Systems Strategy Triangle Model:

The previous evaluation for various models and applications related to PPM shows that business strategy is directly impacted by the operations activities which are mainly run through the project selection and executions. To further evaluate all models, this section will study the IS Strategy Triangle Model with relation to Business Strategy and PPM as per the explained framework in chapter one.

As stated by (Pearlson and Saunders 2006), for the organization to ensure success in the business, it should balance between the Business Strategy, IS Strategy and Organizational Strategy. For example, the structure of the organization should be carefully decided based on the function and business nature of the company. The companies which are running many projects related to their strategic objectives should decide to have project or matrix structure but not a functional structure as per Gardiner (2005). In the case study, the organization structure is project structure which will be discussed in chapter 5. Secondly, the IS strategy will concern the tools, resources, infrastructure and processes available in the company. These IS resources should be

carefully decided, selected and invested by the management so it supports the business strategy and can lead the organization to its expected place in the future according to Meskendahl (2010), Archer and Ghasemzadeh (1999), Fetch and Bidanda (2008) and Carazo (2010).

Due to the fact that some organizations may not eliminate the traditional project management and they keep their existing operations management in parallel, PPM can be introduced to bridge the gap between the two functions if it is built and established well by Program Management Office Team Levine (2005). Diamante (2007) agreed that it is a business challenge to successfully define and implement the business strategy in a company to ensure a good return on investments. Therefore, his paper evaluated a *Portfolio Process Management model* to study the impact of business strategy on the initiatives within the organization. These initiatives may also be a project that is proposed to management. The main finding was that this process allows the company to effectively and efficiently allocate resources to the projects to achieve the objectives. This can conclude and indicate that resource management including IS Resources resulted from the IS Strategy which supports the Business Strategy in the Triangle Model. To investigate an integrated system for bridging the gap between Operations and Traditional Project Management, the paper will look at each function in terms of roles. Therefore, to develop the integrated system for Operations and Project Management, the paper will evaluate the characters of each Process and will categorize them into input, output, constraints and controls, and mechanisms.

Table 1: **Roles of Operations Management and Project Management** (Adapted from Levine (2005))

Operations Management Roles	**Project Management Roles**
Strategies	Schedule/Time
Objectives/Goals	Project Cost
Business Performance	Project Performance
Stakeholder Satisfactions	Stakeholder Satisfaction
Project Selection and Mix	Scope/Change Control
Resources Availability	Resources Utilization
Cash Flow/Income	Cash Usage

Looking at the above roles for both functions, some of them can be classified as input, some of them are output, and others are enablers or control and finally mechanisms. For management to use a single Process to eliminate the gap between operations, business and technology, they will need a consolidated view and window to look at both areas. As a suggestion, they can categorize the roles detailed in the above table as input, output, controls and mechanism as mentioned earlier for a given project in alignment with business strategy. For example, referring to the table with regard to resources as a role, management should manage the load on the resources within Operations so they can be utilized in the new projects selected for the portfolio. Another example is it is important to manage and monitor the Operations Cash Flow, so any new proposed project can be budgeted and a decision can be made for the cash allocation. In this example, the input will be Operations Cash Flow; the output is the budget allocation decision for new project as cash usage. To reallocate the roles and categorize them into system oriented representation, Figure 15 below shows the distribution of both processes roles combined into one system:

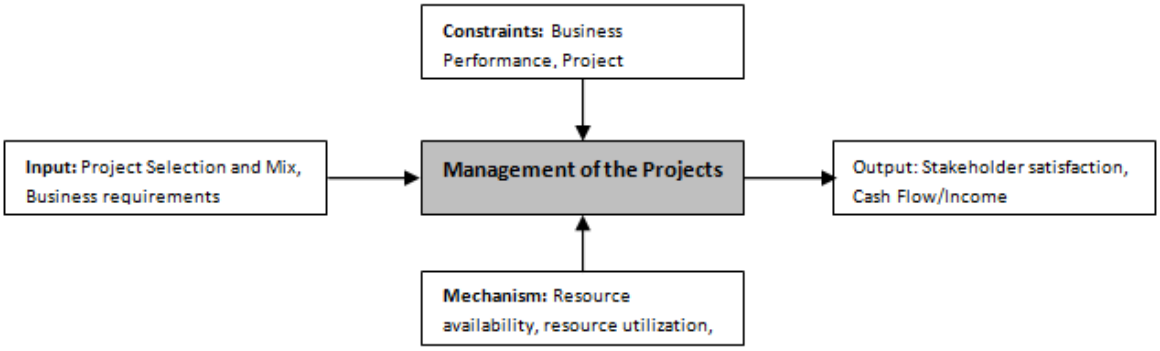

Figure 15: **Project System Showing Constraints and Mechanism** (Adapted from Gardiner 2005)

12. Chapter Three: Research Methodology

12.1. Research Methodology:

To facilitate deep understanding, interviews, questionnaire and empirical data will be used to analyze the importance of PPM and the case study using the principles of the reviewed models and framework in the paper. The literature review will be discussed as per the scope and objectives stated in chapter one. Additionally, all planned interviews will be in Semi-structured form and will be similar to a discussion forum either face-to-face or other communication Medias. The questionnaire will be an online URL distributed to approximately 40 people who are from different levels in the organization with various involvements with projects. Finally, the empirical data is based on the observations at work place and will be supported by the interview.

The decision to use both qualitative and quantitative approaches to collect the data is based on the research topic and objectives. The qualitative method goal is to study and discuss the case study in depth for better understanding of how PPM can result in higher success rate in IT projects from the management perspectives and PMO department. When the management in the case study implemented PMO and PPM, the organization went through strategic change which resulted in different people reactions and behavior which is another reason why qualitative and not quantitative research is required because it is more effective in these scenarios. A study by Tauber (1987) shows that interviews and survey can provide information which are based on people mindset, culture, and behavior. Therefore, interviewing people will be one source to draw a hypothesis of the importance of PPM for IT Projects in Telecommunication Organizations and it will be reflected in the case study. Also, the results of this research might lead to valuable recommendations and suggestions to the given case study company.

The interview will be for only two program managers from PMO team to understand the case study organization and to ensure that the empirical data is correct and accurate. This is enough samples of data to fit this purpose.

On the other hand, Tauber (1987) indicated that qualitative data cannot be projected unlike the quantitative method, and this is the reason why survey questionnaire will be distributed to other staff members informally to people like directors, senior managers, managers, senior engineers and engineers from engineering departments who are involved in the IT Projects under PPM.

This will help to assess the level of their understanding for the process, the maturity level of PMO and PPM in the organization and overall satisfaction of the internal stakeholders. Another aim of the questionnaire outcome is to compare and evaluate the consistency between PMO input for the interview and engineering opinion through the questionnaire.

Research Strategy:

12.2. Qualitative Method - Interview:

The interviews will be conducted with candidates within a social and informal context to increase the comfort level and get as much detail as possible, it is a non-standardized interview. The outcome from the interview will be used to develop the case study chapter besides the empirical data. As per Mandel (1971), the main objective of an interview is to collect accurate and relevant information from the field expert. Similarly, Thornhill, Lewis, and Saunders (2007) explained the term semi-interviews which also named as in depth interviews as the one that allow exploring the general ideas into detailed level, they are favored in exploratory situations like this paper. Additionally, he highlighted that the interviewer should smartly monitor the behavior of the interviewee during the discussion which helps to achieve the interview objective and conclude essential points out of the asked questions.

12.2.1. Interview Questions Design:

Accordingly, the questions should be focused and well-designed to ensure that required information is collected; for example, in my interview, open-ended questions will target the gathering of general and wide information from the candidate. However, short questions will be selected to get straight forward answers. Example of different type of questions will be mentioned later in the chapter. During the interviews, the interviewee's answers might lead to ad hoc questions which will be added to the discussion in the data analysis chapter when all the answers will be analyzed.

To balance the questions and prepare them for the interview, the below model in Figure31 was studied and it shows how questions fall horizontally on it, and the level of question reliability against the amount of data collected from each type of these questions. In my research, the semi-structured interview will result in more reliable and less but focused amount of data. On the other

hand, toward the left side of the model, more data can be resulted from the free association questions, however, these data might not be reliable since different people, at different places and different time will have different answers to the questions. Therefore, the focus will be on the subject and the asked questions but not on the interviewee answers. In the interview, these kinds of questions will be minimized to avoid unreliable data.

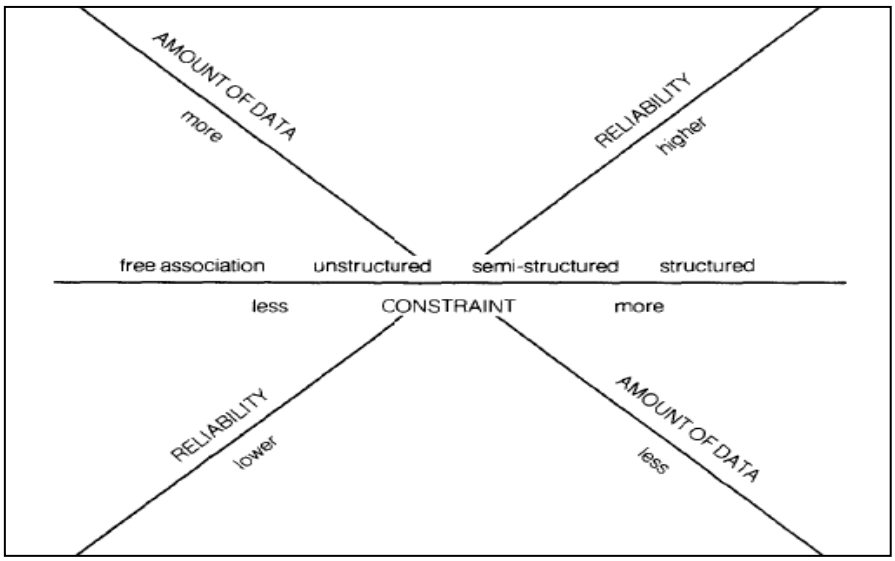

Figure 16: **Question Analysis Model** (Adapted from Mandel (1971))

Below are the initial breakdowns of the interview approach:

Identify the interviewees from the field. At least two should be from the case study company.

Attract their interest and explaining the purpose for the work and its importance to Telecommunication and IT Service Provider Organization (Field and experts).

- Conduct the Interview (Methods)
- Data collection and analysis
- Models used for the interview questions design
- Interview Questions Design.

The following section is further explanation of each question and the reason why it should be addressed in the analysis.

Q1: What is your position and role in PMO?

This question will explain the extent of the interviewee's involvement in the PPM process and activity of program manager within unit such as process plan and design level, process review and assessment level, process implementation and execution level. It will also cover whether this interviewee is handling more managerial activities which are related to business strategy and organization goal directly or only coordination role in the program to facilitate the IT Projects dependencies between the Engineering and other departments.

Q2: What is your background and work experience related to PMO and PPM?

As per Eskerod and Bilchfeldt (2008), it is important for a manager in PMO to have the knowledge and have the academic study complementing that knowledge. Each one is to leverage the success of Project Management process and practice if employed in the right way and time. Also, the work experience will increase the chance that a person can successfully deal and lead other teams, manage the project resources, monitor the milestones, task performance, ensure team motivation, and stakeholders' satisfactions. This will depend on whether the manager is result-oriented, people-oriented or task-oriented.

Q3: What do you think triggers strategic change?

Question 3 is to understand the reasons why management changed the direction and method of managing the projects. Also, it is expected to cover some details on the streanghts and weaknesses in terms of sensitivity analysis of the organization. Sensitivity analysis is used for studying to what extent is the organization sensitive to external changes.

Q4: Were there any difficulties in the program implementation? What were they and in which phase; formation or implementation phase?

Question 4 is to compare the answers to the findings in Eskerod and Bilchfeldt (2008) paper and how much the case study company is different or similar to the results of interviewees done. In addition, it will further show whether the issues are related to people behavior or other factors like resources or knowledge. The phase of the issues faced will assist to know the performance of the PMO leaders and their approach in implementing and introducing the new process of PPM in the organization.

Q5: How do you see management support for PMO and PPM?

Question 5 is to compare the answer with the observed facts within the organization. Also, this will be useful information to understand the overall strength of PMO in introducing PPM.

Q6: How do you rate the Program in terms of success and maturity level? And what are the parameters and measurement criteria?

The above 2 questions is to finalize how management can and should support the organizational changes in introducing PPM. Additionally, the monitoring of the program performance seeks to highlight to management what kind of support is required and in which area. The answers will be compared to the mentioned control methods as per LR and the paper will analyze how much the case study organization is aligned with the suggested context.

Q7: What is the full cycle and process followed in your organization for project selection for PPM?

This question (Q7) will cover the part to explain how new projects are managed, approved and aligned with the business strategy. It will also investigate resource allocations which were initially absent.. In this question, the number of resources a management should ensure as a factor to support all projects in the portfolio should be examined as per Eskerod and Bilchfeldt (2008).

Q8: How is new project budget allocated?

Question 8 is to evaluate the interviewees' knowledge in budget management and how this can help them in their portfolio optimization which is explained by Reyck and Cockayne (2005) that PPM process should consider the financial worth of the project to convince management to invest on the project based on its benefits.

Q9: How resource selection is managed in your organization for the portfolio projects?

Question 9 is to identify and study the selection mechanisms for the resources including the project functional leader, project manager and program manager in the case study. Other than human resources, it looks at technology and systems resources and how they are deployed and employed for the project and work streams and how there might be shared resources between

multiple projects. So, if there is one resource assigned to different projects, how PMO and PPM handle it is an important aspect.

Q10: What is the communication method used and how things like plans, changes, and roadmaps are communicated to different departments and do you see any issues in this?

The answer from this question will be analyzed and compared to the respondents' answers in the online survey. The expectation is to understand how both parties find the communication and how to improve it. Also, if there is any gap, it should be addressed in the recommendations. For interview sample with answers please refer to Appendix 1.

12.2.2. Interview Sampling and Population:

The selected interviewees should be from different background and have been in the field for different period of time as program managers to allow analyzing the importance of knowledge and skills of different program managers. They are employees in the Project Management Office Team in the mentioned case study company and accountable for the PPM as a process.

The main purposes of the questions are to compare how program manager skills and experience can make a difference in managing projects and programs, the overall knowledge and skills of PMO representatives, reasons why PPM was established and the maturity level of the organization, and to develop the case study.

