Improving Project Management in the UAE through Effective Interdependency Management

by Tahereh Shams

FILE	ENT_IN_THE_UAE_THROUGH_EFFECTIVE_INTERDEPENDENCY_MANAGEMENT.DOC (625.5K)		
TIME SUBMITTED	30-MAR-2016 04:58PM	WORD COUNT	15376
SUBMISSION ID	651923959	CHARACTER COUNT	96455

Improving Project Management in the UAE through Effective Interdependency Management

BY

Tahereh Shams

Student ID: 120159

Dissertation submitted in partial fulfilment of MSc in Project Management

Faculty of Engineering & Information Technology

Dissertation Supervisor

Prof. Mohammad Dulaimi
April-2016

Table of Contents

List of figures

List of tables

Abstract

The study involves the analysis of project management interdependencies. Evidently, the investors who engage a portfolio of investments are essentially challenged before realizing success from such investments. The challenge is attached to the fact that most of them are mutually exclusive project, which compete for the available opportunities. Analytically, the study will define such challenges and formulate a resolution for their improvement in project management. It is an empirical study, which incorporates the concept of quantitative and qualitative methodology. Significantly, the findings will be analyzed to formulate a clear conclusion asserting what should be done to improve the project interdependencies. The information will be applied to recommend the areas of weakness in portfolio investment.

Chapter 1: Introduction

1.1 Background information

A key aspect of project management is that of managing the resources availed for the project to ensure effective completion of the project. The one challenge that various project managers are faced with is that of interdependencies of resources and the impact that this has on the completion of a given project. This is especially in considering cases where complex project ecologies are observed. This realization is the main basis of this study. The impact of these interdependencies, which can be either pooled, reciprocal or sequential, is studied in the paper with particular emphasis being on how pooled interdependencies impacts key projects in the healthcare sector (Harrison & Lock 2004, 49). This study will be used in developing solutions to mitigate the challenges that have been observed and thereby created more effective project management models and procedures for firms in the United Arab Emirates. Consequently, this paper is geared towards improvement of project management to deliver the most effective, value, and benefit with project outcomes and results in the UAE through implementation of the best practices in interdependency management.

Project interdependency is a relationship between two or more projects in such a manner due to sharing of resources, budget, deliverables, objectives, outcomes, or vision (Martinelli, Waddell, & Rahschulte, 2014). Project interdependencies are very important in project management because they allow for quantification of program benefits since they link several projects to the program objectives in organizations (Letavec, Rollins, & Altwies, 2007).

1.2 Statement of the research problem

The growth of business firms is largely driven by the projects that they undertake; hence, organizations require project management skills to achieve good resource management capacities and competitiveness, which result to growth (Brady & Davies 2004). Project management knowledge extends to the management of specific operational and strategic goals that the company wishes to achieve. More and more firms choose project management as a responsive and reliable framework for their products development (Schindler & Eppler 2003). A project or program management involves good understanding and management of project interdependencies in PPM contexts (Dietrich &Lehtonen 2005). However, research has repeatedly shown that many project managers lack the competency to manage several projects or maximize project outcomes where many projects (Patanakul& Milosevic 2009).In their study on application of system dynamics approaches in the UAE, interdependency management is identified as a key challenges for project managers.

In a mainstay, study by Ameemi (2011), the scholar reports that a significant proportion of project managers in the UAE fail in planning and organization of integrated projects. In essence, in the UAE, project interdependencies in PPM contexts are a key challenge for the investment's management. This problem warrants research aimed at providing recommendations on how to optimize project management through good management. Notably, the problem of project interdependency being a challenge to project management is more complex in the UAE than in other nations due to the culture differences that exists in the nation, which has a larger working population of expatriates than the native population in the workforce (Ameemi, 2011). This study is geared towards providing recommendations to this challenge in the UAE after exhaustively discussing the problem in the light of previous research on the topic.

1.3 Research questions and objectives

The overarching goal of the study entail investigating the concept of project interdependencies and how this is a challenge to project management. Therefore, provide recommendations on how to improve project management in the UAE. The specific objectives in this study are:

1. To investigate the concept of project interdependencies and explore how it affects project management.

2. To analyze the problem of poor project interdependency management as a challenge of project management in the UAE, the challenges facing portfolio and program management to effectively manage interdependencies between projects

3. To compare project interdependency management in the PPM contexts and provide recommendations on how PPM can develop positive relationships between PM that would enable the effective management of shared projects. To fulfill the above objectives, the study answers the following questions.

a. How do project interdependencies affect project management in the PPM context?

b. How competent are project managers in the UAE concerning project interdependency management? What are the factors that make project interdependencies a challenge in project management in the nation?

c. What are the best project interdependency management practices? What improvements should be made to project interdependency management in the UAE in order to improve project management?

1.4 Outline of the contents of the study

This study will significantly to the project management literature and provide insight towards the improvement of project's practices. The management of the project is a vital element of organizational management that contributes directly to organizational performance. This study is henceforth very important because it highlights and provides insight on issues that can affect the success of many organizations in the United Arab Emirates.

Chapter 2: Review of Literatures

2.1 Project management: Definitions

In every discussion of project management, a definition of the term suffices. Likewise, in this paper, it is very important to develop an operational definition of the term before exploring the topic in depth. Project management is a heavily studied topic and has been defined differently by different scholars and academicians. A good way of understanding project management and comprehending how it is implemented in business and what it entails, it is important to view the term as a sort of portmanteau formed by the words 'project' and 'management'. Defining both words separately can offer a good insight to understand project management. The word 'project' is best defined as "a unique process, consisting of a set of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective conforming to specific requirements, including constraints of time, cost and resources" (Lester 2014, 1). In essence, a project is an undertaking aimed at the achievement of measurable goals using pre-determined resources and time.

Management, entail the process of ensuring that things are done correctly. One of the most popular definitions of management was put forward by the legendary Frederick W. Taylor, who defined the term as "the art of knowing what you want to do and then seeing that it is done

in the best and cheapest way"(Taylor cited in Havinal, 2009, p. 3). This definition is the anchor of management decisions that simplify the concept as just the process of influencing others to do the things that one wants done. Koontz and O'Donnell (1974, p. 3) define management as "the direction and maintenance of an internal environment in an enterprise where individuals working in groups can perform efficiently and effectively towards the attainment of group goals". This is perhaps the best definition of management because it creates a better picture of management as an internal organizational process through which people are led towards achievement of organizational interests.

From the above definitions of project and management, we can conjure up a definition of project management as the maintenance of direction and oversight to ensure the achievement of the set objectives in an organizational project. Lester (2014, p. 7) provides a comprehensive definition of project management by describing it as "the planning, monitoring, and control of all aspects of a project and the motivation of all those involved in it in order to achieve the project objectives within agreed criteria of time, cost, and performance" (Lester, 2014). The definition incorporates the important ingredients that should be included in a proper definition of project definition. Project management, like all other forms of management, requires application of all the functions of the management process that include organizing, staffing, planning, motivating, and directing (Talloo, 2007). Such an understanding allows us to delve into project interdependencies and comprehend their impact on the PPM, project portfolio management.

2.2 The project's concept of interdependency

The interdependency of a project is a term in project management studies used to denote the relationship between different projects in a PPM context. Simply put, project interdependency occurs where a project is dependent on another project or other several projects

in the same organization (Moersidik, Arifin, Soesilo, Hartono, & Latief, 2015). Project interdependency can occur through numerous ways. The first is the situation in which several projects share resources. For example, two projects conducted by one team of employees are dependent on each other because they share human resources. In addition, interdependency can occur in situations where a project uses the result or findings of another project. For example, an innovation project to create a new product will need to use results of research projects conducted by the research department in a firm. Another way through which project interdependency may occur is in which one project cannot be started until another one is started or until one deliverable or output from the other project is released. For example, the painting project of cars in a motor vehicle manufacturing plant cannot be started until the assembling projects are over. These examples suggest that project interdependency is a common occurrence in organizations because specialization and division of labor creates different departments and teams that are highly interrelated and integrated. In such multi-department and consequently PPM organizational settings, it is quite important to implement good management approaches to optimize project success (Moersidik et al. 2015).

Project interdependencies are classified into three classes through different classification systems. Griffin and Moorhead (2010) classify interdependencies as pooled interdependencies, reciprocal or sequential. In this approach, pooled interdependencies, resources from different projects are shared or used successively in different projects. In the reciprocal class of interdependencies, the interactions between the involved projects involve exchanges between the projects. Sequential project interdependencies, the third type of interdependencies according to Griifin and Moorhead (2010), involve the dependency of projects on the outcomes of other projects. Morris (2008) endorses the classification of interdependencies into pooled, reciprocal,

and sequential classes. This is the most popular approach to classify project interdependencies. In their article on the construction of balanced project portfolios based on identification of the interactions between projects, there are three types of interdependencies just like Griffin and Moorhead (2010) but used different terminologies the classification. The three classes of interactions are resource interactions, technical dependence and benefit interactions (Eilat et al, 2006). In this classification, resource interactions involve the sharing of resources by different projects just like the pooled interdependencies in Griffin and Moorhead's (2010) classification. Similarly, the benefit interaction and technical dependence interdependencies in Eilat et al.'s (2006) classification match the reciprocal and sequential interdependencies in the classification proposed by Griffin and Moorhead (2010). This demonstrates consensus in the classification of project interdependencies.

The concept of project interdependency is a vital part of project management. According to Moersidik (2015, p. 66), a portfolio of a project is "a collection of various components including programs, projects, and operations managed as a group to achieve strategic objectives." In essence, all interrelated organizational projects are organized into a portfolio that outlines their relationships in order to facilitate their management. However, it is notable that a project portfolio does not only house interdependent projects, but a set of projects in organization organized in a quantifiable manner to facilitate their prioritization, ranking, and measuring. This implies that a project portfolio is not a tool primarily designed for outlining project interdependencies, but rather a tool that is very essential for the management of such interdependencies (Moersidik et al. 2015).

The interdependencies between projects are driven by many factors. Resource utilization, organizational goals, vision, mission, project outcomes, the market, stakeholders, strategic

partners, and other factors in the organizational environment can affect the interdependencies between projects and influence their worth, value, and priority (Moersidik et al. 2015). It is recommended that project interdependencies should be accurately evaluated as a key factor, which is considered in the development of an investment portfolio. This step is of crucial importance in project management (Laslo, 2010). Notably, project interdependencies are outlined and managed through the organizational project portfolio, making it the most important instrument in the management of interdependencies in the complex and dynamic organizational environments that interdependencies occur.