As mentioned by Eskerod and Bilchfeldt (2008), although some companies have already implemented PPM for a while, they still have issues in managing their projects, resources and budget. Therefore, through the answers of these questions by the field experts, it is likely to understand these issues faced in PPM implementation and their root cause according to the case study discussed in chapter 5 of this paper. As a practice completed by Eskerod and Bilchfeldt (2008), it is recommended that all answers should be revisited with the interviewee after completing a preliminary draft of the research analysis to ensure accurate and correct conclusion. Depending on the time and limitation, this process may not be investigated in this dissertation paper.

12.2.3. Interview Data Collection:

Due to the confidentiality of the data and organization name, the interview data will be collected by taking notes while the candidate answering the questions and it will not be recorded. As agreed by Thornhill, Lewis, and Saunders (2007), it is recommended to take notes while the interview is progressing which will show your interest to the other person. The notes will also help in case if the recording approach is not allowed like in my case. In addition, it helps you generally summarize the valuable points and have all points quickly reviewed once the interview is over. Finally, in each interview, the note should include the identical details about the interviewers which will be used in the correlation and comparison of data. These details might include time, date, location and interview environment and setup. A coding like numbers or letters can be used in order to keep the organization's and person's anonymity in place.

12.2.4. Interview Sample Frame and Sample Techniques:

As per Thornhill, Lewis, and Saunders (2007), the sampling frame is similar to membership criteria for people who will agree to be interviewed in my research. Since my research is studying major IT projects in Telecommunication and IT service provider organizations, then the candidate should be working in similar environment. Also, the objective of the research is to interview people who are responsible for PPM process within PMO department. The candidates will be randomly selected as will be decided by the PMO head in the organization.

The sample frame will exclude anyone who is not meeting the criteria in the below list:

- Telecommunication or IT Service Provider Organization
- Global organization dealing with worldwide customers
- PMO representative
- Senior program manager
- Junior program manager
- More than 2 years in the field of IT projects

12.3. Quantitative Method – Questionnaire:

As suggested by Thornhill, Lewis, and Saunders (2007), In order to gather data from different participants, the questionnaire can be used as one way to ensure group of people will interpret the questions in the same way. They suggested two types of questionnaire which are self-administered and interviewer-administered. In my research I will use the first type which is self-administered which is designed online and respondents can access the web independently. This type of questionnaire is influenced by many factors like the audience size, audience importance, nature of data and questions and also number of questions. For example, if you have large sample of people who are difficult to access or reach, it is recommended to use the online questionnaire. The second type is the interviewer-administered where the researcher should ensure capturing the answers from the participants which is not feasible in my case study.

12.3.1. Questionnaire and Questions Design:

As per Soest, DAS and Toepoel (2006), the surveys design in terms of questions grouping and clustering impacts the answers from the candidates. Therefore, it is important to consider that age, gender, attitude and characteristics might affect their input and answers. The author also emphasizes that the web survey design should carefully be done based on the respondents group. In my research, the respondents are either engineers or IT Operations who are busy with their daily tasks and operational plans. Therefore, the questionnaire is designed with focused and direct questions as multiple choices. There are no open ended questions considering that the time required for the questionnaire is maximum 10 minutes. Also, the survey avoids follow-up questions to ensure the accuracy of the input. As reported by Soest, DAS and Toepoel (2006), the trained respondents who are familiar with the survey design will answer the question in strategic way to avoid answering the follow-up question. While if they are not trained, they will quickly answer the survey if it is well designed and structured. All responses should carefully be studied and analyzed in terms of consistency. As an example, it is more likely to have similar answers from people who are handling similar tasks or role in the company. Another point highlighted by Soest, DAS and Toepoel (2006), the importance of selecting the scale of the questions to get the accurate answers. For example, scale from 0-10 will be more effective than scale from 0-5 which will limit the respondent's option. In the questionnaire, the scale of responses is descriptive to ensure common interpretation of questions and answers.

The questionnaire is logically divided into three sections looking at different areas of knowledge and information required to support the case study investigation. For my research, it is required to study the operational sections and their commitment to PMO and PPM methodology. The questions first focus on the respondents' designations, role, and background. Secondly, group two focuses on the involvement of the users in PPM and the clarity of the business strategy within the engineering and IT operations sections. Furthermore, this section looks at the percentage of respondents who believe that PPM can add value to IT Projects based on their experience. Finally, section three looks atat the percentage of people who believe that PMO and PPM should be improved in certain areas based on the given selections referenced in Appendix 2 which is the actual questionnaire. This will show the challenges faced by the engineering team and then will be compared to the findings and answers of the interviews of the PMO representatives when discussing the challenges and methodology followed by the organization. For example, if the survey shows that communication is considered as critical issue within and from PMO, then the research will explore the PMO interviewee's answers on their communication methods as per Q9 and look if they are conflicting or not.

The main focus in the survey design was the clarity and grouping of the questions for easy response. Each group was kept in a separate page for better focus on the questions. Once the user is done with group one, he should go to next page which takes him/her to the next group of questions. It was decided to do it online because it will ease the distribution stage and data gathering after all participants finishes their contributions. For online access to the survey, please go to the following link:

Survey URL: http://www.buid.ac.ae/survey/ppm.htm

12.3.2. Questionnaire Sampling and Population:

The questioner will be designed for Engineering and Operations section within ***Company A***. it will focus on the level of staff understanding of the objectives, benefits, role and importance of PPM and PMO. Also, it will clarify whether the organization's management has effective communication method for communicating the Strategy to lower managers and departments' heads. It is important to analyze this angle of the topic since it is related to have the employees of different levels aligning their objectives and goals to the strategic objectives.

Additionally, to capture the level of awareness in the organization from people other than PMO representatives, it is required to run a questionnaire among the Engineering and Operations Teams. This will help to comprehend how the awareness of the PPM Process is important and contributes to the success of projects since IT and Engineering are the main teams in implementation phase. The main objective is to investigate the knowledge and satisfaction level of people outside PMO unlike the interview which is dedicated for PMO representatives.

The sample selection is based on the objectives of the research paper which is related to IT and technology projects and to increase their success using the PPM. Therefore, Engineering and Operations departments are decided to be the questionnaire sample. The size of the sample was based on the number of people in these departments who are really working on the projects which are managed by the PPM and PMO. This sample is selected in one region and not the all regions for the company since it is global and has different branches in the Gulf and the world. So, with the agreement of head of the selected region, it was finalized that the maximum number that the sample can reach is 50 participants. As per Thornhill, Lewis, and Saunders (2007), constraints such as time, effort and budget should be considered while deciding the sample.

12.3.3. Questionnaire Data Collection:

The questionnaire is designed in the SnapSurvey software available in the university. The software is installed in a web server and allows creation of web surveys where a link is generated and provided to respondents for their input. The benefit of using the online survey is that all respondents' answers will be received in the university server and can be exported to CSV file similar to excel. For the data analysis and correlations, there are two options either to use excel to get all the figures and charts or to use the SPSS software available in the university. This will be decided based on the time availability and what differences it makes if using SSPS or Excel. In case of excel, the data from the CSV file can directly be used with the same data format which is descriptive sentences. However, SPSS does not recognize text format and all data should be changed to numerical representation which adds a step of data manipulation before data analysis.

12.3.4. Questionnaire Sample Frame and Sample Techniques:

Similar to the interview sample frame definition, there are certain criteria defined for this purpose as the following:

- Representatives should be from Telecommunication or IT Service Provider Organization
- Global organization dealing with worldwide customers
- Engineering or Operations Department
- Respondents can only be from below designations excluding the Chief Executives and Vise Presidents.
- Directors/Senior Directors
- Manager/Senior Manager
- Engineer/Senior Engineer
- Technician/Senior Technician
- PMO Manager/Coordinator
- Respondents should be assigned to IT project within the organization project portfolio

There are different sample techniques as per Thornhill, Lewis, and Saunders (2007) which are probability or representative sampling and judgmental sampling as in Figure 17 below. In this research paper, the probability sample used as a technique where the respondents are selected randomly from engineering team based on the planned objectives and research scope. However, only people who are working with the PPM team would be selected to answer the survey but there is no specific project type categorization. Additionally, it is recommended to use the probability technique where the population is more than 50 which is the scenario in my research as per Thornhill, Lewis, and Saunders (2007).

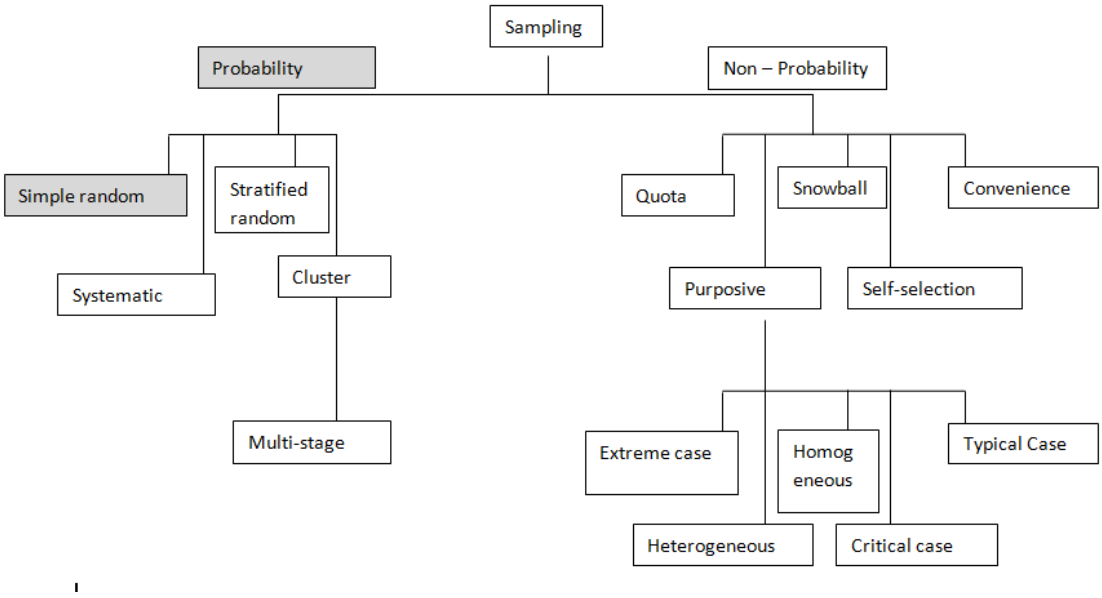

Figure 17: **Sampling Techniques** (Adapted from Thornhill, Lewis, and Saunders (2007))

12.4. Empirical Data and Observation:

Finally, the research and data analysis will also depend on the empirical data and direct observations for employees' performance, work, culture and opinion on having PPM process formalized and implemented for all IT projects.

Participant observation is used as a technique to collect data related to the daily work of engineering department and to understand their view on PPM and PMO department implementation in the organization. Thornhill, Lewis, and Saunders (2007) highlighted that this method should be used with other research techniques as a support tool since most business and management research do not use it much.

To clearly understand the participant method besides its definition, there are four types which are as following:

- Participant as observer
- Observer as participant
- Complete participant
- Complete observer

Both complete participant and complete observer hide their identity as a researcher from the people whom they are selected as a sample for the research. However, in my research, my identity will not be shared and I will not be part of the engineering daily tasks. This shows that the research approach will be completely as an observer. This method is preferred in my case because of the sensitivity of data. Complete observer can help to identify and recognize information which is related to people behaviors, personal opinion, non-bios ideas and how engineering section is influenced by the projects' load and PPM formalities. However, ethics are one important factor as explained by Thornhill, Lewis, and Saunders (2007) since the researcher should not use these data for external use or to expose people's ideas to other teams and departments.

13. Chapter Four: Results and Data Analysis

13.1. Introduction:

This chapter is divided into two main parts which are the research result section and the data analysis and discussion section. The first part is mainly to show the high level of results from the two research methodologies used, interview and questionnaire.

The second focus of area will be the questionnaire data analysis and discussion which will study and analyze the relationship between the survey questions and variables found in the results. Also, it will cover the consistency between engineering input as a stakeholder to the project portfolio management process and the PMO interview summary in the CS. The questionnaire targeted the engineering department to study PPM maturity level from their perspective, the employee's satisfaction with the process in terms of clarity, communication, and performance. Finally, in addition to the questionnaire results detailing the audience approach and main facts turn out in the process, the overall outcome will be compared to the PMO interview results and data in case study.

It is important to keep in consideration that the detailed interview data analysis and discussion is demonstrated in a separate Chapter 5 which is the case study. This chapter is progressively built based on the observations and interview gathered information. The CS is kept in different chapter to fairly analyze the organization and the amount of data collected and observed.

For all questions and multiple answers, please refer to Appendix 2.

13.2. Overall Interview Results:

The interviewees general feedback on the questions design and type was good and there were no much clarifications requested after asking the questions. The approach to reach the two PMO was through email sent to the team head explaining the purpose of my research topic with attaching the "To Whom it May Concern" letter which is in Appendix 3 to get their confirmation and willingness to participate. Two candidates confirmed and requested to schedule the meeting with them according to their schedule. The team requested to ensure that interviewee and organization identity remain synonymous and the data is only for the academic purpose. This was clearly mentioned in the "To Whom it May Concern" letter.

From the two candidates, only one confirmed the availability and accepted the meeting invitation while the other person rescheduled the meeting three times. Because of the time limitation and difficulty, the second interview was decided to be out of the scope which resulted in missing one of the objectives as it will be explained later in the section.

The interview was planned to be face to face, however, the person was in Abu Dhabi and was busy with travelling for several workshops. Therefore, it was agreed to have the interview as a telephonic conference. Since it is difficult to interpret the body language during the interview as suggested in the methodology chapter, I was focusing on the voice tone and how quick and clear the answer is. It is important to highlight that that some information such as the key performance indicator for the assigned employee was added and discussed during the interview.

Methodology chapter detailed the objectives of the interview and how it will support the research topic. First, the interview resulted in one main chapter in the research paper which is the case study explaining the organization PPM process, issues faced and interesting section discussing the SWOT analysis. During the interview open discussion, one question was added indirectly which is related to what are the strengths and weaknesses of the organization in general, and then this question's answer automatically pulled in the threats and opportunities which was captured and illustrated in the case study.

During the interview, two questions were added to clarify another areas and it was based on the open discussion with the interviewee. The two questions are as below and their answers can be interpreted in the data analysis and discussion in chapter 5.

- What is the PMO structure?
- What are the strengths, weaknesses, threats and opportunity for the organization?

Other questions were not asked explicitly, however they were addressed in the open question such as question 7 in Appendix 1.