2.3 How Project Interdependency Poses Challenges

Project interdependence is challenged by the interdependencies on the power structure in organizations. Project interdependencies may be misconceived as simple relations between organizational projects, but they are complex interactions that involve deeper factors in organizations while they affect the core organizational strategy and competitiveness. One issue that contributes to the complexity of project interdependencies is that they are linked to power in organizations. Where there is little interdependency, there is little or no need for assertion of power in any situation (Walker, 2015). According to Walker (2015), in conditions of high project interdependency, there is usually high motivation between employees to work collaboratively if the right incentives are provided; hence, there is also no great need for the assertion of power or authority. On the other hand, in situations of moderate project interdependence in which power and authority is more frequently asserted. However, Walker (2015) further notes that even in low interdependence contexts where power is not expected to be asserted, some people may use illegitimate power with the aim of getting pay-offs in the future. For example, even in cases where projects do not interact, individuals in formal positions of power in an organization may

hoard resources to employ them in projects in the future from which they will gain more benefits.

The relationship between power and project interdependence is that it changes the power structure in organizations (Walker, 2015). Notably, project interdependency means that one project will depend on another project, which is perhaps managed by a different project manager. Dependency is the basis of power in organizations (Walker, 2015). An example suffices to elucidate this terse observation. When project manager A possesses scarce resources required by project managers B and C in such a way such that he/she alone can control the utility of those resources, then he or she gains monopoly power that can be exercised on the project managers B and C within the same organization. From this example, analogizing the power relationships that may develop in organizations due to the disruption of the power structure by interdependencies, it is evident that such interactions can create divisions within organizations and henceforth affect the ability of employees to work together towards organizational goals. Project interdependencies can henceforth be said to have adverse impacts on relationships between employees and organizational departments by staving off power to some factions, hence creating adverse impacts in project management. From logic, when there is no collaboration between different departments or employee teams within an organization, performance is bound to be negatively affected. It is recommended that a good audit be done to diagnose the impacts of interdependence on the power structure in organizations in order to ensure proper project management in organizations (Walker, 2015).

Another factor that makes project interdependencies a key challenge in project management is communication. The management of Project Interfaces- Key Points to facilitate Project Success, Morris (2008), a professor and researcher in management, explains that proper

project management requires perfect liaison in order to achieve higher rates of integration in multi-project contexts with challenging project interdependencies. The author further explains that to attain liaison, the parties involved in project management need to maintain effective communication within the organization. In addition, Morris (2008) notes that effective communication in contexts of project interdependence facilitates good working relationships, which is a prerequisite of both project and organizational success. Maintaining effective communication is usually a challenge in most organizations, and this challenge grows bigger with the presence of project interdependencies, which tend to be more divisive than cohesive if the proper management measures are not put in place (Platje, Siedel, & Wadman, 1994). Effective between-project communication in multi-project contexts is highly recommended as a measure to mitigate this challenge (Killen, Krumbeck, Kjaer, & Durant-Law, 2009).

Project interdependencies also pose challenges to project management because they involve complex decision-making processes. Verbano, Nosella, Venturini, and Turra (2009) note that in project portfolio management, project interdependencies complicate project management because there are multiple decision-makers, many strategic decisions and considerations to be made, dynamic opportunities, multiple qualitative objectives that may be conflicting and uncertainty of the risk in the projects. In essence, when projects are interdependent, decision-making is affected due to the presence of many opportunities, conflicting objectives, and many decision makers all involved actively in the process (Verbano et al. 2009). This is a challenge to project development because decision-making is stalled during conflict-resolution processes and efforts to harmonize differing ideas and opinions from different parties in the process. The process of identifying project interdependencies is itself time consuming and requires a pool of human resources in a multi-project context. Notably, portfolio managers usually have numerous

projects with confounding information that may not be accurate, and hence sorting through many projects to identify interactions between them may be quite challenging (Taveska & Toropova, 2013).

Besides the general challenges faced by project managers due to project interdependencies, certain challenges are more closely related to specific classes of interdependencies. For example, in pooled interdependencies, it is likely that sharing resources will create a social dilemma about projects are allowed to utilize the resources first or how the resources will be allocated for different projects (Bergeron, 2007, p. 1092). Notably, although projects are usually prioritized, some projects sharing the same resources may be all-important or may be crucial to different departments within an organization. Due to inevitable sharing of resources in different projects, interdependency creates cases of artificial pushing of some projects into crisis in order to acquire top priority and resources for other projects (Engwall & Jebrant, 2003). Notably, this kind of situation would be a case of a company harming itself through unhealthy competition for resources between resources. The sharing of human resources also creates challenges for project management. This is because when employees are involved in too many projects, they lack opportunities for recovery between assignments and professional development, and hence there is a deterioration of morale and performance due to improper work-life balances (Zika-Viktorsson, Sundstrom, and Engwall, 2006). Another project management challenge related to the sharing of resources is the sharing of knowledge. According to Tiwana (1999, p. 76), it is not impossible to make employees in an organization to use and share knowledge. In situations where projects are interdependent because they share knowledge as a resource, project managers may face key challenges in influencing the people to maintain focus on organizational goals and share knowledge to ensure success on all fronts.

Project interdependencies, whether pooled, reciprocal, or sequential, may create challenges in project development due to the need for close coordination of resource, knowledge, information, and results sharing. For reciprocal or benefit interdependencies, a challenge that project portfolio managers may face is that some managers fail to identify and exploit the synergies in projects due to exclusive focus on their projects or the unavailability of quality information (Elonen & Arto, 2003). Some project managers are usually not concerned with any other projects in a portfolio except their own, making it quite difficult to manage sequential or outcome interdependencies because they use results of other projects (Teller et al. 2012, p. 600). This discussion shows that there are many factors that make project interdependency a challenge for project management.

2.4 Theoretical Conceptualizations Of Best Project Interdependency Management

Though the topic of project interdependency management is inadequately studied, theorists have outlined several tools in project portfolio management that can be used to manage projects in multi-project environments. The tools and methods for good project interdependency management are broadly categorized into hard and soft tools (Taveska & Toropova, 2013). The hard tools for project interdependency management include visual tools, network mapping, and optimization models. On the other hand, the soft tools for interdependency management are usually informal and include meetings, gut-feelings and intuition, diversity, and good organizational leadership (Taveska & Toropova, 2013). The best theoretical approach to project interdependency management, according to existent literature, is the system dynamics approach. This theoretical conceptualization and the interdependency management tools are discussed

exhaustively below, resulting to the generation of a theoretical framework for project interdependency management.

2.5 System Dynamics Approach

According to Morris (2008, p. 407) "the most pervasive intellectual tradition to project management, whether in organization, planning, control, or other aspects, is without doubt the systems approach". The systems perspective is an interdisciplinary theoretical approach aimed at elucidating the principles that can be applied to understand behavior in systems. The systems perspective was developed in the 1920s and 30s with an objective of analyzing how living organisms interact and control their environments. The Gestalt psychologists also suggested that the human mind organizes sensory data by processing it through systems. In this approach, a system describes a group of related elements or things. Morris (2008, p. 408) asserts that a system is "an assemblage of people, things, information, or other attributes, grouped together according to a particular system objective". For example, an organization is a whole system that involves grouping of production, marketing, management, and sales departments together with other organizational functions. The different departments in an organization are the subsystems or parts that make up the organization. Systems are properly organized and the subsets in each one of them works collaboratively with the others to make the whole. The systemic view proposes that the whole is more than the sum of its parts (Morris, 2008). This indicates that every subset in a system should not work towards its own success but should collaborate with the other systems towards the overarching goal of success for the whole system.

The systemic perspective developed by accretions in the 1950s and the decades afterwards as it was continually applied to analyze behavior in psychology, economics, sociology, human anthropology, and other disciplines in which scholars study organization and

hierarchical classification (Morris, 2008). In project management, the systems approach has been very useful in analyzing the best approaches to management in multi-department or multi-project environments. In the systems approach, projects are viewed as organizations that should be successfully regulated, directed through clearly defined objectives, and managed best through "progressive development of information and multilevel project control"(Morris, 2008, p. 409).However, the systems approach still encourages the view of projects as subsets of a larger system, the organization, or more accurately, the project portfolio. In the multi-project context, the systems perspective recommends application of an "across-the-board approach" to integrate different projects and manage the interfaces (interdependencies) well (Morris, 2008). Since the whole is more than the sum of its parts, interdependent projects in an organization should be managed in such a manner that the overarching goal is not project success but organizational performance.

The system dynamics approach, which is a modification of the systems theory, has been increasingly applied in project management and is suggested to be more suitable for analyzing multi-project environments. The system dynamics approach was developed in the 1960s as a modeling technique for analysis of behavior in organizations (systems). The system dynamics approach, like the systems theory, is anchored on the principle, which asserts, "the structure of a system gives rise to its behavior" (Sterman, 2000, p. 35). The system dynamics approach explains that the individual components (, subsystems, parts or subsets) do not have the most ambiguous behaviors, although the interaction between them create the complex behavior in a system. Sterman (2000) notes that in the system dynamics school of thought, feedback structures are used to describe the loops through which behavior in complex systems can be understood. Through the system dynamics theory, individuals can analyze the long-term effects of the actions

taken in as system and explain how they affect the organization, the environment, the society, and the participants involved (Sterman, 2000).

The system dynamics school of thought offers a more superior theoretical approach to project management because it allows for analysis of changing environments. Krumbeck and Killen (2010, p. 3) elucidate that compared to other commonly used network mapping approaches used in the business management field, "system dynamics offers the opportunity to analyze sophisticated challenges. It permits organizations to learn and understand their internal systems through a more effective model. In project management and project portfolio management, system dynamics modeling is important in understanding the interdependencies between different projects (Forrester, 1992, p. 19). This theoretical approach is very useful in project portfolio decision-making.

2.6 Use of Visual Tools

Visual tools are one of the hard tools that are used in analyzing project interdependency and creating recommendations on how to solve them. Two types of visual tools are identified for use in project interdependency management. These two tools are network mapping and dependency matrices (Taveska & Toropova, 2013). Brandes & Erlebach (2005, p. 7) define 'network' as an informal concept that describes an object consisting of different elements. In the mathematical graphical methods, graph nodes, also known as vertices, outline the elements of a system (Taveska & Toropova, 2013). This approach is used to map the relations between the elements in a system such as an organization (Killen, Krumbeck, Kjaer, & Durant-Law, 2009).

Network mapping is useful in identifying project interdependencies because it is capable of analyzing multiple projects within a project portfolio at the same time. Network mapping is often used with design structure matrices (DSM) to manage interdependencies within project

portfolios (Krumbeck & Killen, 2010). This approach help determines all the key relationships in a complex project or team interactions. The network analysis approach applied in project management studies is known as social network analysis (SNA), which enables for visual presentation of the flows and interactions between different subsystems or components of an organization (Anklam, Cross, & Gulas, 2005).