In general, overall objective of the interview was almost achieved successfully. However, instead of interviewing two program managers to identify the importance of knowledge and skills in making a difference in managing project portfolios. It was only possible to reach one program manager who has long experience in PMO. This was one of the research limitation.

Below Table 2 and Figure 17 show the statistics of the interview results for more simplicity in terms of targeted objectives and audience.

Table 2: Criteria to assess the successfulness of the Research Interview

Criteria	Total Targeted	Achieved	Not Achieved	Average %age
Main Objectives	4	3	1	75%
Number of Interviewees	2	1	1	50%
	Average Percentage Success			**63%**

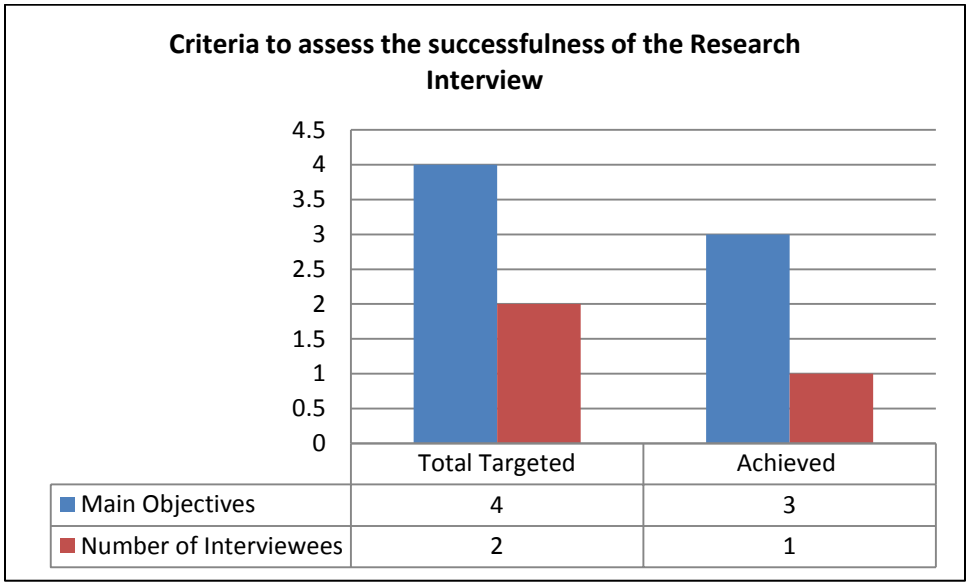

Figure 18: Criteria to assess the successfulness of the Research Interview

13.3. Questionnaire Results:

The first step after completing the questionnaire design was to approach head of engineering department in ***Company A*** requesting for approval to circulate the survey URL. The request email was sent to the team head with the "To Whom it May Concern" letter issued from the university declaring that the input will only be used for academic purpose. The team head reviewed the questions and he agreed that the length of the survey is fair and he approved and support the distribution. However, he insisted on sending the survey to people who are involved in the projects under PMO and PPM to not target irrelevant audience. This in fact was the purpose of the questionnaire as detailed in the methodology chapter. Therefore, the targeted total number of people within engineering was not more than 50 participants in that specific region including designations like engineers, managers, and directors who are playing different roles as project team members, project managers, and work stream functional leader in the program. After the participations, some engineers provided their feedback that generally most questions were clear and easy to answer which was a positive feedback and the web survey was successfully completed by most of them.

However, when I started the data analysis, I found that Q10 could have been asked differently which might allow more analysis. For explanation and with reference to the question, the answer cannot be a very good maturity level while the PPM is not aligned well with the strategy. Therefore, to resolve this confusion, I only considered the Excellent, Very Good, Good, and Poor as an answer.

Generally, looking at the planned sample of around 60 and total participants achievements, below Figure 19 and Table 3 simplify the results:

Table 3: Criteria to assess the successfulness of the Research Questionnaire

Criteria	Total Targeted	Achieved	Not Achieved	Average %age
Sample Size	50	34	16	68%

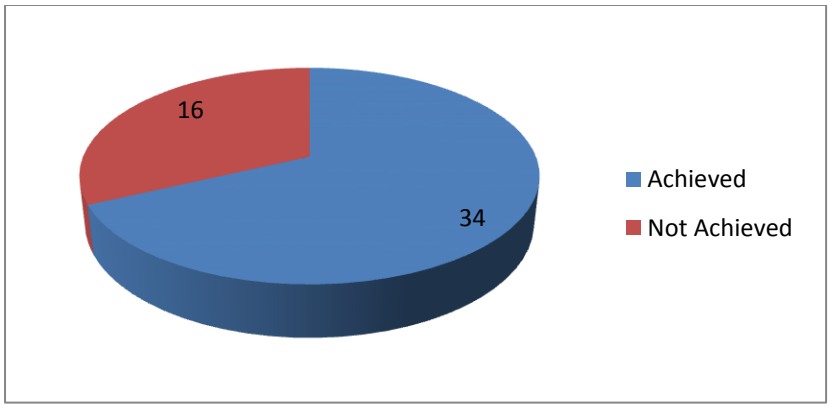

Figure 19: Criteria to assess the successfulness of the Research Questionnaire

13.3.1. Data Treatment and Replacement Process:

After keeping the link of the survey accessible for three weeks, it was completed by majority of participants. IT representatives in the university monitored the progress of the received data for another three days and confirmed that no more participation is happening. She sent me the compiled excel document with all the answers from the university server. The data of total 34 participants was reviewed and found that some of the rows in the gathered information table need to be treated as some participants missed out few questions.

First, all the records in the table that have missing data were filtered as in Figure 20, then based on the role and designation of the participant, it was compared to similar records which have full data from other participants. The missing data was replaced with the same value of majority of other available answers in the made comparison. In general, missing data were only 5 fields and should not impact the total sample much. Original questionnaire answers file is in Appendix 4.

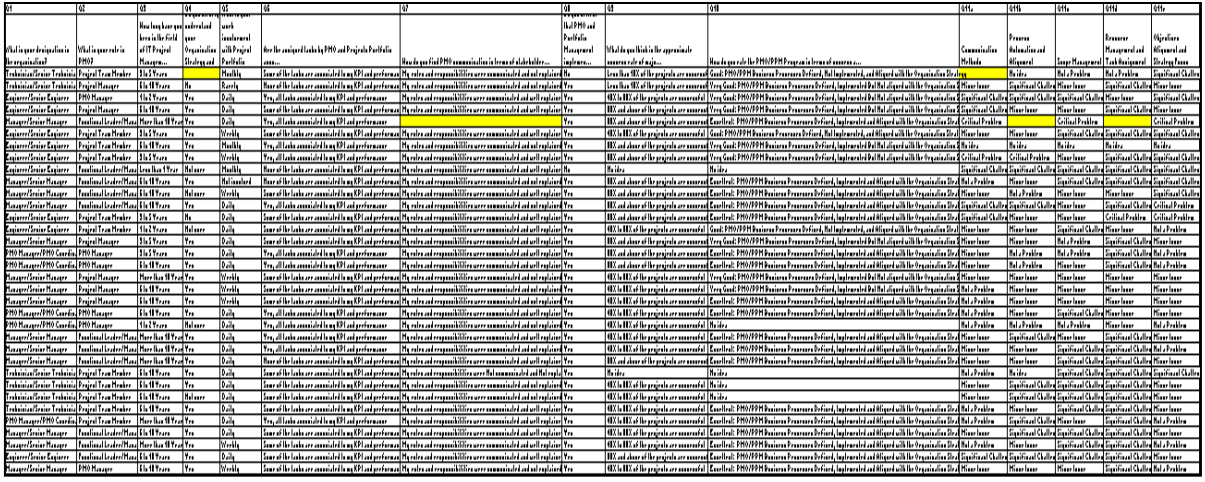

Figure 20: Missing Data in Some Records

To explain the process of treating the missing data, in the case of question 4 related to organization strategy understanding, the data was filtered based on the participants designation. The missing data found for a participant whose designation in the organization is technician, so it was compared to what other technicians' answers as an average or majority answers. So in this case, 3 technicians answers were as 'Yes', one as 'No' and another one as 'Not Sure'. Therefore, the null replaced with 'Yes' value and it was noticed that all expect for one technician are project team members which is another indications that the replacement is close to accurate.

Another example is question 7 which has one record missing the data which is related to communication of roles and responsibilities from PMO to stakeholders. It was decided to replace the value with the similar records based on the role field in the PPM and PMO. This is because the understanding of the role is directly related to the project team deliverables. The participant with the missed data was a functional leader and all other functional leaders received their role and responsibilities and it was well explained to them so it was kept as others. In this question, from the total input for all records it was found that 13 got their roles and responsibilities communicated and well explained, 19 got them communicated and not explained and only 1 employee has not receive and communication nor explanation on this. Ignoring the 1 person, since there is no huge difference between 19 and 13, it was decided to go with the role as a factor for comparison instead.

Finally, for all questions 11a, 11b, and 11d they are treated in the same way. Since this question is looking at the overall required improvement areas in the program, it was replaced by the majority selected answer. Below table4 shows the replacements and treatment for all sub-questions of question11 as highlighted data. This represent what was the majority answers.

Table 4: Treatment for missing data in question 11 of the questionnaire based on majority input

Selected answer	Q11a	Q11b	Q11d
Critical Problem	2	1	1
Significant Challenge	6	10	**22**
Minor Issue	**15**	**15**	8
Not a Problem	9	4	1
No Idea	1	3	1

Since the objective of the survey is to collect majority feedback from engineering section in the CS organization, it can be concluded that this objective was met and will be explained in the data analysis part. Although the total planned target was 50 participants, only 34 answered the online survey after several follow ups with the departments. So, 68% of the targeted participants completed the survey which can be considered as a reasonable contribution since the work nature of this section is a busy environment and specific staff is involved in PPM.

13.3.2. Overall Respondents' Areas.

Below are the total statistics shown in Figure 21, Figure 22, and Figure 23 for the statistics of the roles and designations of the participants in general and tasks and key performance indicators association respectively.

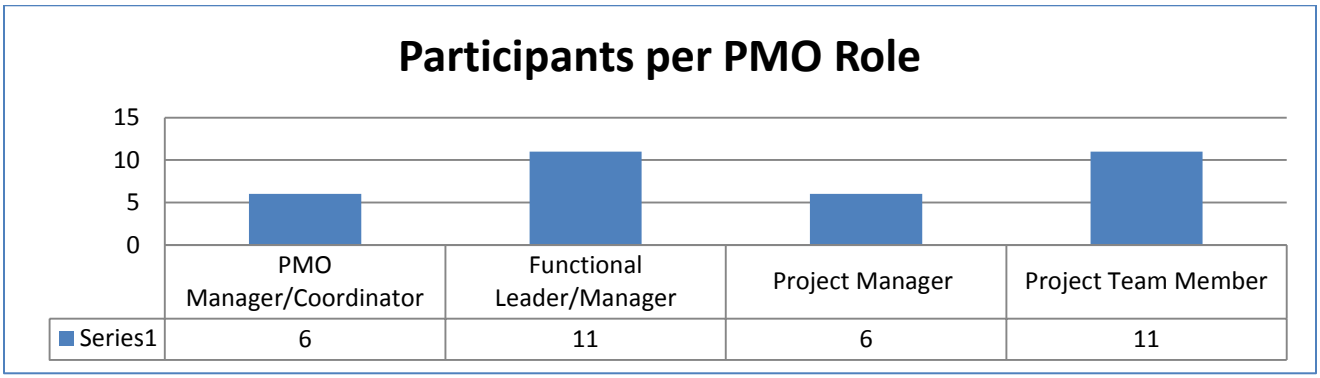

Figure 21: Participants per PMO Role

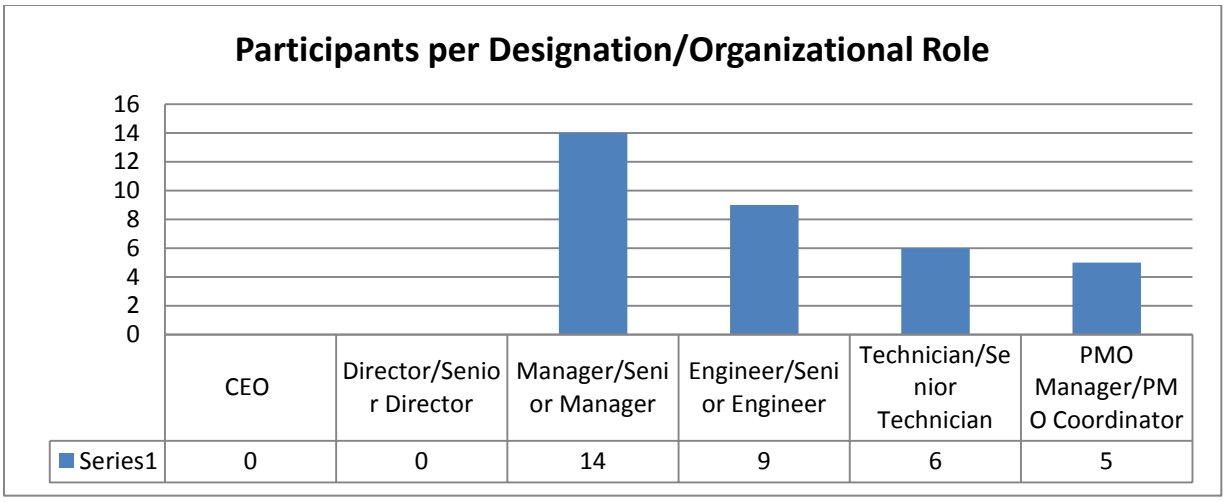

Figure 22: Participants per Designation

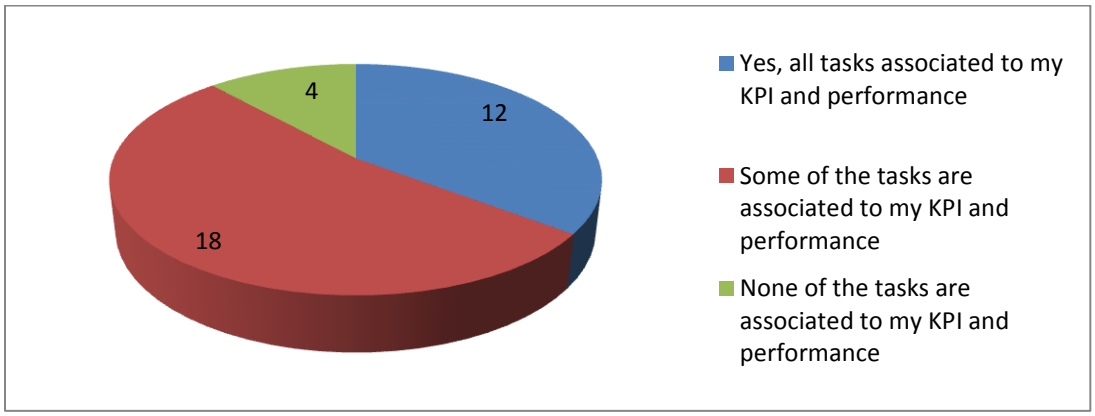

Figure 23: Employee Performance and PPM Tasks and KPI Association

13.3.3. Organizational Strategy Clarity:

The answers from both Q1 and Q4 have been correlated to find out the number of employees within engineering and operations departments that have good understanding of the organization strategy. As per table5 and Figure 24, it was found that out of the total respondents 34, 79% understand the long terms objectives of their company. However, people who declined that they know what is the strategy were 2 and 5 were not sure about their answers or understanding.