The other type of visual tools used in project interdependency management is dependency matrices. This approach provides a matrix-based technique that is applied to "visualize and manage project interdependencies by plotting them in rows and columns" (Taveska & Toropova, 2013, p. 18). This approach is most important in helping project and project portfolio managers to improve their understanding of the project interactions within the portfolio (Killen & Kjaer, 2012). This approach is however criticized for its inability to be used in analyzing project interactions among many projects because it is most appropriate in analyzing pairs of projects (Dickinson, Thornton, & Graves, 2006).

2.7 Optimization Models

Optimization programming models are mathematical methods used to map the interactions between different entities. Such approaches include goal programming, linear programming and quadratic programming (Taveska & Toropova, 2013). Optimization models are based on mathematical functions and they are used to analyze multiple constraints and objectives, resource allocations, and schedules in project interactions. Like visual tools, optimization models for interdependency management require input of large datasets and hence software tools are used to analyze those (Taveska & Toropova, 2013). These approaches are used in complex situations such as multi-project environments to map the interrelations between different projects (Blecic, Cecchini, & Pusceddu, 2008). Taveska and Toropova (2013) used the

different theoretical approaches in the management of project interdependencies. This theoretical framework, as modeled by Taveska and Toropova (2013, p. 69) is illustrated in figure 1.

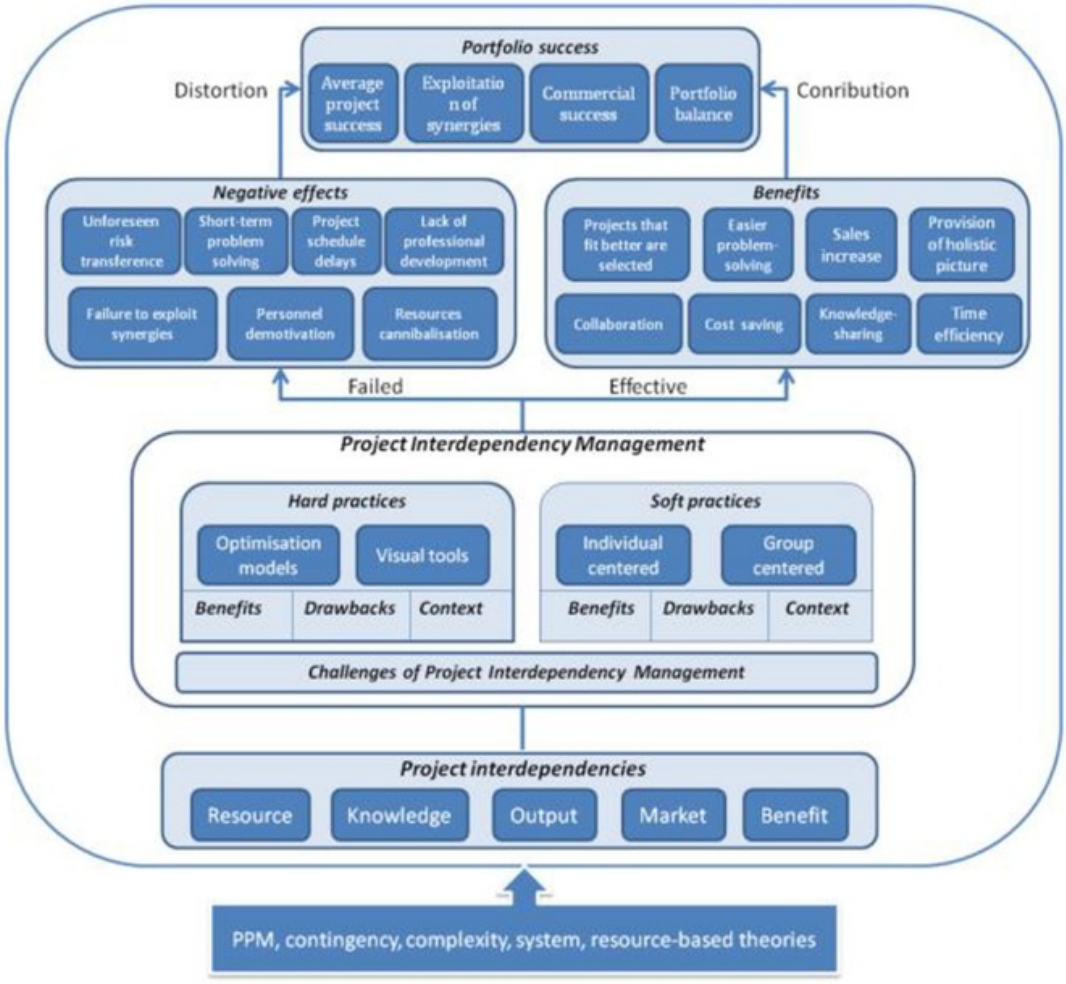

Figure 1: Theoretical framework for project interdependency management (Taveska & Toropova, 2013, p. 69)

The figure asserts the manner in which project management can be improved to enhance the availability of the various interdependencies. The interdependencies of the project entail resource, knowledge, output, market and benefits. Though there is significantly a relevant

literature on interdependencies and their management, this field is still much understudied. Rungi and Hilmola (2011) regard this topic as an emerging field because it has not been adequately studied. Rungi (2010) confirms this by stating that though project interdependency management is used by more than 91% of all firms and though it dates back to the 1960s, more research is required. In addition, Moersidik et al. (2015) note that most studies done on project interdependency management have been conducted as part of other studies. This indicates a knowledge gap that should be covered by studies on project interdependency in the United Arab Emirates.

Network Mapping and Analysis

Network Mapping can be employed in the study of factors, which influence the understanding of project interdependencies. Tools used in network mapping can display the relationships between nodes found in networks at multiple levels. In doing this, these network-mapping tools can reveal the accumulated effects. Evidently, the network uses some software tools, which plays an important role in recording, analyzing, and visually displaying the relationships of nodes of items. These maps facilitate an analysis by making actual changes in the network or through modeling the proposed changes in a network. The graphical displays found in network mapping provides an easy way to study and interpret formatting that helps in revealing patterns better than matrix displays of data or verbal explanations.

In studying network mapping and analysis as a conceptual model, it is important to understand project interdependencies by exploring the role that culture, process, and visual presentation play. The major applications of network mapping are SNA and other organizational network related to the SNA. The Social Network Analysis is used where relationships of organizations or people are studied and analyzed. The analysis of Social Network entail a tool

that helps to understand and improve the relationships between networks of organizations or people. The SNA is also used to promote collaboration, support critical nodes, and manage and maintain networks during the restructuring of an organization.

The domain of the PM, mapping of network of project interdependencies between criteria helps in the evaluation of other contractors. Network Mapping as a conceptual model has many other applications, such as biological, economical, and mathematical modeling. Network Mapping can be used to measure product development such as information flows and team interactions, which can play a significant role in identifying the crucial nodes in the network.

The completeness and accuracy of the data determine the validity of network mapping. Each application of Network Mapping must consider the way to obtain data for the study and analysis of project interdependencies. However, it is vital to note that no data collection is free from bias. Most Social Network Analysis retrieve data from people. Software equipment are present to help in retrieving data, which plays a significant role in reducing bias.

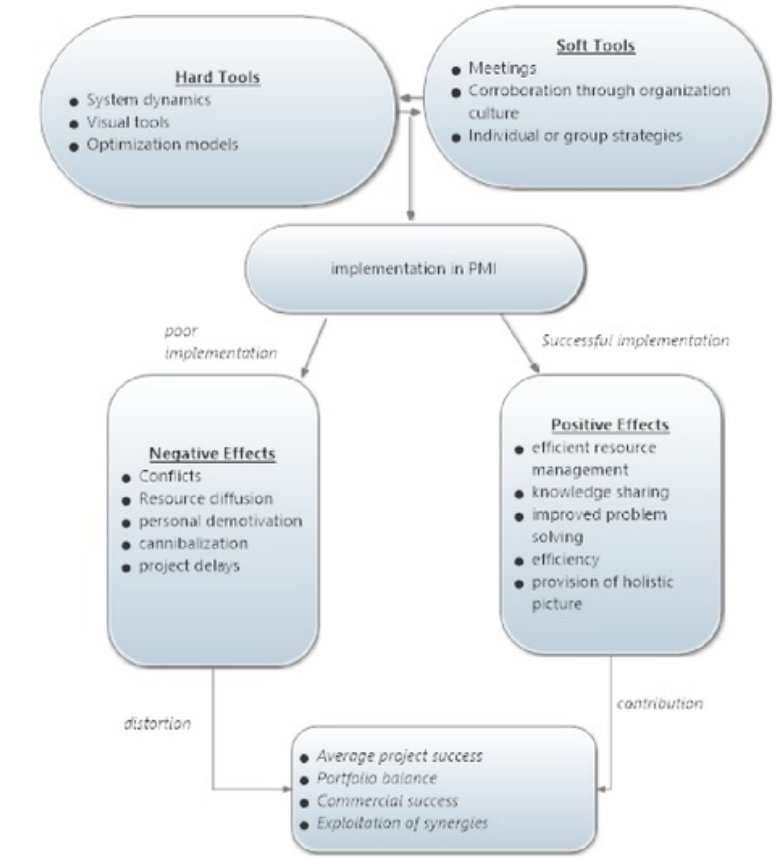

Figure 2 : Conceptual Model

Chapter 3: Methodology

3.1 Introduction

The primary objective of this research paper is to evaluate and assess how the various project managers within health sector in the UAE can be able to improve their overall project performance by enhancing the efficiency and effectiveness of the relevant pooled project

interdependencies. Therefore, this chapter will specifically, describe how the qualitative case study approach and the quantitative research design methodology can be applied to evaluate how the enhancement of the efficiency and effectiveness in the project management models can improve project management performance within the UAE health sector. In essence, the main hypothesis in the research paper is that whenever the various project managers enhance the efficiency and the effectiveness of the pooled project interdependencies, it implies that it is more likely for the relevant managers to attain a high performance in the stated projects.

Approach

The research entails a qualitative approach where information on various reviews will be analyzed and comparisons done. The study will rely on secondary data from five projects that are applicable within the UAE health sector. The samples will be formulated through the simple random platform to help in the realization of a fair conclusion. The qualitative case study research approach will mainly evaluate and analyze the following critical projects within the UAE health sector; medical supplies and equipment project, medical laboratory project and the healthcare information systems management project.

3.2 Implication of the Conceptual Model Framework for the Research Design Methodology

The section mainly evaluates the implication of the conceptual system in chapter two (2) for the research design methodology with respect to this research paper:

Components of Project Interdependencies

In the first place, the research methodology will mainly seek to evaluate the extent to which the different healthcare facility projects tend to share the various resources and knowledge

for each individual projects. In addition, the interviews with the relevant managers will provide essential information about the various interdependencies in the healthcare projects depicting how they influence them to meet their goals. The practice will help in the formulation of effective strategies to improve them and enhance the performance of the respective health care facility.