13.3.3.1. Overall responses:

Table 5: Overall strategy clarity statistics

Total Respondents	Total Yes	Total No	Total Not Sure
34	27	2	5

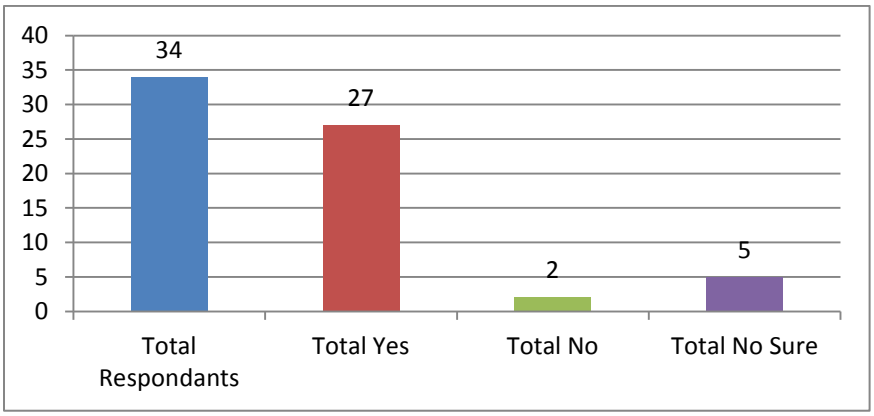

Figure 24: Overall strategy clarity statistics

13.3.3.2. Senior Employees responses:

Since it is always the chance that some survey participants are new or very low grade employees in the company, a further analysis done using more specific data to identify how many seniors understands the strategy. This might be a more relevant study focusing on engineers, senior engineers, managers and senior managers. Table 6 and Figure 25 show that total 19 seniors staff out of 23 are clear and understand the strategy. While only 1 who does not understand the business objectives and 3 who are not sure about their strategy background. In other words, 86% of seniors confirmed their awareness of the organizational business and strategy which is a good number for a company who established the PMO and PMM since three years only.

Table 6: Seniors employees understanding the organization strategy

Total Seniors	Total Yes	Total No	Total No Sure
23	19	1	3

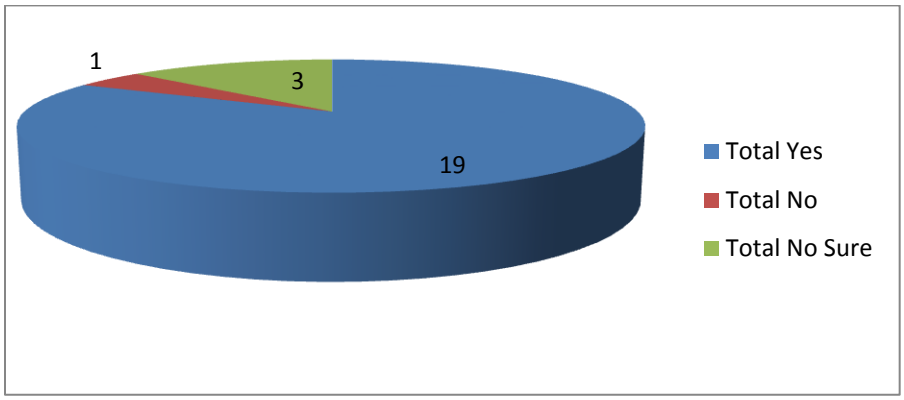

Figure 25: Senior employees understanding the organization strategy

13.3.4. Roles and Responsibilities Communication:

13.3.4.1. Overall responses for roles and responsibilities:

Looking at table7 and Figure 26, it shows 33 employees in general received their roles and responsibilities from the PMO office combining the communicated and explained figure with the communicated and not explained. However, only 20 staff has it explained by PMO to ensure full understanding and clarity on their involvements. On the other hand, it was found that only one person did not receive his or her roles and responsibilities.

Table 7: The overall statistics for employees whether they received their roles and responsibilities

Total Employees	Communicated&Explained	Communicated&Not Explained	Not Communicated&Not Explained
34	20	13	1

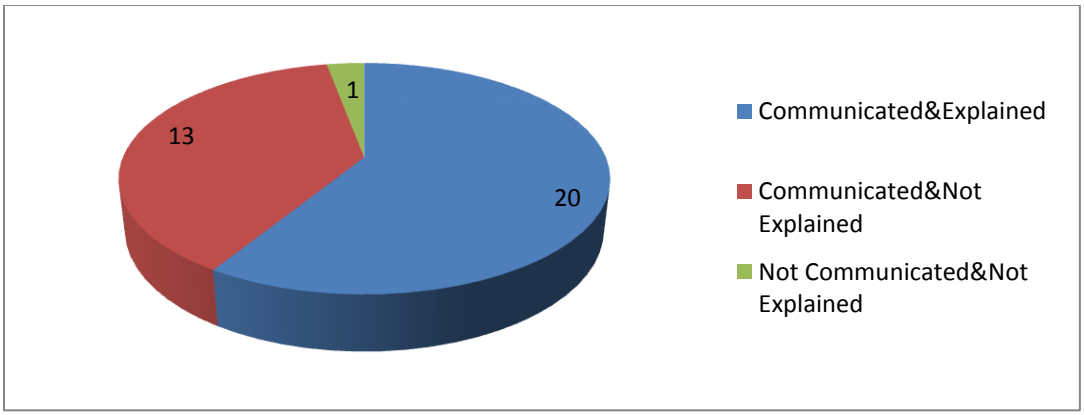

Figure 26: The overall statistics for employees whether they received their roles and responsibilities

13.3.4.2. Employees' outside PMO:

To ensure more accurate analysis considering only engineering participants, the graph and statistics have been narrowed to people who are outside the PMO to figure out the number of staff have their roles and responsibilities communicated and explained. Total participants from engineering and operations are 28 including functional leaders, project managers and project manager respectively 11, 6, and 11. 16% out of 28 have got their roles and responsibilities communicated and explained, 11% have their roles and responsibilities communicated but not explained and only 1 person who did not receive it.

Table 8: Engineering statistics for employees whether they received their roles and responsibilities

	Total Functional Leaders	Total Project Managers	Total Project Team Member
Total Sum	11	6	11
Total C&E	8	2	6
Total C&-E	3	4	4
Total -C&-E	0	0	1

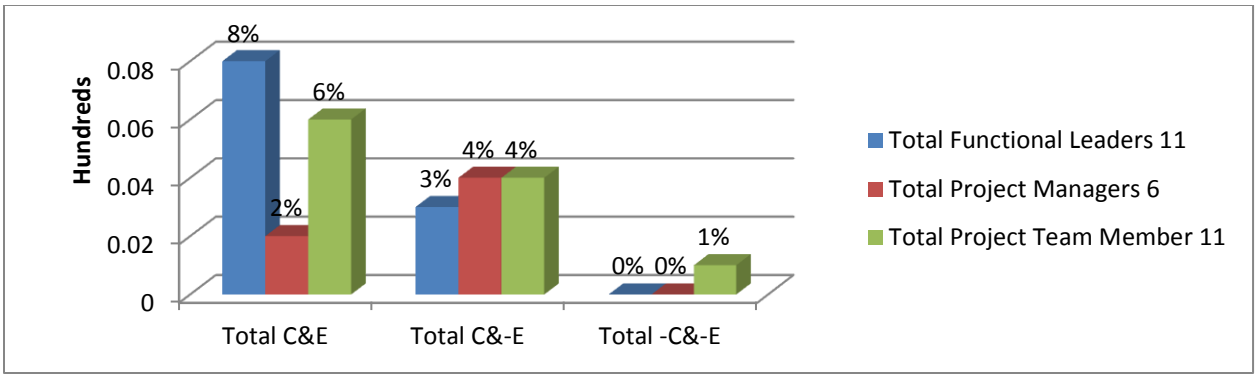

Figure 27: Engineering statistics for employees whether they received their roles and responsibilities

13.3.5. PMO and PPM Improvements Areas:

Table 9 and Figure 28 are explaining the overall participants' perspectives on the important improvements required within PMO and PPM to increase the IT projects success in the organization. For simplicity, answers rated above 10 will be considered as priority for the organization to investigate for enhancements rather looking at low rates. Therefore, for areas that are having significant challenges, 23 participants believe that resource management and task assignment is the most. Also, 15 employees consider scope management is a significant challenge as well.

Another priority is the areas where majority people found minor issues in the process automation and alignment where 16 people agree on. Similarly, scope management and objectives alignment and strategy focus have almost same number of staff believes that it is at a minor issues. It is better to deal with these cases to avoid future problems which may occur as a result.

Table 9: Overall statistics of areas of improvements required in PMO and PPM

Answers	Process Automation and Alignment	Scope Management	Resource Management and Task Assignment	Objectives Alignment and Strategy Focus
Critical Problem	1	1	1	3
Significant Challenge	10	15	23	8
Minor Issue	16	13	8	14
Not a Problem	4	4	1	8
No idea	3	1	1	1

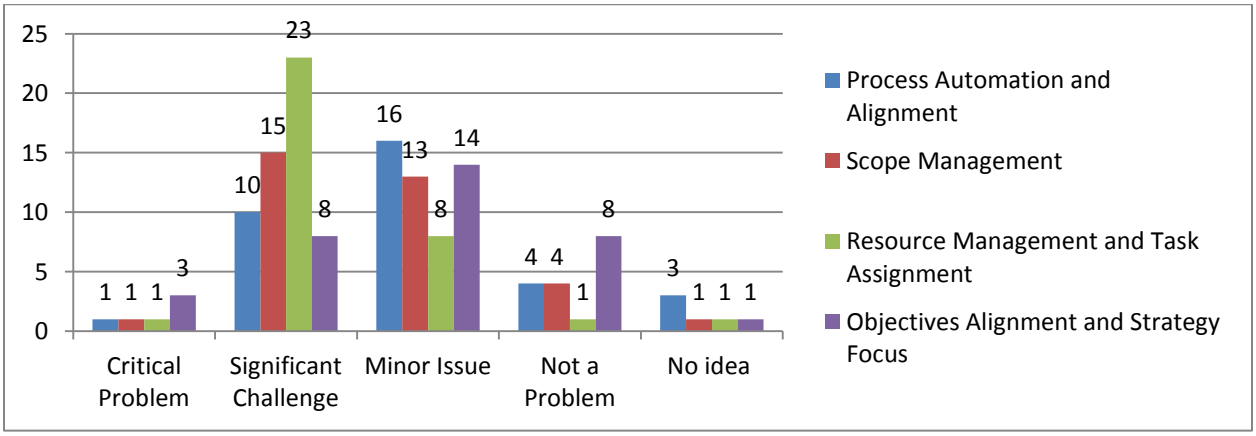

Figure 28: Overall statistics of areas of improvements required in PMO and PPM

Another valuable study is to look at the analysis which focuses on perspectives of people who understand the strategy and answers Q4 with Yes so, a correlation between three variables is achieved. In Table10 and Figure 29, it is almost found that same trend as the previous results from overall participants' opinions. Resource management is the highest rate where significant challenges are followed by scope management. In the same way, the minor issues is mostly found in process automation and then followed by objectives alignment and strategy focus.

Table 10: Statistics of areas of improvements required in PMO and PPM as per people understood the strategy

Answers	Process Automation and Alignment	Scope Management	Resource Management and Task Assignment	Objectives Alignment and Strategy Focus
Critical Problem	1	1	0	2
Significant Challenge	7	12	20	6
Minor Issue	14	10	5	12
Not a Problem	2	3	1	6
No idea	3	1	1	1

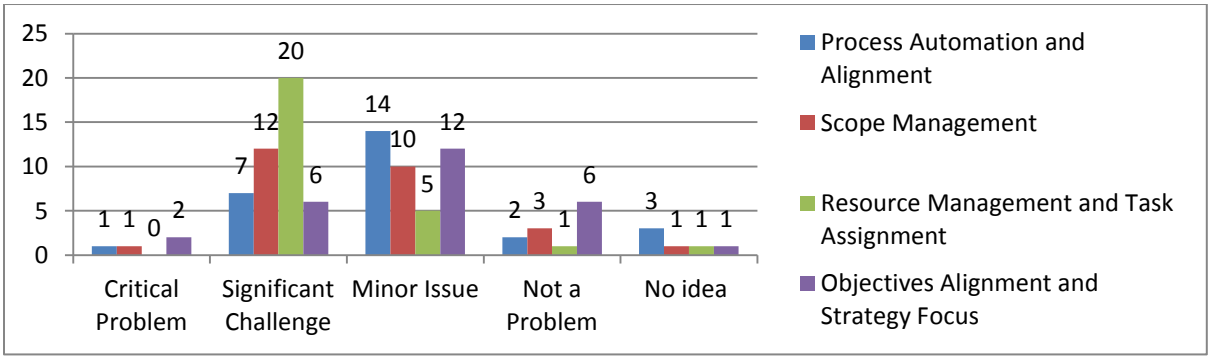

Figure 29: Statistics of areas of improvements required in PMO and PPM as per people understood the strategy

13.3.6. PMO and PPM Success and Maturity Level Assessment:

13.3.6.1. Overall responses:

Overall, table11 and Figure 30 show that 26 employees out of 34 believe that PMO and PPM processes are either very good or excellent in the organization. To investigate this, another level of analysis is added trying to find and compare this figure with the answer of Q9 on the success rate of IT projects in the company under PPM.