Project Interdependency Management

In this case, the research methodology will mainly seek to determine whether the different project managers use the hard practices or the soft practices in the analysis of the effectiveness of their individual projects.

(I) Hard Practices

Specifically, using the questionnaires in the methodology will mainly seek to obtain information relating to whether the different project managers use the optimization models or the visual tools in the analysis of the project interdependencies.

(II) Soft Practices

Similarly, using the questionnaires or the interviews, the research methodology will mainly seek to obtain information relating to whether the different project managers use the individual centered or the group centered approaches in the analysis of the project interdependencies.

A New Conceptual Model

Using the available literature on the project management field, we propose the conceptual model, which can help in relating the organization learning practice and the performance of the project risk management in an organization. The proposed conceptual model is the stage-gate-

buffer. The conceptual model provides a guideline to a project to evaluate the interdependencies based on the organization's size, technological turbulence and the experience of the employees. Evidently, it assists the project managers to absorb the aspect of interdependence conflict when running the project. The concept will serve as a measurement instrument that can be used to read two concepts, *and* evaluate their level in any empirical study done in the future, which will be based on the questionnaire target for the organization.

Project Portfolio Success

In this case, the research design methodology will mainly seek to evaluate success in the overall project interdependencies according to the influences of the negative effects factors as well as the positive beneficial factors. The primary data questionnaire will seek to obtain information on what the different project managers feel are the positive beneficial effects factors which contribute to the success of the project as well as what are the negative effect factors that enhance its failure. Therefore, the research design methodology will mainly evaluate the following three (3) case study projects:

Medical Supplies and Equipment Project

The project interdependency management will evaluate the resource commitments, resource sharing, and attention that is given by the various project managers in ensuring that the relevant healthcare facilities in the UAE are well equipped with the stated medical supplies and medical equipment. In essence, the medical supplies and equipment project mainly depends on the completion of the Healthcare Information System project as well as the medical laboratory project.

Medical Laboratory Project

Similarly, this case study will evaluate the various resource commitments, resource sharing and the focus that is given by the project managers in ensuring that the relevant healthcare facilities in the UAE are well equipped with a medical laboratory facility. In this case, the medical laboratory project specifically depends on the completion of the healthcare information system and resources.

Healthcare Information Management System Project

Finally, this case study will also evaluate the financial, technological infrastructure as well as the human resource commitments that will be required by the various project managers working on the healthcare information management system in order to set up an effective healthcare information management system within the healthcare facilities found in the UAE. In essence, this project is systematically related to all the other healthcare facility projects such that the medical supplies and equipment project as well as the medical laboratory projects seem to depend on the healthcare information system project.

3.3 Research Design Methodology

To facilitate the realization of the objectives of the research, which in this case relate to the evaluation of how the enhancement of the effectiveness in the pooled project management, dependencies is able to increase the performance of the relevant project management within the healthcare sector in the UAE. This paper will utilize the stated two research design methodology approaches; the qualitative case study research approach and the quantitative research design methodology.

3.3.1 Qualitative Case Study Research Design

The research design will seek to analyze and observe the performance and the interdependencies within the three (3) main critical healthcare projects with respect to the enhancement of the overall project performance. In essence, the qualitative case study research approach will evaluate how the pooled interdependencies among the medical supplies and equipment project, the medical laboratory project as well as the healthcare information management system project is able to enhance the overall project performance within the healthcare sector in the UAE (Brandes & Erlebach, 2005).

In addition, based on the qualitative case study research methodology, this paper will analyze and observe the performance of each of the stated three (3) projects and therefore collect the relevant project information from the respective project managers, which will facilitate the determination of how the effectiveness in the pooled project interdependencies is likely to increase overall project performance. For instance, in this case, the qualitative case study research design will seek to collect the relevant information from each of the three (3) stated project managers with respect to the project resource sharing, and effectiveness of the communication among the three (3) project managers. It will also seek to collect project timings as well as consistencies of the project's goals and objectives (Creswell, 2013; Martinelli, Waddell & Rahschulle, 2014).

3.3.2 Quantitative Research Design

In this case, the quantitative research design will mainly seek to examine the effectiveness as well as the nature of the pooled interdependencies among the three (3) healthcare projects and therefore establish any significant relationship that will describe how the effectiveness in the pooled interdependencies among the three (3) healthcare projects is likely to

increase the overall project management performance. In addition, the stated quantitative research design methodology will also seek to quantify and attach numerical values to the various project deliverable variables that will define the overall project management performance within the UAE healthcare sector (Lester, 2014).

3.4 Research Methodology of the Conceptual Model

Justifying the conceptual model will require using a questionnaire to take the opinions of professionals. About the existence of the relationship between the organization learning practice and the performance of the project risk management in an organization, the questionnaire will be given to different companies in the UAE. It will also consider that the professionals who will participate in the question will come from different organizations, where these organizations will have different levels of organizational maturity.

3.5 Data Collection

This paper will mainly utilize the primary information which will be specifically collected from the population of all the healthcare facilities' project managers within the UAE. In essence, the relevant data that will be retrieved from the project managers will relate to the information pertaining to the extent of resource sharing, project co-ordination, communication aspects as well as the goal consistency among the three (3) different projects. In addition, the overall performance of the stated healthcare projects will also be assessed by collecting the project performance deliverables such as whether the stated projects were completed within the set deadline and budget.

The data pertaining to the extent of resource sharing, project co-ordination, communication will be collected using the primary data questionnaire, which will be designed

specifically in order to collect the stated primary data variable with respect to the extent of the project interdependencies and the overall project performance within the UAE healthcare sector. In this case, the primary data questionnaire will be sent to the respective companies through their primary email address, where the project manager will be required to fill in the questionnaire and return the document.

The following is an extract of the primary data questionnaire that will be administered to the various project managers that are in charge of the stated healthcare facility projects within the UAE.

1. How many different projects depend on the completion of the specific project that you are in charge?

- ○ One
- ○ Two
- ○ Three
- ○ None

2. How often do you interact with the project managers from the other dependent projects?

- ○ Daily
- ○ Weekly
- ○ Monthly
- ○ None of the above

3. Do you normally share the resources and the knowledge among the different projects?

4. Please choose the nature of the project interdependencies with respect

to output, market and the overall benefits of the stated project interdependencies.

- ○ Meetings
- ○ Gut-feelings and intuition
- ○ Diversity
- ○ Good organizational leadership

5. What form of project interdependency management do you normally employ?

- ○ Visual tools
- ○ Optimization models
- ○ Individual centered approaches
- ○ Group centered approaches

6. If soft practices are used, what tools do you normally employ in the management of the stated project interdependencies?

- ○ Focusing on certain individuals
- ○ Focusing on groups

8. In your opinion, in a scale of 1-7, what are the positive beneficial factors that contribute to the overall project interdependency success?

- ○ Sharing of knowledge
- ○ Cost savings
- ○ Sales increase.
- ○ Project scheduling and timing efficiency
- ○ Selection of compatible projects
- ○ Others

In addition, to the use of the information provided in the questionnaire, this research paper will also schedule face-to-face interviews with the relevant project managers in the three (3) case study projects within the UAE. In essence, the conduct of the face-to-face interview will mainly seek to supplement and clarify the relevant information that was obtained from the primary data questionnaire (Leedy & Ormrod, 2005; Saunders, Saunders & Thornhill, 2011)).

3.6 Sampling

This study will mainly make use of the selective non-probability sampling approach to attain the primary objectives in the paper. Based on the selective non-probability sampling approach, this research paper will mainly seek to collect the relevant data for this paper from 30 healthcare facilities that have undertaken the completion of the three (3) case study projects medical supplies and equipment project, medical laboratory project and the healthcare information system management project. The study engages the organizations so that they can provide adequate information which will comparatively provide a concise solution. This will be done to make sure that the data collected from these companies will be credible. Therefore, this paper will mainly use the available published project reports within the UAE to specifically sample the stated three (3) case study projects for evaluation and data collection.

3. 7 Validity and Reliability

In this case, research validity will be enhanced by ensuring that the main objective of the research as well as the research design is consistent with the relevant theoretical literature. In essence, research validity seems to have been enhanced in the research paper because of the

effectiveness of the enhanced project interdependencies with the overall project performance is mostly consistent with the relevant theoretical literature studies within the UAE.

In addition, internal validity in this study is also enhanced by the fact that the selected qualitative research approach is appropriately suited in the determination of the relationship of the effectiveness of the venture interdependencies(Bryman and Bell, 2011, p. 475). Moreover, internal validity for this study will also be enhanced by ensuring that the relevant data collected from the primary questionnaire and the face interviews is relevant in the measurement of the stated two study variables i.e. the effectiveness of the project interdependencies and the overall project performance within the UAE healthcare sector.

Finally, reliability in the study will be enhanced by ensuring that the primary data collected from the questionnaire accurately measures the stated study variables. In addition, reliability in the research paper will also be enhanced by supplementing the accuracy of the primary data questionnaire using the face-to-face interviews (Latevac, Rollins & Altwies, 2007).

3.8 Limitation of the Study and Ethical Considerations

The primary limitation in the study is that it would be very difficult and time consuming to locate the relevant healthcare projects within the UAE that have had experience with the stated three (3) projects relating to the medical supplies and equipment, medical laboratory project as well as the healthcare information system management project. The relevant ethical considerations in this research paper will be enhanced by guaranteeing that the critical and sensitive information from the three (3) case study projects will be kept confidential and will only be used for the purpose of the study.

4. Case Study Analysis

4.1 Semi-Structured Interview Procedure

As Easton (2010, p. 123) and Yin (2009, p. 11) contend that case study examination is fundamentally varied about the data that can be gathered. Nevertheless, as Yin (2009, p. 11) underscores, it is typically connected with qualitative data put together by means of interviews. For that reason, two primary sorts of interviews are recognized: standardized (structured) and non-standardized (semi-structured and inside and out). The main sort is utilized to accumulate data that will be subjected to quantitative examination. The second one is utilized for social event qualitative data, for example, in case study research (in the same place). Along these lines, Bryman and Bell (2011, p. 465) allude to this type as a qualitative interview. This method of an interview is less structured when contrasted with the standardized, it is more focused on the perspectives of the respondents as opposed to the worries of the researchers, it permits "going off at digressions" or withdrawing from the interview plan, which is very debilitated in standardized interviews. Case studies, and particularly various case studies (Bryman and Bell, 2011, p. 473), are normally connected with semi-structured interviews (Easton, 2010, p. 123).

Rungi (2009, p. 1510) additionally actualized semi-structure interviews while concentrating on PIs. Besides Saunders et al. (2012, p. 377) propose that semi-structured interviews suit well to exploratory and logical studies. Consequently, this strategy is received in our study. Semi-structured interviews as characterized by Bryman and Bell (2011, pp. 205, 467) and Saunders et al. (2009, p. 320) allude to the case where the analyst uses an interview guide with arrangement of inquiries, communicated when all is said in done terms, which request can be fluctuated in light of the setting of the interview. In this manner, interview guides for the portfolio and undertaking supervisors comprised of 11 general inquiries are produced. Just the

initial two basic inquiries somewhat vary from one another as to suit the part of the two groups of respondents. The inquiries were first sent to our contacts in the case organizations alongside a layout of the reason for the examination and input was looked for on their clarity and understandability. The point was to refine the inquiries and guarantee that they could be seen plainly by every one of the respondents. Both contacts had not recommended any adjustment, so the beginning inquiry as introduced in the interview aide were utilized. The initial two inquiries are presenting ones posed with the intention of acclimating ourselves with the respondents and their involvement with interdependent projects. Whatever remains of the inquiries are firmly identified with the built up hypothetical structure as showed in Figure below.

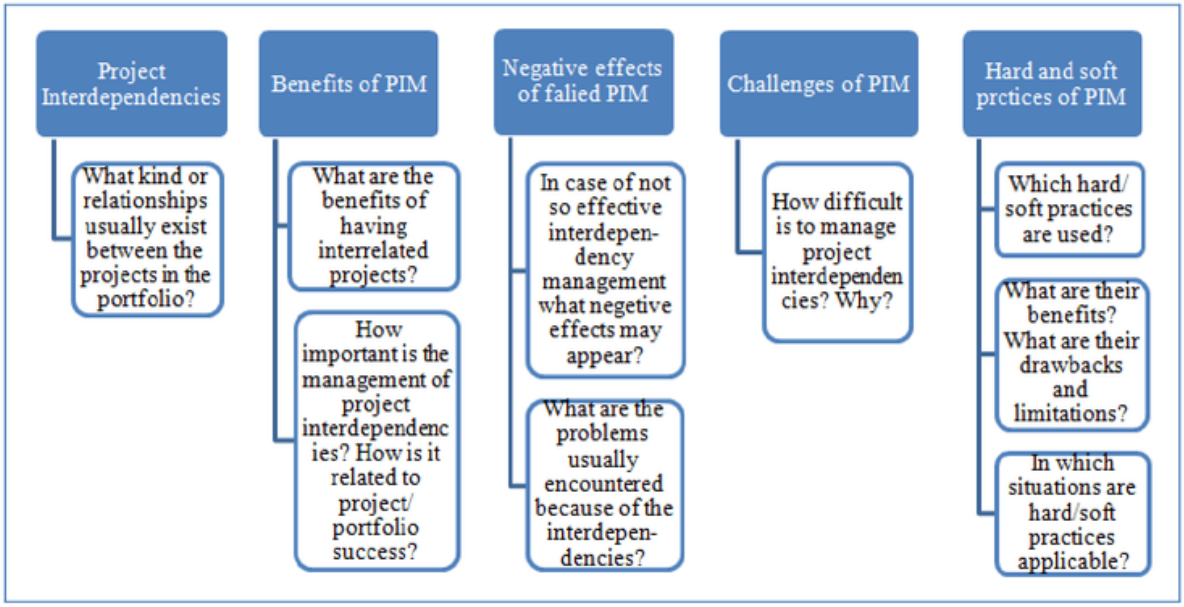

Figure 3. Hypothetical structure of project interdependencies

The interview procedure was adaptable (Bryman and Bell, 2011, p. 467) permitting assortment of rich empirical data (Eisenhardt and Graebner, 2007, p. 25). Respondents were

urged to talk unreservedly and share their experience and learning as they have witnessed. All the readied inquiries were asked in a comparable way, yet the adaptability to ask further inquiries in light of some essential for our study answers was likewise held (Anklam et al., 2005, p. 398). This kind of an interview configuration is of specific significance for our various case study plan as it permits us to present some structure required for cross-case likeness (Bryman and Bell, 2011, p. 467) while holding the adaptability to ask follow-up and examining questions. This would not have been conceivable in case we utilized top to bottom interviews that are non-order and casual neither structured interviews that are excessively unbending (Saunders et al. 2009, p. 321). We as researchers attempted to stay adjusted, not talking an excessive amount of or too less, and abstain from utilizing driving inquiries (Bryman and Bell, 2011, p. 475).

4.2 Interview Proceedings

In our study, we utilized internet-intervened interviews to spur the accuracy and efficiency of information. The concept was directed in a virtual situation through Skype. Consequently, they can be considered as synchronous or ongoing (Bryman and Bell, 2011, p. 659). The interviews took about 20 to 45 minutes. Just four interviewees could utilize web camera while we utilized web camera during every one of the interviews. The Researchers took an interest in the majority of the interviews, whereby each was asking question in a per-concurred succession. The subsequent meet-up probing inquiries were asked interchangeably. The interviews were recorded using Skype recording machines and were later translated.

The information on interview span and transcripts length is exhibited in Table 5. It ought to be noticed that the contact individual from case Organization Y was available during every one of the interviews completed in this organization. In the principal interview, the respondent was a dynamic (Respondent 4). Respondent four masterminded his interview in combination

with Respondent 5* who accepted they both had comparative opinions on the inquiries inquired. In this way, Respondent 5* did not effectively take part, but rather just contributed with a few remarks that he/she thought to be excluded by Respondent 4.

Table 1. Review analysis

Project	Respondent	Position	Years of experience	Interview duration, in	Transcribept, number of pages
X	Respondent1	Project manager	8	00:36:38	8
	Respondent2	Portfolio manager	13	00:34:26	7
	Respondent3	Portfolio manager	15	00:21:35	8
Y	Respondent4	Portfolio manager	7	00:44:22	8
	Respondent4*	Portfolio manager	n/a		
	Respondent6	Project manager	12	00:24:08	6
	Respondent7	Project manager	13	00:36:01	8
	Respondent8	Project manager	5	00:26:56	6

4.2.1 Limitation of Qualitative Interviews and Their Overcoming

Various issues are identified with qualitative interviews. Saunders et al. (2009, p. 326) outlines them as: generalizability, reliability, and types of bias. Because of the un-standardized nature of the interviews, the issue of unwavering quality emerges whereby it is addressed whether different interviewers would think of same results. Regarding generalizability, the case study data is observed to be difficult to be measurably summed up to the whole populace (Saunders et al. 2009, p. 327). Regarding predisposition, Saunders et al. (2009, p. 326) distinguish two sorts of predisposition: respondent and interviewer inclination. The interviewer inclination happens in case where the remarks, tone or the non-verbal conduct of the interviewers influences the reactions of the respondents. Besides, the predispositions or the hypothetical confirmation that the researchers have examined may likewise influence the interpretation of the

reactions. The methods we utilize in order to defeat the three previously stated interview downsides intently look like the moves we make in order to hold fast to the criteria for quality examination.

Regarding respondent bias, it might be brought about by the recognitions that respondents have about the interviewers. Due to the affectability of a topic, respondents may not will to uncover certain angles, giving a fractional photo of the phenomenon in this way. Eisenhardt and Graebner (2007, p. 28) contend further that interviews are frequently connected with data bias created by the cognizant consideration of the respondents on the impressions they pass on or the review sense making. Yin (2009, 132) includes self-reporting of the respondents which may not mirror the genuine reality, as another downside. In order to beat the respondent bias Eisenhardt and Graebner (2007, p. 28) proposes selecting informants that are educated about the phenomenon and that can see it from different points of view, for example, organizational actors from different various leveled levels. In this way, in our study we both include task and portfolio chiefs. Notwithstanding, we recognize that the vicinity of the contact individual in organization Y might have influenced the unwavering quality of the data. Regarding review sense making it is not saw that respondents had any difficulties to review their involvement in PIM.

The specific constraint of the interviews we led by using Skype as a mediating innovation, is that we were not generally ready to watch the non-verbal communication and perceive how the respondents respond in a physical sense to the inquiries. For instance, we were not generally ready to see uneasiness, puzzlement or perplexity (Bryman and Bell, 2011, p. 477). In any case, we paid consideration on the verbal reactions that would not have been conceivable if we directed the interviews in an offbeat situation by means of email for instance. Another

impediment of the Skype interviews can be identified with the specialized issues, for example, the cases when the line was poor and the respondents were not ready to hear us well or the other way around. In this case, we rehashed the inquiry or requested that the respondents rehash their answer. In any case, we did not encounter any significant issues with the association and we could record every one of the interviews in a far-reaching way. Another confinement of our concentrate especially is identified with the potential vicinity of dialect obstruction. Every one of the interviews were led in English, which is not a local dialect neither for the researchers nor for the respondents. The components utilized to conquer this confinement are explained in segment 5.4.

The disadvantage of our data accumulation strategy when all is said in done is that it depends just on the respondents' opinions as a wellspring of confirmation; though it is recognized that, the main quality of a case study is numerous sorts of data sources (Yin, 2009, p. 11) used to triangulate the findings. In spite of the fact that we interviewed both task and portfolio directors in order to give numerous points of view on the investigated phenomenon and attain data triangulation as defined by Guion et al. (2011, p. 2), still this kind of triangulation could be discovered constrained. We attempted endeavors to get one more wellspring of proof through organizational archives. However, the wellspring that we got was rejected because of privacy arrangements of the organizations. Nevertheless, we attempted to supplement this with investigator triangulation (in the same place) by having two researchers.

Table 2. Example of the Likert scale descriptions used in the survey

Variable : UPI project	**I am convinced that I have the right understanding of project interdependencies.**

5	I suggest am aware of all project interdependencies within the project portfolio
4	I suggest am aware of all project interdependencies within the project portfolio
3	I suggest am aware of all project interdependencies within the project portfolio
2	I am aware of few project interdependencies within the project portfolio
1	No, I think I am unaware of the interdependencies in the project portfolio

4.3 Data Analysis

As concurred by Bricki & Green (2007, p. 530), the main difficulties of qualitative exploration is the process of breaking down the unfathomable database such as the transcripts. As suggested by Anklam et al. (2005, p. 398), the data analysis was successful and this was attributed to the fact that we carried out a thorough and adequate representation of empirical findings. It is also important to have a cautious record of the meanings of the data. In order to seek after this creator recommends three general systems: "developing a case portrayal", "thinking about opponent clarifications" and "relying on hypothetical recommendations". In this study we will seek after the technique of "relying on hypothetical suggestions", which infers that the initial examination destinations and case study configuration are shelter the hypothesis based exploration address, the writing audit and created hypothetical structure to manage the exploration bearing (Danilovic & Browning, 2007, p. 310). The other two procedures according to Groenveld (1997, p. 49) are more suitable for expressive or simply explanatory studies.