For example, if the employee think that PPM is maturity is excellent or very good, it is most likely to have the projects successful rate is high or good. Table 12 and Figure 31 show that all the 25 respondents who think that PPM and PMO are matured are also in agreement that either 40% to 80% of IT projects are successful or even some people believe that it is 80% and above. This indicates that the process is really successful in the organization.

Table 11: Overall PMO and PPM Success and Maturity

Total Participants	Answers between Excellent and very good	Other Answers
34	26	8

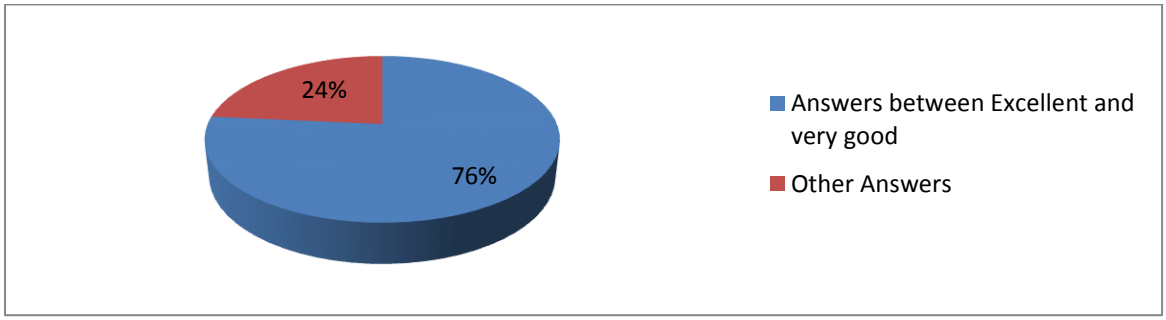

Figure 30: Overall PMO and PPM Success and Maturity

Table 12: PMO and PPM Success and Maturity compared to successful rate of IT Projects

IT Project Successful Answers	Maturity is Excellent	Maturity is Very Good
80% and above of the projects are successful	9	4
40% to 80% of the projects are successful	9	3
Less than 10% of the projects are successful	0	1
No idea	0	0

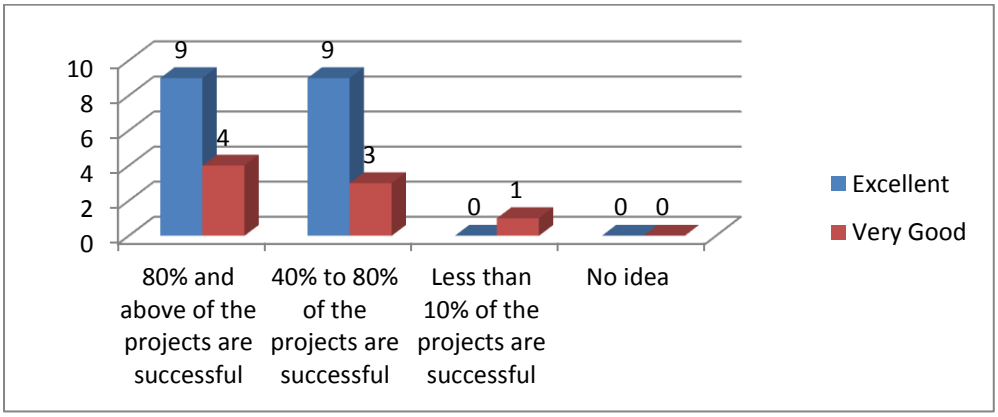

Figure 31: PMO and PPM Success and Maturity compared to successful rate of IT Projects

13.4. Questionnaire Data Analysis and Discussion:

In this section, the paper will evaluate the results from the questionnaire including the statistics and facts gathered. There are different areas that the survey questions cover such as roles and designation of the participants, PMO stakeholders' strategy interpretation and clarity, understanding roles and responsibilities, PPM and PMO maturity level and areas of improvements. Also, it will focus on how these areas support the PPM, PMO and strategic and business outcomes. The discussion will analyze each area and progressively will correlate the information to realize different research indications.

13.4.1. PPM stakeholder role and designation:

The result in Figure 21 shows that 28 employees are participating in the projects selected for PPM including project managers, team members and functional leaders. However, only 6 participants are from PMO office and this in fact explains the hierarchy matrix structure for this organization. In other words, it can be indicated that every program manager in PMO works with at least 4 people from the regional engineering section. This is the matrix structure for any project oriented organization which is also used in the case study company as in Figure 32.

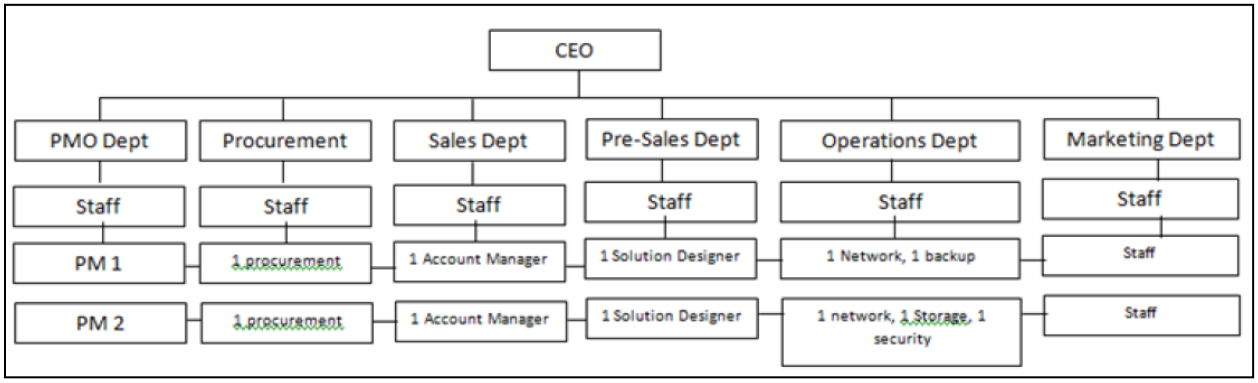

Figure 32: **Sample Organizational Matrix Structure** (Adapted from Gardiner (2005))

Furthermore, Figure 22 suggests that 29 participant are from senior positions in engineering department and as per the raw data, majority of the staff has experience at least 6 years and above. The one person difference in the resulted total regional PPM players and total senior comes from having one PMO manager selecting the designation as engineer which might be a human data entry error while filling the survey. As per the LR, people experience plays a main

role in PPM success through proper project implementation. Also, the experienced employees will different impact on the project success in the organization.

To make sense and use of figure 19 and 20, another variable from the main database answers is correlated which is the association of KPI. It is found that total 30 members have at least some of the tasks if not all associated to their annual performance. The indication is that company and management understand two things and trying to achieve them. First, the importance of the people motivations which ensures hard working and teamwork spirit is in place. Secondly, KPI's will align the employee's daily operations and tasks related to PPM to the high level business objectives. According to the literature review, this will reduce the gap and will take the company to the expected competitive advantage. This goal will only be addressed if the KPI's are also align and support the projects deliverables. This suggests that the management has a motivation and reward system as part of their strategy but it may be under planning and not necessarily implemented.

It can be realized that due to the high number of people working with PPM and PMO, it is important for them to understand their scope and work involvement level. It is valuable to look at their understanding of their role through the statistics from the Figure 26 that proves to have 33 of the staff received their roles and responsibilities from PMO. It is communicated but only 13 have them explicitly explained as detailed in the result section. This statistics is an evident that PMO ensures communication channels is built between strategic team and operations team to reduce the gap in the processes. However, the questionnaire does not reflect the ways of communication. This will be covered in the interview discussion chapter.

The consistency in the respondents' answers show that survey design and questions flow are good and as expected by the users. However, it cannot be guaranteed that if more user sample is selected, same results will be concluded as a finding. For example, if we take more regions for the same organization, the answers might vary from region to another with regard to roles and responsibilities being communicated.

13.4.2. Strategy Clarity and Business Objectives:

As implies from the previous discussion section that most employees from engineering are clear about their roles and so it is crucial to also understand the organization strategy. Percentage of 79% as indicated from Figure 24 which demonstrates overall total employees (27 employees) understand the business objectives. Out of the 27, there are 19 staff who are senior employees involved in PPM. This is another good example of top down communication from management to their lower level of staff. The management support is another factor for the projects and business and in the next paragraph; it will be analyzed whether or not the project success rate is good enough since all indicators lead to positive conclusion. In another word, if the results are optimistic, then the project's success should be high or at least good.

Also, it shows the teamwork spirit and leadership style which ensures success reasons are in place so the results are obtained and achieved. Additionally, the strategy should be supported by both IS and organizational strategy which is including IT and people within the enterprise as per IS Strategy Model. Therefore, from the discussed results, the management assess the three angels on the IS strategy model and include technology as an IS resource and use the capabilities in its organizational strategy to optimize the PPM features. There is no evident that this is explicitly used in the company; however, the principle is followed and implemented as shown in the study data analysis.

13.4.3. PPM and PMO Maturity and Improvements Areas:

Table10 and Figure 29 show the statistics of areas of improvements required in PMO and PPM as per people understood the strategy which was discussed earlier. It is noticed that the overall statistics in Figure 28 and Table 9 are not contradicting the results in Figure 29 although it is at a specific level. In other words, there are two studies to understand and investigate the improvements areas required for PPM, the first was to the overall participants' opinion and the second was to capture people who really understand the strategy and their opinion. Therefore, this outcome may point out that ***Company A*** can use this assessment as an input for the improvement process. Table10 illustrates that most senior employees agree that organization is facing significant challenges in scope and resource management. This can lead to many conclusions such as people are still not ready to take the load of the PPM new resources

management methods and projects as a change reaction. Second, another possibility is that management and PMO might not have proper scope management and keep changing either at the strategy level or project requirements level with no proper change management as focal business process. The last possible reason might be that PPM process is not aligned completely or might not be implemented well which cause issues at the project and operations level.

From the general observations, it was noticed that most engineers feel that PMO does not understand their issues and limitations and they are setting high expectations which can't be met by engineering. This is one of the reasons why annual objectives are not met by the region.

As a result, another variables and data is analyzed and examined which is the overall rating for PPM as good or excellent program which was 26 staff. Out of these 26, 25 people agree that 40% and above of the projects are successful since PPM is implemented. In fact there is one participant who selected PPM program as a very good and then selected success of IT Projects is 10% to 40% which is not considered to conclude a fact. This is because the two answers seem to be neither realistic nor matching. It cannot be that he/she believes that the process is successful and but the projects are not. On the other hand, he/she might evaluate the process in isolation of project success in reality. For example, some people may think that documentation is perfect and meet the standards and best practices but it does not mean that the actual work is successful. This one person input in the survey was considered as minor and was not included in the conclusion of this studied question and area.

To focus on the majority answers, this shows that answers are compatible between other employees. To elaborate on this, the statement that can be concluded is that 'because we have good PPM, many people find that projects are successful with a good percentage considering IT and technology factors'.

In summary, since most people are from engineering, playing senior role and designation in PMO and PPM, they assessed the PPM maturity as good and excellent and found that it is serving the organization goal which they have clear understanding of. This study does not include directors or Chief Executive Officer since they are not part of the sample.

14. Chapter Five: "Company A" Case Study Interview Data Results:

14.1. Case Study Introduction:

Based on the gathered information from interviewing the PMO representative through a telephonic interview, ***Company A*** is a strong global organization in Telecommunication Industry and has been in the market for a long time with limited competitors which are not matured enough. The organization follows project structure where there is the executive board, the departmental managers and a PMO office. Program managers are part of the PMO office and run different projects in the company having a project manager from relevant department as per project scope and nature. ***Company A*** used to implement all project using the traditional project management approach where each team manage its projects distinct from other departments. In some cases, the departments have conflicts, duplicate effort, and also unnecessary projects which were approved based on people preferences.

The organization experienced a market crisis and defined a new strategy which insists to have a Project Management Office Team responsible for the Project Portfolio Management. As most employees are experienced people with a long work experience skills, there was an organizational culture risk and challenge facing the PMO and management team. Therefore, the main focus of the PMO team was to make sure all people acknowledge, understand and appreciate the role of PPM to have successful enterprise. Additionally, it is crucial to realize how PPM will help the organization to be differentiated in the market since new strong competitor came in the picture with new ideas and service packages.

Company A has huge network infrastructure which should be enhanced and developed to support the new type of services which are demanded by the market. These enhancements will need new major IT projects which are complex and required resources to change the old network to the new infrastructure. As per management, all projects should be managed and streamed through PPM process.

The interviewee explained the structure of the program that has different work streams consist of multiple related projects which have common strategy and objective. Each work stream has a

functional leader from the experts so the ownership remains within the actual team. The functional leader looks after the complete work stream with all projects. Individual project managers assigned to each project for easy communication and work load balancing. Also, it depends on the nature of the project and field. PPM risk management is a major concept in the program where all work streams owners should manage the risks and their impact within their areas. Overall, a Program Manager from the PMO team is responsible and accountable to manage the work stream and its dependencies with other projects or work streams. Therefore, the milestone dependency and mapping is important to be managed and monitored to control the projects schedule and budget.

14.2. Interview Results:

14.2.1. Case Study Strategic Analysis – SWOT Analysis

This section will summarize the interview outcome and will include the SWOT analysis for Company A to screen the organization environmental factors. It will identify the strengths, weaknesses, opportunities and threats of ***Company A*** to further understand why this organization decided to implement the portfolio management and have an independent department for the project management office. SWOT analysis section is referenced from http://www.quickmba.com/strategy/swot/.

Secondly, the chapter will appraise the case study and will investigate it in comparison to the findings concluded in the Literature Review Chapter based on different studies. This investigation will cover Project Portfolio Management which will look at how ***Company A*** established PMO and implement the PPM and what are the main reasons lead to this decision. It will discuss change and risk management approach in the company and how it adds control mechanism to the enterprise's IT projects and contributes to their success. The SWOT analysis is concluded from the interview process.