The case study utilized the Cross-Case methodology, which investigates several projects to analyse the various interdependencies. The case is meant to develop a further understanding of the case, whereby the methodology is based on variables and case-situated circumstances. More

importantly, Cross-case examination accounts for proper qualitative examination. The creators explain that within case-arranged cross-case examination principal similitudes and steady relationship, and additionally deviations in findings are indicated and from that point accumulated to give a broader legitimization of the investigated matters. Yin (2003, p. 133) names this sort of investigation as a cross-case amalgamation and notes that examination of results here depends vigorously on reasonable and conceivable factious interpretation. In order to support heartiness of the examination Template investigation is utilized in this study as a scientific system to be taken after when analyzing gathered empirical data.

According to Groenveld (1997, p. 49), the format is a leveled rundown of some of the classifications and codes that mention the topics, which are uncovered from hypothetical foundation of the case study. The codes are definable as “the labels and marks that assign units in terms of meaning to the inferential as incorporated by the study.” The predefined codes of the study are progressive along the lines connected to the data units, which are intended to help and assist guideline investigations for the qualitative data (Bricki & Green, 2007, p. 530). As recommended by (Anklam et al., 2005, p. 398) of the predefined format in this study is guided by the hypothetical foundation gave in the writing survey segment, i.e. in view of the idea driven data categorizing (Saunders et. al., 2012, p. 558). The initial idea driven (on the same page) codes are "unmistakable" codes, which implies they involve minimum of interpretation and they depend on the ideas determined in the writing (Danilovic & Browning, 2007, p. 310).

The initial layout controls the procedure of data examination. While proceeding with the examination of the gathered data, the layout is modified and revised according to the findings. Units of data providing new pertinent confirmation to the examination address that cannot be attributed to the predetermined rundown of codes are allotted with new codes. Accordingly, in

this case data-driven arrangement is utilized (Saunders et. al., 2012, p. 573). In order to make the data-driven codes we utilize the "grounded" approach (Miles and Humerban, 1994, p. 58). Within this methodology, two-stage coding strategy recommended by Charmaz (2006, referred to in Saunders et al., 2012, p. 568) is utilized specifically. To start with, open coding is utilized to disaggregate unlabeled data into theoretical units and give them a code. These codes according to Danilovic & Browning (2007, p. 310) are "interpretative" as they get from the researchers exposition of respondents' answers. Second, engaged coding is connected to reassess the coded data and break down whether the initially created codes can be credited to bigger units of these data (in the same place, p. 569). Analyzing interview transcripts within format examination system involves likewise elimination of repetitive codes in cases where significant pieces of data are not perceived. The various leveled order of the initial layout is not changed during the format modification.

Saunders et al. (2012, p. 572) state this methodology combines both deductive and inductive angles since predetermined classes from initial format (deductive aspect)can be corrected according to data investigation suggestions and new findings (inductive viewpoint). Along these lines, King (1998, referred to in Saunders et al., 2003, p. 397) recommends that format examination might be useful in identifying new research bearings and new issues of the topic that the researchers did not have intention to focus on in the beginning of their exploration venture. This diagnostic system is plainly in line with a crossbreed research approach, sought after in this study. According to Cassel and Simon (2004, p. 257) Template examination works particularly well when is utilized with the motivation behind getting insight from different viewpoints on a specific topic or substance, which is in line with our choice to interview both portfolio and venture administrators (Easton, 2010, p. 123).

4.4 Criteria for Qualitative Research

Since it is insufficient to case that all around completed examination will prompt great conclusions, criteria for judging the nature of the study and the findings ought to be introduced (Bricki & Green, 2007, p. 530). Saunders et al. (2003, p. 100) for instance, propose dependability and legitimacy as the most prominent criteria in business and administration research largely. Anklam et al. (2005, p. 398) contend that these two criteria are likewise significant for qualitative exploration specifically, yet that their application requires some change in qualitative terms. Guba and Lincoln (1994, p. 112) give this alteration by proposing trustworthiness and legitimacy as criteria. In our study we stick to five main viable criteria recommended by Miles and Huberman (1993, p. 277) that are esteemed by these creators to be appropriate to a qualitative examination and basic realist custom. These researchers, while naming the criteria, they match the more conventional terms with the "more suitable options for assessing the "trustworthiness" and "genuineness" of sociology examination. Along these lines, they appear to provide a practical outline of the criteria proposed by different creators in the writing.

4.4.1 Objectivity/Conformability

This criterion intends to guarantee lack of bias of researchers and that the study is free of unacknowledged bias. We attempt to satisfy these criteria in the way Danilovic & Browning, (2007, p. 310) recommend that by acquainting ourselves with the topic through writing survey, remaining unbiased during the interview process, demonstrating mindful listening, and by being delicate to the social differences that may exist among project managers in UAE. The involvement with the society and dialect of UAE helps us to see some socially specific meanings. We attempt to defeat this constraint by setting an English familiarity basis for the

determination of respondents. Besides, we test our understanding and give synopses of the clarifications given by the respondents (Saunders et al., 2009, p. 328).

The utilized interview shape that permits us to test a few meanings that are thought to be socially specific or misunderstood. Having two researchers from the biomedical engineering field present all through the examination handle additionally adds to the objectivity of the findings. In line with the contention by Bricki & Green (2007, p. 530) regarding the interpretative component in sociology research, we unequivocally recognize that the findings may be liable to twofold hermeneutics, whereby the dialect hindrances and our biases molded by the looked into writing may have added to this. Every one of the interviews are deciphered and chance to peruse the transcripts in order to verify the information is given to respondents. We additionally give unequivocal and subtle element depiction of our strategy and methods.

4.4.2 Reliability and Accountability

This criteria means to guarantee that the study is predictable, stable after some time, and crosswise over strategies enabling different researchers to think of comparable results. Therefore, we recognize that the aftereffects of our study are not intended to be rehashed since we trust they mirror the truth now they were collected (Danilovic & Browning, 2007, p. 310). In any case, we give point-by-point notes of our exploration approach and the reasons underpinning it within segments 4 and 5 on the Methodology and Research Design that can be alluded to by different examines (Anklam et al., 2005, p. 398). The interviews were completed according to semi-structured interview guide and interview system explained in segment 5.2.4. The interview inquiries were investigated by our theory manager and by the contact persons in the case organizations. In order to maintain a strategic distance from respondents' bias, educated respondents were chosen as explained in area 5.2.5. We, both researchers, were involved in the

exploration procedure and we were normally coming up with comparable interpretation of the data confirming its unwavering quality. Providing the respondents with the interview questions ahead of time to permit them to get ready additionally adds to the unwavering quality of the study (Saunders et al., 2009, p. 328). Moreover, every one of the respondents were recorded using various apparatuses: Skype recording application and advanced mobile phone Dictaphone in order to stay away from danger of information misfortune. The recorded interviews and important interview transcripts were sorted out and stored as an electronic database.

4.4.3 Authenticity and Internal Validity

This foundation questions whether the study findings bode well, whether they are valid and bona fide. We trust that the gave thick portrayal of the foundation of our exploration and in addition the converging conclusions inferred taking into account the data interpretation by the two researchers, fulfill this standard. During data examination and talk, the empirical data is linked to the classes of earlier hypothesis (Miles and Huberman, 1994, p. 279), further contributing to this measure. Moreover, the finishes of the exploration are imparted to the contact persons as original informants from the case organizations.

4.4.4 Transferability and External Validity

This measure tries to reveal the degree to which investigate findings can be summed up (Saunders et al., 2003, p.102). As expressed in area 4.2.1.4, the generalizability of these study findings are liable to expository speculation whereby the examination findings are linked to the hypothesis. In line with the basic authenticity position, this model inquiries the "activity capacity" of the examination i.e. the study's hypothetical and reasonable commitment. We trust that with this study we increase the level of understanding of PIM for every gathering and bring

issues to light about its significance. We additionally give managerial ramifications where we talk about the significance of our findings for the managerial and the scholastic group of audience.

4.5 Findings and Discussion

4.5.1 Findings and Discussion: Research Avenue 1 - Visual Project Mapping

4.5.2 Ease of Interpretation of the Maps

We utilized the data from the input sessions so that we can gather information from four topics: the simplicity of map interpretation, members' capacity to attain insights from the maps, the members' perspectives of the advantages they might have the capacity to benefit from VPM as well as their thoughts on the usage and utilization of the VPM. The inquiries were expressed toward the start of the program as a feature of an audit of the points of the exploration and the mode of the criticism session. A significant part of the unconstrained criticism from members tended to these inquiries and further input were realized by posing the inquiries again in a semi-modified interview group to the end of the input sessions. Input from the four topics is displayed in Sections 5.1.1–5.1.4.

VPM shows circles for every task and arrows which indicate the extend which relies on another venture. A few elders in the society realized the depiction of the course of the bolt not intuitive. The rationale we utilized took after traditions of SNA in the sense that the bolt points to the hub that is relied on, which is as opposed to the customary stream charting traditions where the bolt points the other way. As pointed stones have a bigger visual effect, we received the SNA approach since it makes it less demanding to identify projects that have numerous awards. After an explanation of the traditions, the elders realized the rationale and suggeted that they could

analyse the maps precisely. The portfolio director [p1] at the main department [Dpt1] could see "stream designs from the data that were anything but difficult to interpret" [Dpt1p1]. The high-ranking leaders at Dpt2 shouted that the maps gave the capacity to "see the associations and where the work should be finished. It is similar to moving from a 2D to a 3D picture!" and remarked further, "it adds worth to me and I can see (the connections) which I had not seen some time recently. You can see the associations that is fantastic" [Dpt2p1].

VPM showcases were displayed using distinct levels of filtering and a scope of different choices, for example, the utilization of shading, the span of undertaking circles, and the expansion of documentations. While the members valued the upsides of the different showcase alternatives, each recognized that the best sort of presentation would rely on upon every individual circumstance. Administrators at Dpt1 recommended that if departments were employing on VPM consistently it is better to receive a couple of standard arrangements for the maps to be interpreted rapidly and effectively.

4.5.3 Insights from the Maps

Both department s discovered new insights through viewing their task interdependencies VPM design. Bunches of interdependencies uncovered by maps gave some capable insights, which were not clear using different techniques. The new insights elucidated the relative significance of the projects taking into account reliance bunches and chains and incited activity on an ongoing task issue in Dpt2. A portion of the insights came about because of the maps presenting information in another way, making associations less demanding to get a handle on ("there is a woods of information within task portfolios and the system maps permit you to see the 'value for money'" [Dpt1p1]). Different insights originated from the data which was gathered from the undertaking directors and providing data not beforehand accessible ("We have new

information accessible here, that has not existed before to help us settle on choices and justify activities" [Dpt2p2]).