14.2.1.1. SWOT Analysis Table:

Table 13: SWOT Analysis for Company A

Internal	**Strengths** • Long experience in the market • Employees loyalty and experience • Good reputation • Service reachability, availability and very good network coverage • Strong infrastructure • Customer loyalty • Being the strongest one in the market • Management support for PPM and PMO • Communication channel	**Weaknesses** • PPM as a new change and large number of people resistance • Strategy and approach changing • System limitations to accommodate the new technology and services • Market crisis and employees' job security • Projects alignment with Strategy • Cost/budget of change • Organizational Culture
External	**Opportunities** • New market segmentation • Achieving business and market demand as a global organization • Improve customer satisfaction • Competitive advantage and future positioning	**Threats** • New strong competitor • Complexity of the infrastructure and difficulty to enhance it • Systems integrations • Customer dissatisfaction and/or customer high expectations

14.3. Interview Data Analysis and Discussion:

14.3.1. SWOT Analysis and Discussion:

During the interview of PMO manager, he mentioned that ***Company A*** has much effective strengths than weaknesses being the leading telecommunication organization in its region. As per Barney (1995), a firm should focus on its internal capabilities as strengths and this is represented by the human and other resources which are running and executing the projects in alignment to the business objectives and strategy plan. The interviewee also mentioned that ***Company A*** has a long experience in the industry which resulted in expertise and highly qualified employees and this increased the good reputation of the company even among its competitors globally. However, these capabilities' values are dynamic according to the market where the requirements can change based on customer taste or technology evolution. Therefore, when the market and economy crisis occur and cut cost started, the human resources expertise, skills, creativity and qualifications were mandated for people to secure their jobs and this shows a great example of organization capabilities as a valuable factors to the company survival. Another capability was the concrete telecommunication infrastructure and services which is covering all the cities in the country, customers and business owners. Although there was a new competitor in the market, the organization managed to introduce a brand new network in parallel to the old established network. This enabled the competitive advantage of being the first telecommunication providing the fiber to the home service with the existing resources and capabilities.

Besides the mentioned strengths, interviewee agreed that the top management in the organization is supporting the innovation and new ideas which is also found in the part of the questionnaire discussion. As a result, PMO team was encouraged to implement project portfolio management process internally to run all the new projects and initiatives which is a major strength to have PMP successful in any organization. The portfolio will control and manage all the projects that will contribute to service enhancement through fiber network.

When further scanning the internal environment of ***Company A***, there are weaknesses which should be monitored and managed so they do not converted into threats. For example, introducing new process and procedure on how to run the projects can result in resistance from people. As mentioned earlier, the organization has expert people who used to work independently and they are difficult to be managed by new team in the enterprise. Therefore, it is

important to ensure their involvement during the initiation phase and clear communication to all employees with regard to change reason and objectives in order to have successful change. As per Kotter and Schlesinger (2008), Employees might also misunderstand the change and underestimate its benefits to the organization if lack of communication took place. Also, most managers avoid changes in the organization even if they are required because of the anticipated risk in this decision. If this weakness is well managed, the organization will reduce the impact of the people negative reactions toward the strategic change.

The management introduced the PMO idea and requested volunteers from different departments to nominate themselves or other staff to be part of the PMO new section. This is to involve the team in the change and was a smart step from management to eliminate the disagreement of having this new function in the organization. It is important to discuss the change with the staff and arrive at an agreement on how things will move forward.

As per the SWOT analysis Table 13, the organization has other external factors which are threats and opportunities such as the new competitor in the market and formation of new market segment respectively. The customers now have the choice to select the service provider and no longer bounded with one option. However, the fact that ***Company A*** has good reputation increases the loyalty of most of the customers who decided to complete the journey with it. So, it is worth it to look at the new market requirements and find out new market segmentation as an opportunity through exploring unique options and services targeting unique market segment, and also to increase the advantage to retain the existing customers. The organization focused on increasing customer satisfaction and this was the reason of having a strategic work stream for Customer Service and Quality Management to look at all running projects, processes and procedures in terms of efficiency, effectiveness and value. Furthermore, another threat is system integration which resulted from the system and business complexity; however, it will allow process automation in many departments which can also increase internal and external customer satisfaction. The organization recognized the threat of system integration failure as a project. Therefore, it was included in the business plan and approved as part of the portfolio management process to avoid the failure since it is dependent and related to many other projects and system enhancements.

In conclusion, the company tried to manage its internal factors by changing the weakness into strengths to ensure optimal and maximum benefits. On the other hand, the external threats has been converted into opportunities to better position the organization in the market towards its expected future in terms of strategy.

14.3.2. Critical Appraisal for Company A Compared to LR

14.3.2.1. Project Portfolio Management:

As per the literature review, PPM empowers the organization to focus and deal with all projects in a very dynamic mechanism and approach where the organization can control its approved projects through the portfolio. ***Company A*** follow similar PPM process as following:

Company A ensures that all projects within the departments are passed through the PMO process and methodology so the management can approve them as part of the portfolio and avoid Traditional PM. This was instructed to all regions through PMO Senior Director to Regional Senior Vice Presidents. In return, they cascaded the information and message to their Departmental Senior Directors, Directors, Senior Managers, Managers and then to the Operations and Engineering Subdivisions. This type of communication is known as Top-Down Approach where top management feeds information to operational level. As a further insurance of this new rule, the PMO office Senior Director highlighted this in the regular functional leader meeting so the project stakeholders has common understanding by explaining the team spirit required and benefits of adhering the new rule. This is another type of communication channel which is done in a discussion forum and people felt they are valuable and important to the organization. They even suggested having a centralized location in the organization portal to include all the PPM and PMO templates.

Furthermore, PMO managers accountable for different work streams review and monitor the scope, schedule and budget of the projects by insisting on having progress report submitted by the project managers and functional leaders on periodic basis and they go for an ad hoc meeting if any unexpected event or requirement arises. These reports are all as per the agreed templates released by PMO department.

14.3.2.1.1. Communication Methods:

There are four types of official meetings to feed-back and feed-forward the projects as following:

Work Stream and Project Meeting: to review all the project milestone, risks and actions from previous meetings. This meeting involved the project manager, functional leader and respective program manager to ensure that all role players understand their responsibilities and tasks. It can happen weekly or bi-weekly depending on the work stream complexity where the project members will present their issues, achievements, next steps and areas where management support is required.

Functional Leader Meeting: to review all work streams status with cross functional leaders and lead by the PMO Senior Director as higher level than the previous mentioned meeting (it looks at the projects and departmental dependencies and risks). It happens on monthly basis.

Steering Committee Meeting: Top management to review the work streams from the business strategy and project returns. The functional leaders can also raise any issues or budget requirements with proper justifications in this meeting. This is lead by steering committee members with the involvement of PMO Director, Program Managers and Functional Leaders. It happens on monthly basis.

Strategic Planning: to review and celebrate the previous year achievements and reward employees stars. Also, it shares with main stakeholders the objectives of the next year and the projects pipeline and priority. This is lead by the Chief Technology and Information Officer and one of the goals is to encourage employees to complete the journey. This is an out day event and happen on annual basis.

As mentioned in the LR, it's the organization decision to go with one or more portfolios. ***Company A*** started the program with one portfolio to implement the new network and infrastructure project. During the program timeframe, the market introduced new requirements and demands which resulted in new type of projects and resources required. The management found that these projects have different directions other than the existing ones in the portfolio and at the same time, they have great value to the organization in the long term. In summary, the

current program is ongoing and the plan to introduce a second program with its own set of projects is under study.

14.3.2.2. Change and Risk Management:

Change and Risk Management are two examples of factors that contribute to the success of the ***Company A*** in running PPM and Program as per the discussion with the interviewee. As discussed in the LR, the introduction of PPM as new process is itself a change in the way of work people used to. As per Q4, managing a change was one of the challenges where employees had different reactions to this change as some of them just accepted the idea and were cooperative with the PMO team. Interviewee explained that there is group of people anticipated this change as power conflict since the decision is not anymore within their departments and there are different teams to judge the project. The project managers should draft scope and project charter and submit them to the functional leader (FL). They should then approve it and submit it to the PMO for assessment and to budget team to allocate the cost once decided to accept it in the portfolio. The final group was neutral and they did not show interest in the program nor disagreement. The management challenge was to make sure to have a win-win situation where disagreeing and neutral groups join the program, contribute and add value. For example, whenever there is a project which is in the testing phase and is practical to involve people, the PMO send communication plan to internal staff to be part of the test and enjoy the service for free being the first people in the region to do so. This is what Kotter and Schlesinger (2008) mentioned in his research.

As said by the interviewee, all projects should go through the risk identification phase and updating the project risk register. Wortmann, Boonstra, and Karel (2010) explained the phases of risk management which includes the identifying, analyzing, controlling and monitoring risks and look at what events might or might not happen in a project and how to deal with them. Similarly in Company , when a project is initiated, the program manager discuss the available information about the project and try to identify all possible events which are not expected but might occur. They log the risks in the register and keep monitoring them during the regular review meetings as explained earlier. This explains the similarity to Wortmann, Boonstra, and Karel (2010) evaluation approach which considered as analysis process before the project started. This will guarantee the availability of information to enable the second process which is risk management.

Risk management is to use the analyzed information for management to take the right decision. As an example in the case study, one project's scope is to upgrade the software used in the network to handle new protocol for telephone service. This upgrade will affect another project's service and scope, so the management decided to raise a change request for the second project scope to upgrade prior to the implementation of the work package in the first project. If the information was not analyzed, the management will not be able to decide when to upgrade the software with justified reason.

14.3.2.3. Resource and Budget Management:

The interviewee did not give clear picture on the resource and budget management, however, a high level understanding was made. Once a project is approved and justified, the budget team allocates the tangible and intangible resources to it based on the scope. The resources are mainly from engineering department and also others like marketing and sales as an example. The project functional leader will internally nominate team members and project manager. One issue that was observed is the resources are from the same group of people who are assigned to different work streams which cause the load and complaint from the engineering group.

14.3.2.4. Tools used for PPM in Company A

The organization is using simple excel files to maintain their risk registers, project definitions, assignment matrix and other data. Recently they introduced the functionality of Microsoft Access Database tool to ease the reporting system. It is because of the features in SQL and Access Database software of having different tables and records with relations. In addition, the organization is using the Microsoft project to maintain all the projects' plans and Gantt chart. Interviewee indicated that new tool is under study but not finalized nor approved yet. PMO manager who was interviewed said that 'implementing PPM tool that strengthen the PPM and deal with it as utility or support project is recommended by management and the budget for this requirement is allocated'. As per the LR, the tool should be able to manage the PPM from process perspective and daily operations like reporting and monitoring.

14.3.3. Comparison of Interview and Questionnaire Responses: Revisited discussion

Both research qualitative and quantitative methods resulted into important facts and findings which are compared in this part. The comparison and analysis will cover the clarity in roles and responsibilities for engineering section and maturity and improvements areas.

14.3.3.1. PPM Strategy, Roles and Responsibilities Clarity:

PMO is dealing with engineering department which allocates employees from senior position as per the questionnaire findings. Both survey and interview show that the PMO structure is hierarchy and organization is matrix structure as explained earlier since the upper layer starts with one program manager from independent PMO and then ends with many project managers heading the team members. As per the interview data analysis and discussion, there are different meetings to review the plans, scope, and risks. These meetings are to ensure that PPM team is adhering to the communication plan as per the strategy to share the projects' updates. Further, the survey showed 33 people have their roles and responsibilities shared which also found in the interview data analysis.

However, there are 13 who did not have a meeting with PPM and PMO team to discuss their roles and responsibilities. This is not necessarily being an evident that PMO did not complete their work, but it can lead to a conclusion that these people may miss the review meeting and did not attend.

The strategic meeting and steering committee meeting are an example where the strategy and business objectives are reviewed, achievements shared at business level and also the next plans to move forward with the long term plans. This in fact explains the high response from the questionnaire on the question of understanding the strategy. Referring to the LR, the strategy is main area where business should focus to align the projects and other strategies to achieve the success and goals. On the other hand, management has a main role to play in ensuring successful formation and implementation of the PPM.

14.3.3.2. PPM and PMO Maturity and Improvements Areas:

The questionnaire showed that majority of employees specifically from the senior level agrees that PPM is facing significant challenges in scope management and resources management. First, the scope management is discussed in the LR and explained how the random changes in the project scope or strategy definition can lead to project failures. Therefore, the change management process which was detailed in the interview data analysis part is the strategic solution in PPM to eliminate these failures. Secondly, the risk management is another control to manage the risks resulted from the project requirements modifications. Yet, the questionnaire indicates that PPM and PMO team should enforce these processes which might be defined and implemented but not aligned with all other areas in the engineering region. In other words, engineering departments might have other processes in place with are not aligned with the strategic processes.

Another fact is the good success rate ranging from 40%-80% and 80% and above which was agreed by people who selected the maturity level of PPM is either very good or excellent. From my observations, it was recognized that the PMO and management have confident that their function is in the right track as per the plan; however, they are working on some improvements in the system to achieve better reporting and system automation. This will increase the probability of higher rate of PPM maturity and lead to efficient and effective project execution.

14.3.3.3. Resource Management:

As per the interview findings, engineering head of the region will nominate the functional leader and then the project team manager and members is decided internally in the region by the FL. Therefore, the actual selection process provides the resources the opportunity to be involved in various projects and gain knowledge. However, it was realized that engineering FL are often selecting the same group of people for various projects which result in overloading the members. During the observations, employees mentioned that PMO assigns a lot of tasks on engineering and it defines high expectations and outcomes. However, PMO feels that regions engineering is deciding who to participate in the projects and work streams. It seems that there is a misunderstanding, lack of alignment and assignment in the resources management process.

There should be a team which is unbiased from the organization to study this issue and propose a solution.

14.3.3.4. EPMO Context:

As per the LR and definition of EPMO, it is basically the implementation of project management office at the enterprise level and then controlling the project portfolio of all the enterprise. From the research outcome, interview and survey discussion, it can be concluded that ***Company A*** implemented EPMO though they name it as PMO and PPM separately. This is because they have PMO office which initiated the PPM process and with the management support, they successfully forced all the enterprise projects to be through the PPM. Any other projects out of the PPM are not scoped in the budget nor resource allocation. It was mentioned by one of the PMO employees that this was communicated to all departments during the strategic operation meeting with Chief Technology Information Officer - CTIO.

This shows that the high successful projects rate resulted from the questionnaire as the senior employees believe is referred to the management support in ***Company A*** for program management office, strategic processes, project management ownership and commitment, and strong PMO structure that facilitate communication and coordination between teams. This was also agreed by the interviewee from PMO.

14.4. Chapter Summary:

In summary, ***Company A*** implemented the PPM process to reduce the impact of the strategic change of introducing new technology, infrastructure elements, complex projects and project management methodology adherence. The organization is trying to control the projects and business progress through some strategic processes such as resource, change and risk management.

15. Overall Research Findings: Analysis Revisited

This section revisits all the research results, data analysis and discussions covered in the literature review, quantitative and qualitative results in the previous chapters.

Finding 1: RQ1: What are the difficulties in today's major IT projects and what role can PPM play in their resolution?

1. Traditional project management measurements weakness has been improved in different aspects by using various PPM frameworks considering new attributes other than time, cost, and scope. The new attributes are related to the nature of IT Projects like:
   1.1. The new models are mostly considering the risks and change management which do not stop the projects failures but reduce them. This was not supported in the traditional models and approaches.
   1.2. Dynamic nature of technology and IT projects contributes to the challenges in successful project closure. Therefore, project management model or PPM should always look to foreseen the probability of future changes of the technology **(LR).**
2. Project managers managerial skills are not enough to support the project, she/he also require strong project team with different and mix of skills and knowledge. The project failure can result from poor collaboration and teamwork **(LR).**

Finding 2: RQ2: How can PPM bridge the gap between daily Operations and major IT Projects?

1. Case study shows good examples of the communication assurance which was considered one element for PPM to reduce the gap between Operations and Strategy. It shows that the employees in the case study were performing at the level of management expectations and they are motivated to deliver the projects. This was found as per the LR, questionnaire, interview:
   1.1. Questionnaire proofs that high number of employees has their KPI defined and assigned to their performance. The sample audience is 34 employees from the engineering section **(Questionnaire).**

1.2. Questionnaire proofs that high number of staff has their roles and responsibilities communicated and most of them received sessions on this. **(Questionnaire).**

1.3. Strategic meeting reviews to discuss the change management, achievements and issues are ensured by PMO and management to monitor the portfolio progress and status. **(Interview).**

1.4. There is no research paper I come across in my dissertation that is studying an integrated system to have one management view to both project and operations management. If this exists, it will help to identify the areas of improvements to address the gap easily.

Finding 3: RQ3: How can PPM achieve the Business Strategy objectives by aligning the Information Systems Strategy and Business Strategy?

1. The studied IS model in this paper showed that without managing IS resources and organizational strategy, the effectiveness of PPM will be minimized will not support the strategy. **(LR and Interview):**

1.1. Case study showed that a new PPM system requires enhancements to automate the portfolio control, performance management, and reporting process. In Company A, organization should carefully study the planned systems and processes which are considered as IS resources and ensure these will support the strategy. **(Interview).**

1.2. Resource management process (including infrastructure as IS resource) has limitations in the case study company and needs to be reviewed by both engineering department and PMO/management. It is causing confusion and misalignment between engineering and PMO. This should be planned in the organizational strategy as per the IS model **(Interview).**

Finding 4: RQ4: Case Study for Telecommunication Network Enhancement Program reflecting above questions.

1. Majority of people agreed in the questionnaire that Scope and Resource Management Processes are critical factors to the success of the PPM.
   1.1. People find overloading and task assignment is not considered by PMO and management.
   1.2. A random scope change is a project failure factor which causes a risk. It was found that when there are requirements from powerful members, project scope tend to randomly changes even if it will deviate from the strategy.
2. Case Study is implementing the PPM through the PMO. None of the research methods showed that EPMO is used.

16. Chapter Six: Conclusion and Recommendations

16.1. Conclusion:

In conclusion, the outcome of this research shows that organizations might have different reasons for project failures and each company is resolving these issues differently. In the case of IT projects in telecommunication and IT service provider organizations, the dynamic aspects of IT and technology plays a major role in making these projects complex and difficult to manage. Some papers focused on traditional PM which measures failure based on the scope, time and cost of projects. However, these measurements are not enough to evaluate project outcomes since there are other significant factors reported from the literature such as changes during the project, new market requirements, project managers' knowledge and skills, risk rating and management support. These are factors that can be used to measure more effectively the project outcome in terms of its success or failure, as agreed by other authors.

In specific, this chapter will look at the overall conclusion on analyzing the gathered and analyzed information from LR, interviewing PMO program manager, and questionnaire results and findings discussed in chapter 4 and 5. This conclusion will cover findings related to the three main research questions and the case study discussion and analysis. There are four main conclusions for the research questions as following:

Conclusion 1:

First, this research has come with an agreement to most of other researches that IT Projects measurements techniques cannot be defined and standardized for all companies. Therefore, it can be concluded that the IT Projects have different failures reasons depending on the organization's business; and in some scenarios, it is unique to a specific product or service. As a result, the organization needs to analyze the sensitivity of its strategy and projects to the technology changes as an attribute for continuous review and planning. The sensitivity ratio will be based on the complexity of the projects in the portfolio and the dependency of these projects. The stronger the relationships between the projects in the portfolio, the more the impact of the sensitivity will be on the company's strategy. This can lead to a conclusion that successful IT projects can only support the business if the organization reviews its strategic analysis using one of the techniques such as the discussed SWOT analysis tool. Then based on the internal strengths and weakness,

and external threats and opportunities, the management will have better feasibility to decide the best or most appropriate PPM model to be used. This is important because the main objective of the models is to align the projects with the strategy.

Secondly, a project lifecycle success can be referred to the balance between soft and technical skills for the project manager and team members. It is concluded that the variety of skills for the project team can be resulted from interfacing with different areas like IT, finance, technology, marketing, sales, or others. **(Refer to Overall Research Findings Section, RQ1 (1.1, 1.2 and 1.3))**

Conclusion 2:

The research also concluded that one way of reducing the gap between operations and strategy is the alignment of employees KPI's and daily activity to the strategic objectives of the organization. This is shown in the questionnaire results that most staff in the sample have defined their objectives at their department level and relate it to individual goals and to the strategy at the other end.

RQ2 has been answered through the interview and the case study in ***Company A*** which shows that due to the various and well planned communication channels as a feedback and feed-forward sessions, the employees who are involved in PPM projects are not facing major issues in terms of business knowledge common understanding and they are aligned with the strategic objectives. This point indicates that selecting the right method of communication is important based on the organization culture. In this case study, the continual reviews and face to face meetings were more effective and efficient than emails or online intranet communications. Also, the meetings are productive and help to reduce the gap between the operations, engineering and strategy. Further, most of the staffs' tasks are associated with their annual performance and promotions as a KPI which is monitored by the management where a reward system is invoked.

Another point that addresses this question, based on the studied research papers, it can be concluded from the findings that none of the models or methodology looks at the operations management process and the project management process as one system. The main point is that it will be more effective to have a complete model with the project review process and reporting embedded. **(Refer to Overall Research Findings Section, RQ2 (1.1, 1.2, and 1.3))**

Conclusion 3:

It can be concluded that challenges in mapping the business strategy with IS resources exist for many reasons including poor resource planning. If this is found at the IS strategy level, it impacts the overall PPM role in aligning IS and Business Strategies. This means the IS triangle model can be used as one method to evaluate the organization strategy strength. For example, if both organizational strategy and IS strategy are clear, effective, efficient, and most importantly aligned, it will lead to strong strategy. However, the PPM process should also be in alignment to properly manage and handle all the inputs and outputs from the organization's strategic processes as the model suggest. On the other hand, the identified weakness and challenge in the case study SWOT and interview gathered and interpreted information from the organization shows that there is no implementation of a specific model for planning the IS resources for the portfolio. **(Refer to Overall Research Findings Section, Q3 (1.1 and 1.2)).**

Conclusion 4:

Overall, the case study analysis shows that management in ***Company A*** implemented the PPM without proper study for the required support functions and processes like the human resources management. It is also obvious that there is no involvement of the human resource (HR) department to ensure enough employees available to run the projects in the portfolio. Therefore, the engineering department is overloaded with the tasks and their daily operations. The HR department responsibility is to develop the capabilities and the skills of the employees to match the required and expected level of knowledge for the new projects and changes.

In some cases in the case study organization, management representatives have different interests than the project team and project manager, therefore, it is concluded that the organization is facing organizational culture challenges. This mostly ends up with the scope management issues which are impacted by the interest of the people and their position and power in making decision. The literature review shows that the scope is still one factor that is considered by many organizations to evaluate the success of the projects. This was also found in ***Company A*** from the observation and the survey result shows scope management as an issue as well.

Finally, although the company is not explicitly following the complete methodology of EPMO, it is concluded that the organization is planning to go for this direction as a future objectives and it

is implemented gradually. Therefore, the organizations which have limited time and resources can use the same approach by implementing the PMO office first and then enforce the PPM process and methodology to reduce the change resistance. **(Refer to Overall Research Findings Section, Q4 (1 and 2)).**

16.2. Recommendations:

The research findings and conclusions of this study have a number of important implications for future practice in IT service provider and telecommunication organizations. These recommendations include different aspects of the organization such as the processes, organization, and technology.

Recommendation 1:

The research suggests that any organization should consider the HR role in portfolio management. This role involves securing the required technical training and overall awareness for the employees who are directly dealing with the projects. This is important action because the projects are considered as the implementation of the strategy by Operations and Engineering departments. In this scenario, the PPM enables the management to administer the interdependent training requirements which are resulted from introducing new projects, technology, or processes in the organization project portfolio. For example, Company A is recommended to reemphasize their existing HR work stream to start actual mapping between the projects requirements, resource availability and employees skills. Also, the HR role is to develop the new skills that are required to improve the organizational capabilities to support the portfolio requirement.

This research studies different models and evaluates their advantages and disadvantages to help organizations select the most appropriate model for their strategy. Company A management is recommended to use the multi-objective model by Fetch and Bidanda (2008). The reason is that this model is evaluating the resource availability and accordingly managing the projects' assignments. This helps to reduce the complaints from project implementation team of having staff overloads. **(Refer to Conclusion Section, Conclusion 1 and Conclusion 4).**

Recommendation 2:

Taken together, the selected questionnaire sample for this research paper consists of 34 employees to investigate the importance of KPI's and tasks assignment to reduce the gap between Operations and Strategy does not support strong recommendations to global organizations which have ten thousands of employees in different regions. Therefore, further research might explore a larger sample to participate in the survey in order to support the positive outcomes of this research. Also, a further study investigating an expanded scope of the research to include other departments would be interesting. These departments are those which interface with Engineering and Operations such as Sales Team, Marketing Team, Finance Team, and IT Development Team. Also, to have more accurate outcome and conclusions, the same research can cover multiple telecommunication companies. This will allow further research area to compare the results, categorize the issues, and suggest corrective actions and models as standards or best practices.

In general, it is recommended that management use the questionnaire results and try to address the areas where negative indications are. This can be completed after increasing the sample as the results might be changed. For example, the people who are not having KPI's related to PPM tasks should be considered by management. Management should have mitigation plans to not face future issues like de-motivations and negative attitude. For explanation, the 18 people who have some of the KPI's not associated, managers should study their cases and identify how and where new KPI's can be defined. Also, there should be plan for the people who do not have any KPI defined though it is only 4 individuals according to the questionnaire results. The idea is to eliminate the cases where KPI's are not defined so the staffs have better performance monitoring and achievements. **(Refer to Conclusion Section, Conclusion 2).**

Recommendation 3:

From my knowledge and experience in IT organization and the world known ISO 20000 standards for IT Service Management, It is recommended that ***Company A*** study the feasibility of defining a service catalogue for all services. The service catalogue maps all services from business strategy assets to the level of operational assets. The service catalogue enables the organizations to have better reporting mechanism and capabilities at different layers for different purposes. For example, management would be in better position to identify which business service is having the highest value and income to the company. On the other side, it enables the organization to report all the services that are causing customer dissatisfaction because of service failures or hardware faulty. Also, it demonstrate the services that need to be enhanced in the future strategic planning including the IS strategy. The service catalogue is a powerful tool which allows the following features. Service catalogue example is shown in Table 14 below.

- Identification, capturing, documenting all the organizational services and assets (Hardware, Software, and human resources)
- One-to-one mapping, One-to-many, and Many-to-many mapping between services and assets. Finally;
- Map all services and assets impact to the business strategic level.

Table 14: Service Catalogue Sample

Strategic Objective	Business Service	Operational (Ops) Services	Related Assets	Service Owner	Asset Owner
Strategic Objective 1	Business Service 1	Ops Service 1	Asset 1 & Asset 2	Owner 1	Owner 2
		Ops Service 2	Asset 1 & Asset 54	Owner 1	Owner 4
		Ops Service 3	Asset 2 & asset 12	Owner 3	Owner 6
Strategic Objective 2	Business Service 2	Ops Service 4	Asset 1 & Asset 2	Owner 1	Owner 2
		Ops Service 5	Asset 1 & Asset 9	Owner 1	Owner 4
		Ops Service 6	Asset 2 and asset 1	Owner 3	Owner 6

16.3. Overall Research Limitations:

- **Confidentiality:**

The current investigation was limited by the organization policy and criticality. It has confidentiality policy to not expose internal information and knowledge to outside users even if it is academic use. Therefore, the organization in the case study is kept anonymous and the interviewee identity. This is considered as limitation because it constraint the amount of data in my research about the company and also the competitor identity. It restricts my research from interviewing top management representative such as the CTIO.

- **Data Access:**

The current study was also unable to analyze the documented processes and procedures in the organization. There was a difficulty in direct access to information related to access to the centralized business strategy and operations' issues in the organization. For example, to understand performance issues and KPI association, it would have been useful to look at the performance system and explain in it in this paper, however, the management did not approve to do this from the initial discussion phase. Therefore, the KPI was only analyzed from employees' perspectives and not system's.

- **Meetings:**

Thirdly, the study did not evaluate the use of face-to-face interview with the targeted PMO manager in the organization since they are senior level and distance in another city. This limitation leads to have the interview through telephone and the observation of body language was impacted. If this is a face to face interview, then more ad hoc questions might be added if valuable and other designed questions might be dropped.

- **Questionnaire Follow up:**

Questionnaire distribution was not a difficult task since it was web based survey. However, it was difficult to follow up with the engineering and operations departments. One of the reasons is that there is no mechanism to check who did and did not complete the survey. System was only

providing the total respondents. Some people used to be annoyed whenever I follow up on the survey and that was delaying my data analysis chapter completion.