Another chief remarked, "I will let you know this brings conditions out to the light, and gives me a superior thankfulness (of the conditions)" [Dpt1p3] and "the maps permit bottlenecks to be anticipated within projects and outer to projects, and take into consideration the prioritization of projects to demonstrate the dangers in following through with a choice" [Dpt1p3]. Members likewise identified general insights, with the maps to provide a valuable remedy to the passage vision, which is attribute by the increasing specialization in the workforce. In the increasingly specialized and complex task environment, specialization is vital, yet it can restrain key vision. Members felt the maps served to "contextualize the information" and give a dream over the specializations [Dpt2p1].

4.5.4 Implementation of VPM

Administrators reported that the utilization of VPM on an ongoing premise in a department displayed some potential difficulties. Ensuring that the advantages exceeded the exertion would require more profound investigation [Dpt2p2]. As this exploration was the first run through the methodology was trialed in a departmental setting, the formation of VPM displays required additional time than would most likely be required if actualized on an ongoing premise. In any case, it was not within the extent of the examination to attempt to foresee the ongoing level of exertion that would be required. Another test referred to by the members was identified with the dynamic way of venture portfolios. The technique for data gathering utilized for the examination has produced a depiction of the undertaking portfolio at a given point in time; in any case, directors at both departments concurred that developing a strategy to

frequently invigorate the data to mirror the dynamic portfolio would be considerably more valuable.

4.5.5 Discussion: Research Avenue 1 - Visual Project Mapping:

The two departments' encounters give initial insights into how to build initial representations using a system mapping methodology, and how to interpret and utilize such representations. The qualitative findings from the input sessions indicated that the VPM shows illuminated the connections in the middle of projects and gave new insights to the abnormal state portfolio partners at the two departments. By highlighting the most vital projects as far as their amassed interdependencies, and by revealing groups of interdependence, the VPM investigation gave significant information about the relative influence and significance of projects that would not be promptly obvious through customary strategies for analyzing venture interdependencies. Directors at both departments felt that advantages from using the maps would be achievable from their utilization as choice making and specialized tools. Albeit both departments were entirely positive about the maps general, Managers at Dpt2 were especially eager and specific about the advantages, particularly as a tool for informing key administration choices.

The findings adjust to and develop existing examination. For instance, the remarks by administrators at Dpt1 – regarding the need to embrace a couple of standard VPM arranges so that the maps could be rapidly and effortlessly interpreted – take after basic PPM approaches where layouts and standard departments for diagrams and portfolio maps are produced and received to help with examination and correlation (Cooper et al., 2001; Loch, 2000). In another case, the remark by Dpt2p1 that viewing a VPM presentation was similar to going from "2D to 3D" adjusts to writing that recommends that a very much outlined information representation in 2D is more than a 2D representation. This is because of its influence to give rich information

(Warglien, 2010). Notably, the combination of PC produced visual data shows and the human psychological capacity to examine and find designs using the visual representations recommended as a standout amongst the most effective and adaptable subjective frameworks (Tergan and Keller, 2005). This examination gives a sample of this combination and findings that show the manner in which human psychological abilities are upheld and upgraded.

Questions remain unanswered on the manner in which departments can actualize VPM on an ongoing premise. Our findings underscore the requirement for choices about the source to gather the data, the technique for data accumulation, and the fitting recurrence of data gathering. The findings enforce the writing that underscores the requirement for more research showing how the data presentations are utilized as a part of practice. The risk of static bias (Warglien and Jacobides, 2010) was recognized in the criticism, as members investigated approaches to beat the constraints of a single guide in representing a dynamic portfolio. The findings likewise adjust to writing on other visual representations utilized for PPM and vital choice making (Loch, 2000; Platts and Tan, 2004), and indicate that departments need to consider the showcase alternatives and the specific advantages coveted and afterward outline a customized approach.

4.6 Findings and Discussion: Research Avenue 2 - Factors affecting UPI

4.6.1 Data Analysis

We examined the data to investigate connections R1 and R2 in the calculated model in Figure 2. The relationship R3, in the middle of understanding project interdependencies (UPI) and PPM execution, could not be tried in this initial study with just two departments. The venture culture and process variables grouped into the three builds identified in Table 3. UPI4, a develop containing four factors identified with the level of UPI; CUL5, a build containing five things relating to the way of life, for example, levels of trust to bolster the sharing of information in the

undertaking environment; and PROC5, a build containing five things relating to the procedures used to catch and share venture information.

Table 2. Statistical analysis of the interdependencies from the case study

Variable Name	**Construct name and components** (in bold)			**Descriptive statistics**	
	UPI4 Cronbach alpha 0.743	**CUL5** Cronbach alpha 0.840	**PROC5** Cronbach alpha 0.887	Mean	Std. dev.
UPI project	**.711**			3.90	0.912
UP Depend	**.764**			4.00	0.879
UP They Depend	**.709**			3.71	1.043
Continuity	**.510**			2.98	0.934
Access Data		**.786**		3.30	0.607
Learn Mistakes		**.604**	.483	3.26	0.788
Trust		**.762**		3.65	0.758
Trust Port	.472	**.584**		3.58	1.011
Discuss Weak		**.806**		3.24	0.916
Process Project Perf1			**.848**	3.87	0.870
Transfer			**.835**	3.46	0.999
Capture Review			**.722**	3.55	1.066
Capture Milestone			**.838**	3.55	1.119
Informal Transfer			**.788**	3.69	0.905

Interestingly, the variable for Continuity was included in the UPI4 though it might have been relied upon to adjust to the CUL5 build. This indicates continuity among task supervisors might be especially firmly adjusted to their level of understanding of undertaking interdependencies. Table 4 identifies the connections between the identified builds and highlights the connections R1 and R2 from the calculated model in Figure 2. While both are significant

connections, R1 is more grounded than R2, indicating that for this study the way of life (CUL5) has a more grounded relationship with the level of UPI (UPI4) than the procedures and strategies utilized (PROC5). The relationship in the middle of CUL5 and PROC5 is likewise appeared on table 4.

Table 3. Relationship of the interdependencies

Construct	Mean	Std. Dev.	1. UPI4	2. CUL5	3. PROC5
1. UPI4	3.63	0.925	-		
2. CUL5	3.426	0.835	0.586 (R1) (0.000)	-	
3. PROC5	3.64	1.022	0.404 (R2) (0.002)	0.350 (0.010)	-

4.6.2 Discussion: Research Avenue 2 – Factors affecting UPI

The findings uncover that both the procedures and the projects culture are related with the level of understanding of venture interdependencies, and that a task culture that is described by trust and advances information sharing might have an especially solid influence. The findings highlight that the tools and forms and the venture society and environment are both critical factors in a department understanding of task portfolio interdependencies. This finding underpins other exploration that accentuates the solid relationship of society and environment with PPM results, and alerts against an attention on procedures and tools in disconnection (Christiansen and Varnes, 2008).

5. Conclusion and Future Research

This examination adds to and broadens past studies in two territories: the utilization of visual representations to bolster key choice making, and the improvement and use of strategies and tools for the administration of task interdependencies. Notwithstanding the commitments to

these assortments of exploration and writing, the findings likewise give direction to experts of PPM. It is largely acknowledged that departments need to comprehend the interdependencies between projects in order to deal with their task portfolios in a vital way. We have depicted two departments' encounters with applying another method for outwardly representing data to bolster choice making, and we have tried a theoretical model of the understanding of venture interdependencies. This exploration has created insights into how departments might have the capacity to enhance their understanding of venture interdependencies through two roads of investigation.

To begin with, we tried the utilization of VPM, a system mapping approach for the representation of task interdependencies to bolster choice making. Findings indicate that VPM offers insights that can enhance understanding, and that it can possibly give advantages by providing backing to key choice making and as a specialized tool. Second, we investigated the connections in a proposed calculated model on factors influencing projects understanding of task interdependencies. The findings highlight the significance of both culture and handle, and propose that the way of life factors might have more influence than the procedure factors on an department's understanding of undertaking interdependencies. We accentuate this is an exploratory study involving two departments. Further research with different departments and industries is required to verify or amplify these findings and refine insights into the factors that influence a department's understanding of venture interdependencies.

In conclusion, this exploratory examination has introduced venture system mapping as a representation system for understanding the interdependencies in portfolios. Our study indicates that system mapping has potential as a tool to help with PPM and backing vital portfolio choice making; in any case, the outcomes likewise highlight that the culture and environment might be

more vital than the tools and procedures. While seeking the best techniques and tools to execute, they should likewise guarantee that the culture and the undertaking environment bolster the between-task correspondence and the catch and sharing of data that is required for better understandability of venture interdependencies.

Reference Lists

Albright, R.E., Nelson, B., 2004. Product and technology mapping tools for planning and portfolio decision making, in: Belliveau, P., Griffin, A., Somermeyer, S.M. (Eds.), The PDMA Toolbook 2 for New Product Development. John Wiley & Sons Inc, Hoboken, pp 397–434.

Anklam, P., Cross, R., Gulas, V., 2005. Expanding the field of vision. The Learning Department, 12(6), 539–551.

Ameemi, H. T. (2011). *A study of project managers' competence standards in the UAE.* Dubai: The British University in Dubai.

Anklam, P., Cross, R., & Gulas, V. (2005). Expanding the field of vision. *The Learning Organization, 12(6)*, 539-51.

Archer, N.P., Ghasemzadeh, F., 1999. An integrated framework for project portfolio selection. International Journal of Project Management, 17(4), 207–216.

Aritua, B., Smith, N.J., Bower, D., 2009. Construction client multi-projects – A complex adaptive systems perspective. International Journal of Project Management, 27, 72–79.

Artto, K.A., Dietrich, P.H., Nurminen, M.I., 2004. Strategy implementation by projects, in: Slevin, D.P., Cleland, D.I., Pinto, J.K. (Eds.), Innovations: Project Management Research 2004. Project Management Institute, Newtown Square, PA, pp 103-122.

Babbie, E. (2015). *The practice of social research*. Cengage Learning.

Bergeron, D. (2007). The potential paradox of organizational citizenship behavior: Good citizens at what cost? . *Academy of Management Review, 32(4)*, 1078-95.

Blecic, I., Cecchini, A., & Pusceddu, C. (2008). Constructing strategices in strategic planning: A decision support evaluation model. *Operational Research, 8(2)*, 153-66.

Brady, T., & Davies, A. (2004). Building project capabilities: From explanatory to exploitative learning. *Organization studies, 25(9)*, 1601-21.