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46. Appendices:

Appendix 1: Interview Sample Questions and Answers

Appendix 2: Questionnaire Sample Questions

Appendix 3: To Whom It May Concern Letter

Appendix 4: Original questionnaire Answers File

Appendix 1: Interview Sample Questions

- Q1: What is your position and role in PMO?
- Q2: What is your background and work experience related to PMO and PPM?
- Q3: What do you think triggers strategic change?
- Q4: Were there any difficulties in the program implementation? What were they and in which phase; formation or implementation phase?
- Q5: How do you see management support for PMO and PPM?
- Q6: How do you rate the Program in terms of success and maturity level? And what are the parameters and measurement criteria?
- Q7: What is the full cycle and process followed in your organization for project selection for PPM?
- Q8: How is new project budget allocated?
- Q9: How resource selection is managed in your organization for the portfolio projects?
- Q10: What is the communication method used and how things like plans, changes, and roadmaps are communicated to different departments and do you see any issues in this?

Appendix 2: Questionnaire Sample Questions

Section One: Respondent's Background and Work Experience

Q1 What is your designation in the organization?

- CEO
- Director/Senior Director
- Manager/Senior Manager
- Engineer/Senior Engineer
- Technician/Senior Technician
- PMO Manager/PMO Coordinator

Q2 What is your role in PMO?

- PMO Manager
- Functional Leader/Manager
- Project Manager
- Project Team Member

Q3 How long have you been in the field of IT Project Management?

- Less than 1 Year
- 1 to 2 Years
- 3 to 5 Years
- 6 to 10 Years
- More than 10 Years

Section Two: Work Load and Task Assignment

Q4 Do you clearly understand your Organization Strategy and Objectives?

- Yes
- No
- Not sure

Q5 What is your work involvement with Project Portfolio Management and Program Management Office at work?

- Daily
- Weekly
- Monthly
- Rarely
- Not involved

Q6 Are the assigned tasks by PMO and Projects Portfolio associated and linked to your KPI

and annual performance?

- Yes, all tasks associated to my KPI and performance
- Some of the tasks are associated to my KPI and performance
- None of the tasks are associated to my KPI and performance

Q7 How do you find PMO communication in terms of stakeholders' roles and responsibilities in the projects which are under the Organization Project Portfolio umbrella?

- My roles and responsibilities were communicated and well explained
- My roles and responsibilities were communicated and not explained
- My roles and responsibilities were Not communicated and Not explained

Section Three: PMO and Project Portfolio Management (PPM) Assessment

Q8 Do you believe that PMO and Portfolio Management implementation is useful in the organization to decrease the failures in Major IT Projects?

- Yes
- No

Q9 What do you think is the approximate success rate of major IT Projects in your organization after PMO and Project Portfolio were established?

- 80% and above of the projects are successful
- 40% to 80% of the projects are successful
- 10% to 40% of the projects are successful
- Less than 10% of the projects are successful
- Not changed since it is implemented
- No idea

Q10 How do you rate the PMO/PPM Program in terms of success and maturity level in supporting the IT and Business Projects?

- **Excellent:** PMO/PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy
- **Very Good:** PMO/PPM Business Processes Defined, Implemented But Not aligned with the Organization Strategy
- **Good:** PMO/PPM Business Processes Defined, Not Implemented, and Aligned with the Organization Strategy
- **Poor:** PMO/PPM Business Processes Defined, Not Implemented, and Not Aligned with the Organization Strategy
- **No idea**

Q11 What are the areas of improvements you believe PMO should focus on in order to improve their Processes and Portfolio Management. Considering Operations and Engineering Major IT Projects?

	Critical Problem	Significant Challenge	Minor Issue	Not a Problem	No idea
Communication Methods	○	○	○	○	○
Process Automation and Alignment	○	○	○	○	○
Scope Management	○	○	○	○	○
Resource Management and Task Assignment	○	○	○	○	○
Objectives Alignment and Strategy Focus	○	○	○	○	○

Appendix 3: To Whom It May Concern Letter

03 April 2011

To whom it may concern

This is to certify that **Ms Shamim Rubaiya Salem– Student ID No. 80143** is a registered part-time student on the Master of Science – Information Technology Management programme in The British University in Dubai, from January 2009.

Ms Shamim is currently doing her dissertation in the topic of "Project Portfolio Management for Successful Major IT Projects in Global Telecommunication Organization." She needs your support and valuable input to collect the data for her analysis. The purpose of the interview and survey is to analyze how Project Portfolio Management impacts the IT project success.

The British University in Dubai would like to request your support and cooperation in completing her project.

Any information given will be used solely for academic purposes.

This letter is issued on the students' request.

Yours sincerely,

Nandini Uchil
Head of Student Administration

P O Box: 345015, DIAC, Dubai, United Arab Emirates
Tel.: +971 4 391 3626, Fax: +971 4 366 4698

Appendix 4: Original questionnaire Answers File

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11a	Q11b	Q11c	Q11d	Q11e
What is your designation in the organization?	What is your role in PMO?	How long have you been in the field of IT Project Managem...	Do you clearly understand your Organization Strategy and ...	What is your work involvement with Project Portfolio Mana...	Are the assigned tasks by PMO and Projects Portfolio asso...	How do you find PMO communication in terms of stakeholder...	Do you believe that PMO and Portfolio Management implemen...	What do you think is the approximate success rate of majo...	How do you rate the PMO/PPM Program in terms of success a...	Communication Methods	Process Automation and Alignment	Scope Management	Resource Management and Task Assignment	Objectives Alignment and Strategy Focus
Technician/Senior Technician	Project Team Member	3 to 5 Years		Monthly	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and not explained	No	Less than 10% of the projects are successful	Good: PMO/PPM Business Processes Defined, Not Implemented, and Aligned with the Organization Strategy		No idea	Not a Problem	Not a Problem	Significant Challenge
Technician/Senior Technician	Project Manager	6 to 10 Years	No	Rarely	None of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and not explained	Yes	Less than 10% of the projects are successful	Very Good: PMO/PPM Business Processes Defined, Implemented But Not aligned with the Organization	Minor Issue	Significant Challenge	Minor Issue	Significant Challenge	Minor Issue

									Strategy					
Engineer/Senior Engineer	PMO Manager	1 to 2 Years	Yes	Daily	Yes, all tasks associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	40% to 80% of the projects are successful	Very Good: PMO/ PPM Business Processes Defined, Implemented But Not aligned with the Organization Strategy	Significant Challenge	Significant Challenge	Significant Challenge	Minor Issue	Significant Challenge
Engineer/Senior Engineer	Project Manager	6 to 10 Years	Yes	Daily	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	80% and above of the projects are successful	Very Good: PMO/ PPM Business Processes Defined, Implemented But Not aligned with the Organization Strategy	Significant Challenge	Minor Issue	Minor Issue	Significant Challenge	Minor Issue
Manager/Senior Manager	Functional Leader/ Manager	More than 10 Years	Yes	Daily	Yes, all tasks associated to my KPI and performance		Yes	80% and above of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organizatio	Critical Problem		Critical Problem		Critical Problem

									n Strategy					
Engineer/Senior Engineer	Project Team Member	3 to 5 Years	Yes	Weekly	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	40% to 80% of the projects are successful	Good: PMO/ PPM Business Processes Defined, Not Implemented, and Aligned with the Organization Strategy	Minor Issue	Minor Issue	Significant Challenge	Significant Challenge	Significant Challenge
Engineer/Senior Engineer	Project Team Member	6 to 10 Years	Yes	Monthly	Yes, all tasks associated to my KPI and performance	My roles and responsibilities were communicated and not explained	Yes	80% and above of the projects are successful	Very Good: PMO/ PPM Business Processes Defined, Implemented But Not aligned with the Organization Strategy	No idea	No idea	No idea	No idea	No idea
Engineer/Senior Engineer	Project Team Member	3 to 5 Years	Yes	Weekly	Yes, all tasks associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	80% and above of the projects are successful	Very Good: PMO/ PPM Business Processes Defined, Implemented But Not aligned with the Organizatio	Critical Problem	Critical Problem	Minor Issue	Significant Challenge	Significant Challenge

									n Strategy					
Engineer/Senior Engineer	Functional Leader/ Manager	Less than 1 Year	Not sure	Monthly	None of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and well explained	No	No idea	No idea	Significant Challenge	Significant Challenge	Significant Challenge	Significant Challenge	Significant Challenge
Manager/Senior Manager	Functional Leader/ Manager	6 to 10 Years	Yes	Not involved	None of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and not explained	Yes	80% and above of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Not a Problem	Minor Issue	Significant Challenge	Significant Challenge	Significant Challenge
Manager/Senior Manager	Functional Leader/ Manager	6 to 10 Years	Not sure	Weekly	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	80% and above of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Minor Issue	Not a Problem	Minor Issue	Minor Issue	Significant Challenge

Manager/Senior Manager	Functional Leader/ Manager	6 to 10 Years	Yes	Daily	Yes, all tasks associated to my KPI and performance	My roles and responsibilities were communicated and not explained	Yes	80% and above of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Significant Challenge	Significant Challenge	Minor Issue	Significant Challenge	Critical Problem
Engineer/Senior Engineer	Project Team Member	3 to 5 Years	No	Daily	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	80% and above of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Significant Challenge	Minor Issue	Minor Issue	Critical Problem	Critical Problem
Engineer/Senior Engineer	Project Team Member	1 to 2 Years	Not sure	Daily	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	40% to 80% of the projects are successful	Good: PMO/ PPM Business Processes Defined, Not Implemented, and Aligned with the Organization Strategy	Minor Issue	Minor Issue	Significant Challenge	Minor Issue	Not a Problem

Manager/Senior Manager	Project Manager	3 to 5 Years	Yes	Daily	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	80% and above of the projects are successful	Very Good: PMO/PPM Business Processes Defined, Implemented But Not aligned with the Organization Strategy	Minor Issue	Minor Issue	Not a Problem	Significant Challenge	Minor Issue
PMO Manager/PMO Coordinator	PMO Manager	3 to 5 Years	Yes	Daily	Yes, all tasks associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	80% and above of the projects are successful	Excellent: PMO/PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Minor Issue	Not a Problem	Not a Problem	Significant Challenge	Not a Problem
PMO Manager/PMO Coordinator	PMO Manager	6 to 10 Years	Yes	Daily	Yes, all tasks associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	80% and above of the projects are successful	Excellent: PMO/PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Minor Issue	Not a Problem	Minor Issue	Significant Challenge	Not a Problem

Manager/Senior Manager	Project Manager	More than 10 Years	Yes	Weekly	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and not explained	Yes	40% to 80% of the projects are successful	Very Good: PMO/ PPM Business Processes Defined, Implemented But Not aligned with the Organization Strategy	Minor Issue	Minor Issue	Minor Issue	Minor Issue	Minor Issue
Manager/Senior Manager	Project Manager	6 to 10 Years	Yes	Weekly	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and not explained	Yes	40% to 80% of the projects are successful	Very Good: PMO/ PPM Business Processes Defined, Implemented But Not aligned with the Organization Strategy	Not a Problem	Minor Issue	Minor Issue	Minor Issue	Minor Issue
Manager/Senior Manager	Project Manager	6 to 10 Years	Yes	Weekly	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and not explained	Yes	40% to 80% of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Not a Problem	Minor Issue	Minor Issue	Minor Issue	Minor Issue

PMO Manager/PMO Coordinator	PMO Manager	6 to 10 Years	Yes	Daily	Yes, all tasks associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	40% to 80% of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Not a Problem	Minor Issue	Significant Challenge	Minor Issue	Minor Issue
PMO Manager/PMO Coordinator	PMO Manager	1 to 2 Years	Not sure	Daily	Yes, all tasks associated to my KPI and performance	My roles and responsibilities were communicated and not explained	Yes	40% to 80% of the projects are successful	No idea	Not a Problem	Not a Problem	Not a Problem	Minor Issue	Not a Problem
Manager/Senior Manager	Functional Leader/ Manager	More than 10 Years	Yes	Daily	Yes, all tasks associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	40% to 80% of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Minor Issue	Significant Challenge	Minor Issue	Significant Challenge	Minor Issue
Manager/Senior Manager	Functional Leader/ Manager	More than 10 Years	Yes	Daily	Yes, all tasks associated to my KPI and performance	My roles and responsibilities were communicated and not explained	Yes	40% to 80% of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strate	Minor Issue	Minor Issue	Significant Challenge	Significant Challenge	Not a Problem

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Manager/Senior Manager	Functional Leader/ Manager	More than 10 Years	Yes	Daily	None of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	80% and above of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Minor Issue	Minor Issue	Significant Challenge	Significant Challenge	Minor Issue
Technician/Senior Technician	Project Team Member	6 to 10 Years	Yes	Daily	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were Not communicated and Not explained	Yes	No idea	No idea	Not a Problem	No idea	Significant Challenge	Significant Challenge	Significant Challenge
Technician/Senior Technician	Project Team Member	6 to 10 Years	Yes	Daily	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and not explained	Yes	40% to 80% of the projects are successful	No idea	Minor Issue	Significant Challenge	Significant Challenge	Significant Challenge	Minor Issue
Technician/Senior Technician	Project Team Member	6 to 10 Years	Not sure	Daily	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and not explained	Yes	40% to 80% of the projects are successful	No idea	Minor Issue	Significant Challenge	Significant Challenge	Significant Challenge	Minor Issue

Technician/Senior Technician	Project Team Member	6 to 10 Years	Yes	Daily	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	40% to 80% of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Not a Problem	Minor Issue	Significant Challenge	Significant Challenge	Minor Issue
PMO Manager/PMO Coordinator	Project Team Member	More than 10 Years	Yes	Daily	Yes, all tasks associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	40% to 80% of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Not a Problem	Significant Challenge	Minor Issue	Significant Challenge	Not a Problem
Manager/Senior Manager	Functional Leader/ Manager	6 to 10 Years	Yes	Daily	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	40% to 80% of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Minor Issue	Significant Challenge	Significant Challenge	Significant Challenge	Minor Issue

Manager/Senior Manager	Functional Leader/ Manager	More than 10 Years	Yes	Weekly	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	40% to 80% of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Not a Problem	Minor Issue	Significant Challenge	Significant Challenge	Not a Problem
Engineer/Senior Engineer	Functional Leader/ Manager	6 to 10 Years	Yes	Daily	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and well explained	Yes	80% and above of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Significant Challenge	Significant Challenge	Significant Challenge	Significant Challenge	Minor Issue
Manager/Senior Manager	PMO Manager	6 to 10 Years	Yes	Weekly	Some of the tasks are associated to my KPI and performance	My roles and responsibilities were communicated and not explained	Yes	40% to 80% of the projects are successful	Excellent: PMO/ PPM Business Processes Defined, Implemented and Aligned with the Organization Strategy	Minor Issue	Minor Issue	Minor Issue	Significant Challenge	Not a Problem