Brandes, U., & Erlebach, T. (2005). *Network analysis: Methodological foundations*. Berlin: Springer.

Bricki, N., & Green, J. (2007). A guide to using qualitative research methodology.

Bryman, A., & Bell, E. (2015). *Business research methods*. Oxford university press.

Blau, G.E., Pekny, J.F., Varma, V.A., Bunch, R.R., 2004. Managing a portfolio of interdependent new product candidates in the pharmaceutical industry. Journal of Product Innovation Management, 21, 227–245.

Borgatti, S., 2002. NetDraw: Graph Visualization Software, Analytic technologies. Harvard, MA.

Bradley, J.A., Yassine, A.A., 2006. On the use of network analysis in product development teams. ASME 2006 International Design Engineering Technical Conference (DETC) and 18th International Conference on Design Theory and Methodology (DTM), Philadelphia, 231–242.

Brady, T., Marshall, N., Prencipe, A., Tell, F., 2002. Making sense of learning landscapes in project-based organisations. Third European conference on organizational knowledge, learning and capabilities, Athens, 1-12.

Bresciani, S., Eppler, M.J., 2010. Choosing knowledge visualizations to augment cognition: the manager's view. Information Visualisation (IV), 2010 14th International Conference on Information Visualisation. London, 355–360.

Bridges, D.N., 1999. Project portfolio management: Ideas and practices, in: Dye, L.D., Pennypacker, J.S. (Eds.), Project Portfolio Management: Selecting and

Prioritizing Projects for Competitive Advantage. Center for Business Practices, Havertown, PA.

Browning, T.R., 1998. Use of dependency structure matrices for product development cycle time reduction, Fifth ISPE International Conference on Concurrent Engineering: Research and Applications, Tokyo, Japan, 1998, 1–8.

Burgelman, R.A., 1991. Intraorganizational ecology of strategy making and organizational adaptation: Theory and field research. Organization Science, 2, 239–262.

Cooper, D. R., Schindler, P. S., & Sun, J. (2006). *Business research methods* (Vol. 9). New York: McGraw-hill.

Cleland, D. I., & King, W. R. (2008). Managing project interfaces- Key points for project success. In P. W. Morris, *Project Management Handbook, Second Edition* (pp. 407-46). New York, NY: John Wiley & Sons.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Christensen, C.M., 1997. Making strategy: Learning by doing. Harvard Business Review, Nov-Dec, 141–156.

Christiansen, J.K., Varnes, C., 2008. From models to practice: decision making at portfolio meetings. International Journal of Quality & Reliability Management, 25, 87–101.

Cleland, D.I., 1999. The strategic context of projects, in: Dye, L.D., Pennypacker, J.S. (Eds.), Project Portfolio Management: Selecting and Prioritizing Projects for Competitive Advantage. Center for Business Practice, Havertown, PA.

Dahlgren, J., Söderlund, J., 2010. Modes and mechanisms of control in Multi-Project Organisations: The R&D case. International Journal of Technology Management, 50(1), 1–22.

Danilovic, M., Browning, T.R., 2007. Managing complex product development projects with design structure matrices and domain mapping matrices. International Journal of Project Management, 25, 300–314.

Danilovic, M., Sandkull, B., 2005. International journal of project management, 23, 193–203. Dansereau, D.F., Simpson, D.D., 2009. A picture is worth a thousand words: The case for graphic representations. Professional Psychology: Research and Practice, 40(1), 104–110.

Darvish, M., Yasaei, M., Saeedi, A., 2009. Application of the graph theory and matrix methods to contractor ranking. International Journal of Project Management, 27, 610–619.

Davies, A., Brady, T., 2000. Organisational capabilities and learning in complex product systems: Towards repeatable solutions. Research Policy, 29(7-8), 931–953.

Dickinson, M., Thornton, A., & Graves, S. (2006). Technology portfolio management: Optimizing interdependent projects over multiple time periods. *IEEE Transactions on Engineering Management, 48(4)*, 518-27.

Dinsmore, P.C., 2006. The Right Projects Done Right! From Business Strategy to Successful Project Implementation. Jossey-Bass, San Francisco, CA.

Durant-Law, G.A., 2012. Network project management: Visualising collective knowledge to better understand and model a project-portfolio. Doctor of Philosophy Thesis, Faculty of Business and Government, The University of Canberra, Canberra.

Eilat, H., Golany, B., & Shtub, A. (2006). Constructing and evaluating balanced portfolios of R&D projects with interactions: A dea based methodology. *European Journal of Operational Research, 172*, 1018-39.

Elonen, S., & Artto, K. (2002). Problems in managing internal development projects in multi-project environments. *International Journal of Project Management, 21*, 395-402.

Engwall, M., & Jebrant, A. (2003). The resource allocation syndrome: The Prime challenge of multi-project management? *International Journal of Project Management, 21(6)*, 403-9.

Forrester, J. (1992). *System dynamics, systems thinking and soft OR.* Cambridge, MA: Massachusetts Institute of Technology.

Glaser, B. G., & Strauss, A. L. (2009). *The discovery of grounded theory: Strategies for qualitative research*. Transaction Publishers.

Griffin, R., & Moorhead, G. (2010). *Organizational behavior: Managing people and organizations.* Sydney, Australia: South-Western/Cengage Learning.

Groenveld, P., 1997. Roadmapping integrates business and technology. Research Technology Management, 40, 48–55.

Hanneman, R.A., Riddle, M., 2005. Introduction to Social Network Methods. University of California, Riverside (published in digital form at HYPERLINK "http://faculty.ucr.edu/~hanneman/" \h http://faculty.ucr.edu/~hanneman/), Riverside, CA.

Harrison, F., & Lock, D. (2004). *Advanced project management: A structured approach.* Aldershot, England: Gower.

Havinal, V. (2009). *Management and enterpreneurship.* New Delhi: New Age International.

Jeffery, M., Leliveld, I., 2004. Best practices in IT portfolio management. MIT Sloan Management Review, 45(3), 41–49.

Jonas, D., 2010. Empowering project portfolio managers: How management involvement impacts project portfolio management performance. International Journal of Project Management, 28, 818–831.

Kahn, K.B., Barczak, G., Moss, R., 2006. Perspective: Establishing an NPD best practices framework. Journal of Product Innovation Management, 23(2), 106–116.

Kernbach, S., Eppler, M.J., 2010. The use of visualization in the context of business strategies: An experimental evaluation. Information Visualisation (IV), 2010 14th International Conference on Information Visualisation. London, 349–354.

Kerzner, H., 2004. Advanced Project Management: Best Practices on Implementation. John Wiley and Sons, Hoboken, NJ.

Killen, C., & Kjaer, C. (2012). Understanding project interdependencies: Exploring the role of visual. *International Journal of Project Management* .

Killen, C., Krumbeck, B., Kjaer, C., & Durant-Law, G. (2009). Managing project interdependencies: Exploring new approaches. *School of Systems, Management and Leadership*, 1-8.

Koontz, H., & O'Donnell, C. (1974). *Essentials of management.* New York, NY: McGraw Hill.

Krumbeck, B., & Killen, C. (2010). *A system dynamics approach for strategic analysis of project portfolio interdependencies.* OPUS .

Kumar, S., & Phrommathed, P. (2005). *Research methodology* (pp. 43-50). Springer US.

Laslo, Z. (2010). Project portfolio management: An integrated method for resource planning and scheduling to minimize planning/scheduling- dependent expenses. *International Journal of Project Management, 298*, 609-18.

Leedy, P. D., & Ormrod, J. E. (2005). Practical research. *Planning and design, 8*.

Lester, A. (2014). *Project management, planning, and control: managing engineering, construction, and manufacturing projects to PMI, APM, and BSI standards.* Oxford: Butterworth-Heinemann.

Letavec, C., Rollins, S., & Altwies, D. (2007). *Program management professional (PgMP): A certification study guide with best practices for maximizing business results.* New York, NY: J Ross Publishing.

Martinelli, R., Waddell, J., & Rahschulte, T. (2014). *Program management for improved business results.* New York, NY: John Wiley and Sons.

Moersidik, S., Arifin, S., Soesilo, E., Hartono, M., & Latief, Y. (2015). Project portfolio management to increase PDAM Tirtawening's service coverage area. In C. A. Brebbia, *Water Resources Management VIII* (pp. 65-73). Southampton, UK: WIT Press.

Morris, P. G. (2008). Managing project interfaces- Key points for project success. In D. Cleland, & W. King, *Project management handbook, Second Edition* (pp. 407-46). New York, NY: John Wiley and Sons.

Neuman, W. L. (2005). *Social research methods: Quantitative and qualitative approaches* (Vol. 13). Boston: Allyn and Bacon.

Platje, A., Siedel, H., & Wadman, S. (1994). Project and portfolio planning cycle: Project-based managemnet for the multi-project challenge. *International Journal of Project Management, 12(2)*, 100-6.

Rocha, S. (2004). Has anyone said "ethics"?"Safety" of beneficiaries? Some considerations about info gathering in the field. *Analysis and Advocacy Unit, MSF B*.

Rungi, M., & Hilmola, O.-P. (2011). Interdependency management of projects: Survey compariosn between Estonia and Finland. *Baltic Journal of Management, 6(2)*, 146-62.

Saunders, M. N., Saunders, M., Lewis, P., & Thornhill, A. (2011). *Research methods for business students, 5/e*. Pearson Education India.

Schindler, M., & Eppler, M. J. (2003). Harvesting project knowledge: A review of project learning methods and success factors. *International Journal of Project Management, 21(3)*, 219-28.

Sterman, J. (2000). *Business dynamics: Systems thinking and modelling for a complex world.* New York, NY: McGraw Hill.

Talloo. (2007). *Business organization and management.* New York, NY: McGraw Hill.

Taveska, F., & Toropova, O. (2013). *Managemnet of project interdependencies in a project portfolio.* Umea: Umea School of Business and Economics.

Teller, J., & Kock, A. (2012). An empirical investigation on how portfolio risk management influences project portfolio success. *International Journal of Project Management, 31(6)*, 817-29.

Tiwana, A. (1999). *The knowledge management toolkit.* Upper Saddle River, NJ: Prentice Hall.

Verbano, C., Nosella, A., Venturini, K., & Turra, F. (2009). Addressing R&D investment decisions: A critical review and comparison of R&D project selection methods. *Proceedings of the 4th European Conference on Enterpreneurship and Innovation* (pp. 536-543). Reading, UK: Academic Conferences Limited.

Walker, A. (2015). *Project managemnet in construction.* New York, NY: John Wiley and Sons.

Zika-Viktorsson, A., Sundstrom, P., & Engwall, M. (2006). Project overload: An exploratory study of work and management in multi-project settings. *International Journal of Project Management, 24(5)*, 385-94.